IEEE-ISTO
Industry Standards and Technology Organization
affiliated with the IEEE and the IEEE Standards Association

1

2

3

4

The Printer Working Group
Internet Printing Protocol (IPP):
Document object

A Program of the IEEE-ISTO
pwg

Draft 0.4 for 5100.5-2002

October 14, 2002

24

25

26

The Printer Working Group Standard for Internet Printing Protocol (IPP): Document Object

30

31

32

33

Abstract: This IPP specification extends the IPP Model and Semantics [RFC2911] object model by defining a Document object. The [RFC2911] Job object is extended to contain one or more Document objects which are passive objects operated on by the Job. The Document object is created by the [RFC2911] Send-Document and Send-URI operations and represents an Input Document to the Job. This specification also adds a Document Attributes group (and tag) to these Send-Document and Send-URI requests. The Document Attributes group contains any Document Template attributes to be applied to this Document object being created, overriding any corresponding Job Template attribute supplied at the job level (including the "document-overrides" operation attributes at the Job or Document level). A new Create-Document operation allows a client to supply the Document Attributes without the data (like Create-Job does for a Job object). Then the client sends the data content to that Document object using the new Send-Data operation. The client can also supply Document Attributes with the existing Send-Document and Send-URI operations to create Document objects with content data or a document reference, respectively.

This specification also defines seven new operations for Document objects once they have been created: Cancel-Current-Document, Cancel-Document, Get-Document-Attributes, Get-Documents, Delete-Document, Set-Document-Attributes, and Validate-Document.

This specification also lists all of the attributes defined in other IPP specifications to show their relationship to corresponding attributes defined in this IPP specification for use with the Document object. The full semantics of the "document-state", "document-state-reasons", and "document-state-message" Document Description attributes are given along side of the corresponding [RFC2911] "job-state", "job-state-reasons", and "job-state-message" Job Description attributes.

The purpose for specifying the Document object is so that the print industry can have a common semantic specification for use in IPP, the PWG Semantic Model, the PWG Print Service Interface (PSI) project, and the Free Standards Group Job Ticket API which all have a Document object.

This document is available electronically at:

ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/IPP-document-object.pdf, .doc, .rtf

60

61

90 **About the IEEE-ISTO**

91

92 The IEEE-ISTO is a not-for-profit corporation offering industry groups an innovative and flexible operational forum
93 and support services. The IEEE-ISTO provides a forum not only to develop standards, but also to facilitate activities
94 that support the implementation and acceptance of standards in the marketplace. The organization is affiliated with
95 the IEEE (http://www.ieee.org/) and the IEEE Standards Association (http://standards.ieee.org/).

96

97 For additional information regarding the IEEE-ISTO and its industry programs visit http://www.ieee-isto.org.

98
99

100 **About the IEEE-ISTO PWG**

101 The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and Technology Organization
102 (ISTO) with member organizations including printer manufacturers, print server developers, operating system
103 providers, network operating systems providers, network connectivity vendors, and print management application
104 developers. The group is chartered to make printers and the applications and operating systems supporting them
105 work together better. All references to the PWG in this document implicitly mean "The Printer Working Group, a
106 Program of the IEEE ISTO." In order to meet this objective, the PWG will document the results of their work as open
107 standards that define print related protocols, interfaces, procedures and conventions. Printer manufacturers and
108 vendors of printer related software will benefit from the interoperability provided by voluntary conformance to these
109 standards.

110 In general, a PWG standard is a specification that is stable, well understood, and is technically competent, has
111 multiple, independent and interoperable implementations with substantial operational experience, and enjoys
112 significant public support.

113 For additional information regarding the Printer Working Group visit: http://www.pwg.org

114
115

116 **Contact information:**

117   IPP Web Page: http://www.pwg.org/ipp/
118   IPP Mailing List: ipp@pwg.org

119 To subscribe to the ipp mailing list, send the following email:
120   1) send it to majordomo@pwg.org
121   2) leave the subject line blank
122   3) put the following two lines in the message body:
123   subscribe ipp
124   end

125 Implementers of this specification are encouraged to join the IPP Mailing List in order to participate in any
126 discussions of clarifications or review of registration proposals for additional names. Requests for additional media
127 names, for inclusion in this specification, should be sent to the IPP Mailing list for consideration.
128

128 # Contents

Table of Tables

Table of Figures

245 1 Introduction and Summary

246 **Abstract:** This IPP specification extends the IPP Model and Semantics [RFC2911] object model by defining a
247 Document object. The [RFC2911] Job object is extended to contain one or more Document objects which are
248 passive objects operated on by the Job. The Document object is created by the [RFC2911] Send-Document and
249 Send-URI operations and represents an Input Document to the Job. This specification also adds a Document
250 Attributes group (and tag) to these Send-Document and Send-URI requests. The Document Attributes group
251 contains any Document Template attributes to be applied to this Document object being created, overriding any
252 corresponding Job Template attribute supplied at the job level (including the "document-overrides" operation
253 attributes at the Job or Document level). A new Create-Document operation allows a client to supply the Document
254 Attributes without the data (like Create-Job does for a Job object). Then the client can send the data content to that
255 Document object using the new Send-Data operation.

256 This specification also defines seven new operations for Document objects once they have been created: Cancel-
257 Current-Document, Cancel-Document, Get-Document-Attributes, Get-Documents, Delete-Document, Set-Document-
258 Attributes, and Validate-Document.

259 This specification also lists all of the attributes defined in other IPP specifications to show their relationship to
260 corresponding attributes defined in this IPP specification for use with the Document object. The full semantics of the
261 "document-state", "document-state-reasons", and "document-state-message" Document Description attributes are
262 given along side of the corresponding [RFC2911] "job-state", "job-state-reasons", and "job-state-message" Job
263 Description attributes.

264 The intent is to propose this specification as an IPP extension and which will be referenced as part of the PWG
265 Semantic Model. The purpose for specifying the Document object is so that the print industry can have a common
266 semantic specification for use in IPP, the PWG Semantic Model [pwg-sm], the PWG Print Service Interface (PSI)
267 project [pwg-psi], and the Free Standards Group Job Ticket API [fsg-jt] which all have a Document object.

268 1.1 Scope

269 Part of the extension is to allow the client to supply printing instructions, called Document Template attributes, when
270 creating each Document object. An IPP Printer object implementation MAY support most of the existing Job
271 Template attributes as Document Template attributes as well. (The PWG Semantic Model [pwg-sm] currently calls
272 the Job Template attributes and Document Template attributes simply "Job Processing" and "Document Processing"
273 attributes). Note: There are a number of footnotes which relate this IPP specification to the PWG Semantic model
274 and other PWG projects, such as the Print Service Interface (PSI) [pwg-psi].

275 The Document object is a passive object[1] and is operated upon by the Job. The client uses the new Create-
276 Document operation or either of the existing Send-Document and Send-URI operations to create a Document object.
277 In addition there are 8 new operations that affect the Document object after it has been created as summarized in
278 Table 1.

---

[1] The Document object is *not* a sub-job. If Job trees are desired where sub-jobs can be on different network nodes,
such as in JDF, then a separate specification should be generated for Job trees.

279 **Table 1 - List of Document operations**

Operation Name	Printer support	Brief Description
Create-Document[2]	REQUIRED	Creates a Document object with Document attributes, but no data.
Send-Data	REQUIRED	Sends data to the Document object created by Create-Document.
Send-Document *	REQUIRED	Creates a Document object with Document attributes and data.
Send-URI *	OPTIONAL	Creates a Document object with Document attributes and a URL reference to the data (print-by-reference).
Get-Document-Attributes	REQUIRED	Get requested attributes of specified Document in the specified Job.
Get-Documents	REQUIRED	Get requested attributes of all of the Documents in the specified Job.
Set-Document-Attributes	OPTIONAL	Set the supplied Document attributes on the specified Document.
Cancel-Document	OPTIONAL	Cancel the specified Document in the specified Job, but don't remove it.
Cancel-Current-Document	OPTIONAL	Cancel the current document that the Printer is printing.
Delete-Document	OPTIONAL	Remove the specified Document object and its data from the Job.
Validate-Document	REQUIRED	Validate that the supplied Document attributes are supported.

280 * The existing IPP/1.1 operations defined in [RFC2911] with an extension so the client can supply Document
281 Template attributes.
282 This specification also specifies the life cycle of the Document object by defining the "document-state", "document-
283 state-reasons", and "document-state-message" attributes. Finally, the analogous Document Descriptions attributes
284 that correspond to the Job Description attributes are defined.

285 # 2 Terminology

286 This section defines terminology used throughout this document.

287 ## 2.1 Conformance Terminology

288 Capitalized terms, such as **MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY, NEED NOT,** and
289 **OPTIONAL**, have special meaning relating to conformance as defined in RFC 2119 [RFC2119] and [RFC2911]
290 section 12.1. If an implementation supports the extension defined in this document, then these terms apply;
291 otherwise, they do not. These terms define conformance to *this document (and [RFC2911]) only*; they do not affect
292 conformance to other documents, unless explicitly stated otherwise. To be more specific:

293 **REQUIRED** - an adjective used to indicate that a conforming IPP Printer implementation MUST support the indicated
294 operation, object, attribute, attribute value, status code, or out-of-band value in requests and responses. See
295 [RFC2911] "Appendix A - Terminology for a definition of "support". *Since support of this entire Document Object*
296 *specification is OPTIONAL for conformance to IPP/1.1, the use of the term REQUIRED in this document means*
297 *"REQUIRED if this OPTIONAL Document Object specification is implemented".*

298 **RECOMMENDED** - an adjective used to indicate that a conforming IPP Printer implementation is recommended to
299 support the indicated operation, object, attribute, attribute value, status code, or out-of-band value in requests and
300 responses. *Since support of this entire Document Object specification is OPTIONAL for conformance to IPP/1.1, the*
301 *use of the term RECOMMENDED in this document means "RECOMMENDED if this OPTIONAL Document Object*
302 *specification is implemented".*

---

[2] The Create-Document operation maps to the PWG PSI Send-Document-By-Post operation and the Send-Data
maps to the HTTP Post operation.

303 **OPTIONAL** - an adjective used to indicate that a conforming IPP Printer implementation MAY, but is NOT
304 REQUIRED to, support the indicated operation, object, attribute, attribute value, status code, or out-of-band value in
305 requests and responses.

2.2 Other Terminology

307 This document uses the same terminology as [RFC2911], such as "**client**", "**Printer**", "**attribute**", "**attribute value**",
308 "**keyword**", "**Job Template attribute**", "**Operation attribute**", "**operation**", "**request**", "**response**", and "**support**"
309 with the same meaning. In addition, the following terms are defined for use in this document:

310 **Document object** - the object to represent the logical concept of a document in a Job. A **Job object** can contain
311 one or more **Document objects**.

312 **Job Creation operation** - operations that create Job objects, specifically: Print-Job, Print-URI, and Create-Job as
313 defined in [RFC2911].

314 **Document Creation operation** - operations that create Document objects. Specifically: Create-Document, Print-
315 Job, Print-URI, Send-Document and Send-URI. Note: the Print-Job and Print-URI are both **Job Creation** and
316 **Document Creation** operations, since they create both Job and a **Document object** at the same time. Also this
317 specification does not extend the Print-Job and Print-URI operations. However, this specification does extend the
318 Send-Document and Send-URI operations to allow the client to supply **Document Template** attributes in each
319 request.

320 **Job Level** - attributes supplied in the Print-Job, Print-URI, and Create-Job are referred to as being supplied at the
321 **Job Level**. Attributes supplied at the **Job Level** are a mixture of **Job attributes** and **Document attributes**. **Job**
322 **attributes** apply to the Job as a whole, while **Document attributes** provide defaults for the **Document objects** in
323 case the client does not supply a **Document attribute** at the **Document Level** for a **Document object**. Put another
324 way, **Document objects** *inherit* **Document attributes** from the **Job object** which are used if the client didn't supply
325 a corresponding attribute for the **Document object**.

326 **Document Level** - attribute supplied in the Send-Document, Send-URI, and Create-Document operations are
327 referred to as being supplied at the **Document Level**. Note: attribute supplied in the Print-Job and Print-URI
328 requests are considered as being supplied at the **Job Level** only, *not* also at the **Document Level**, even though
329 Print-Job and Print-URI also create **Document objects**.

330 **Attribute Precedence** - the precedence rules which dictate which attribute value takes precedence when the same
331 attribute is supplied at different points in the work flow with different values, such as at both the **Job Level** and the
332 **Document Level**. See section 5.

333 **Job Attribute** - an **Operation attribute** or a **Job Templat**e attribute that applies to the Job (object) as a whole. For
334 example, "job-name" is an **Operation attribute** and "job-priority" is a **Job Template attribute**.

335 **Document Template attribute** - an attribute that the client supplies in a Create-Document, Send-Document, or
336 Send-URI operation request in the Document Attributes group. For example, "media".

337 **Document attribute** - an **Operation attribute** or a **Document Template attribute** that applies to a **Document**
338 **object** as a whole. For example, "document-format" is an Operation attribute and "media" is a Document Template
339 attribute.

340 Table 2 shows this terminology as applied to the six operations. Note that Print-Job and Print-URI are both Job
341 Creation operations and Document Creation operations, though they only create single Document jobs. In other
342 words, for Print-Job and Print-URI, there is only one document per job, so whether the attributes are considered to be
343 submitted at the Job Level and then inherited by the Document object, is moot, since these operations do not have a

344 separate Document group in which the client can supply Document attributes. Note also that for the "Level" concept,
345 no operation supplies attributes at more than one level.[3]

346   **Table 2 - Job Creation and Document Creation operations**

Job Creation operation	Document Creation operation	Operation	Attribute Group in Request		Level
			Job	**Document**	
yes		**Create-Job**	Job attributes and Document attributes		Job Level
yes	yes	**Print-Job**	Job attributes and Document attributes		
yes	yes	**Print-URI**	Job attributes and Document attributes		
	yes	**Create-Document**		Document attributes	Document Level
	yes	**Send-Document**		Document attributes	
	yes	**Send-URI**		Document attributes	

347

348 **Document Overrides** - a way for a client to specify attributes to apply to specified documents in a multi-document
349 job. Specifically, as member attributes of the "document-overrides" **Job Template attribute** in a **Job Creation**
350 operation or the "document-overrides" **operation attribute** in a **Document Creation operation** as defined in
351 [override]. Note: The **Document Template attributes** supplied in a Create-Document, Send-Document, or Send-
352 URI operation also "override" any Document Template attributes supplied in the Job Creation operation.

353 **3 Document Operations**

354 The Document object semantics are as parallel to the Job object semantics as possible. Therefore, most of the Job
355 operations have analogous Document operations as shown in Table 12 in section "Appendix A: Document operations
356 compared to Job operations". Operations that can apply only to an entire job, have no analogous document
357 operation as indicated. This extension adds 8 new Document operations that operate on the Document object once
358 it is created by the new Create-Document operation or either of the existing two operations: Send-Document and
359 Send-URI operations.

360 Note: By Document object we mean the object once it become a contained part of a Job object, not before or after.
361 So in this specification a Document object does not represent data in a repository.

---

[3] The PWG Semantic Model [pwg-sm] calls the Operation attributes supplied by the client: Job Description attributes
or Document Description attributes for the Job Creation and Document Creation operations, respectively. The [pwg-
sm] also calls Job Template attributes and Document Template attributes: Job Processing and Document Processing
attributes, respectively. Each Processing attribute is defined to be a Job Processing or a Document Processing
attribute, but is not both. The client can supply both Job Processing and Document Processing attributes in a Job
Creation operation, in which case the Document Processing attributes server as defaults for the Document objects.
The Printer copies all of these client's supplied attributes to the Job or Document object. Read-only Job and
Document attributes that the system sets are called Job State and Document State attributes (instead of Description
attributes).

362 ## 3.1 Create-Document Operation

363 This REQUIRED operation allows a client to create a Document object, supply Document attributes, and have the
364 Printer validate those attributes without sending any document content data. If the Printer rejects the request, the
365 client won't have sent the possibly time-consuming data. The client MUST perform the operations in the following
366 order: (1) Create-Job to create the Job object, (2) Create-Document to create the Document object, (3) Send-Data
367 (see section 3.2) to send the content data for the Document object.

368 The client can supply multiple documents for a single Job using pairs of Create-Document and Send-Data
369 operations. The order of the corresponding Send-Data operations is not important, so that the client can send pairs
370 of Create-Document and Send-Data operations or can send a number of Create-Document operations followed by
371 the corresponding Send-Data operations. The latter approach is useful if the client wants to make sure that all
372 Documents will be accepted by the Printer before sending any of the Document data to the Printer.

373 If a Printer supports the Document object, the Printer:

374   1. MUST also support the Create-Document and Send-Data operations

375   2. MUST support the "multiple-operation-time-out" Printer Description attribute (see [RFC2911] section 4.4.31).

376   3. MUST support the "multiple-document-jobs-supported" Printer Description attribute (see [RFC2911] section
377   4.4.16) with a 'true' value, that is the Printer MUST support multiple document jobs.

378   4. MUST support the "multiple-document-handling" Job Template job attribute with at least one value (see
379   [RFC2911] section 4.2.4) and the associated "multiple-document-handling-default" and "multiple-document-
380   handling-supported" Job Template Printer attributes (see [RFC2911] section 4.2). ISSUE 02: Do we want
381   to say which values of "multiple-document-handling" a Printer MUST support? The defined values are:
382   'single-document', 'single-document-new-sheet', 'separate-documents-uncollated-copies', and 'separate-
383   documents-collated-copies'.

384   5. MUST support the Attribute Precedence semantics specified in section 5 for the levels that the Printer
385   supports.

386 The Printer sets the value of the Document's "document-state" Document Description attribute to 'pending', if the
387 Printer accepts the Create-Document request. A Printer MAY set the 'job-data-insufficient' value of the Document's
388 "document-state-reason" Document Description attribute to indicate that processing cannot begin until sufficient data
389 has arrived and set the "document-state" to 'pending'. A non-spooling printer that doesn't implement the 'pending'
390 document state may even set the "document-state" to 'processing', even though there is not yet any data to process.
391 See sections 8.3 and 8.5.

392 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
393 owner (as determined in the Create-Job operation) or an operator or administrator of the Printer object (see
394 [RFC2911] sections 1 and 8.5). Otherwise, the Printer MUST reject the operation and return: 'client-error-forbidden',
395 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

396 ### 3.1.1 Create-Document Request

397 The client supplies the following groups as part of the Create-Document Request:

398 **Group 1: Operation Attributes**

399 **Natural Language and Character Set:**
400 First, the client MUST supply the "attributes-charset" and "attributes-natural-language" Operation attributes
401 as described in [RFC2911] section 3.1.4.1. The Printer object MUST copy these values to the corresponding
402 Job Description attributes described in [RFC2911] sections 4.3.19 and 4.3.20.

403 **Target:**
404 Next, the client MUST supply either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri"
405 (uri) operation attribute(s) which define the target Job object for this operation as described in [RFC2911]
406 section 3.1.5. The client MAY supply the remaining Operation attributes in any order following:

407 **3.1.1.1 "document-number" (integer(1:MAX)) operation attribute:**

408 The client MAY supply the "document-number" Operation attribute to indicate which Document object in the
409 Job this Create-Document is to apply. Usually the client omits this Operation attribute, so that the Printer
410 assigns the next integer value starting at 1 for each Job. A client that is creating multiple Document objects
411 in parallel MAY wish to supply this attribute in order to control the order of the Documents in the job. If
412 supplied, the Printer copies the value to the Document object's "document-number" Document Description
413 attribute.

414 **3.1.1.2 "last-document" (boolean):**

415 The client MUST supply this attribute (as in the Send-Document and Send-URI operation requests). The
416 Printer object MUST support this attribute. This attribute is a boolean flag that the client supplies with a 'true'
417 value if this is the last document for the Job, 'false' otherwise.

418 **Additional Operation attributes in any order:**
419 Any of the other Operation attributes indicated in the "Level Supplied" column labeled with a "y" in the "Doc"
420 column in Table 4, such as "document-name" and "document-format". These operation attributes are said to
421 be supplied at the Document Level and apply to the Document object, overriding any operation attributes
422 supplied at the Job Level. For example, if "document-format" = 'application/postscript' at the Job Level and
423 "document-format" = 'text/plain' in this Create-Document request, this Document will be 'text/plain'. If the
424 next Create-Document request for this Job omits the "document-format" operation attribute, that Document
425 will be 'application/postscript'.

426 **Group 2: Document Template Attributes**

427 **Any Document Template attributes in any order:**
428 The client OPTIONALLY supplies a set of Document Template attributes, that is any attributes indicated in
429 Table 6 in the "Defined for use" column labeled with a "y" in the "D" column. These Document Template
430 attributes are said to be supplied at the Document Level and apply to the Document object, overriding any
431 Document Template attributes supplied at the Job Level. For example, if "media" = 'na-letter-white' at the
432 Job Level and "media" = 'na-letter-transparency' in this Create-Document request, this Document will be 'na-
433 letter-transparency'. If the next Create-Document operation for this Job omits the "media" operation attribute,
434 that Document will be 'na-letter-white' which it inherits from the Job.

435 If the client is not supplying any Document Template attributes in the request, the client SHOULD omit Group
436 2 rather than sending an empty group. However, a Printer object MUST be able to accept an empty group.

437 The client MUST NOT supply the document data in this operation request. See Send-Data operation.

438 In addition to the MANDATORY parameters required for every operation request (see [RFC2911]), the simplest
439 Create-Document request consists of just the "attributes-charset" and "attributes-natural-language" operation
440 attributes; either (1) the "printer-uri" target operation attribute and the "job-id" or (2) the "job-uri" and nothing else. In
441 this simple case, the Printer object:

442   - creates a new Document object and adds it to the specified Job object,

443   - assigns the lowest document number not yet used by this Job, if the client did not supply a "document-number"
444   operation attribute (see section 3.1.1.1). Copy the document number assigned or supplied to the
445   Document object's "document-number" Document Description attribute.

446   - stores a generated Document name in the "document-name" Document Description attribute in the natural
447   language and charset requested (see [RFC2911] section 3.1.4.1) (if those are supported, otherwise using
448   the Printer object's default natural language and charset), and

449   - at job processing time, uses its corresponding default value attributes for the supported Document Template
450   attributes that were (1) not supplied by the client as IPP attributes and (2) not embedded instructions in the
451   document data.

3.1.2 Create-Document Response

453   The Printer object MUST return the following sets of attributes to the client as part of the Create-Job response:

Group 1: Operation Attributes

Status Message:
456   In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
457   "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
458   in [RFC2911] sections 13 and 3.1.6. If the client supplies unsupported or conflicting Job Template attributes
459   or values, the Printer object MUST reject or accept the Print-Job request depending on the whether the client
460   supplied a 'true' or 'false' value for the "ipp-attribute-fidelity" operation attribute or the name of one of the
461   attributes with unsupported values in the "job-mandatory-attributes" operation attribute. See the
462   Implementer's Guide [RFC3196] for a complete description of the suggested steps for processing the
463   attributes in a create request.

Natural Language and Character Set:
465   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
466   3.1.4.2.

Group 2: Unsupported Attributes

468   See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

469   The value of the "ipp-attribute-fidelity" and "job-mandatory-attributes" operation attributes supplied by the
470   client does not affect what attributes the Printer object returns in this group. The value of these two
471   operation attributes only affects whether the Create-Job operation is accepted or rejected. If the Document
472   is accepted, the client may query the Document object using the Get-Document-Attributes operation
473   requesting the unsupported attributes that were returned in the create response to see which attributes were
474   ignored (not stored on the Document object) and which attributes were stored with other (substituted) values.

Group 3: Document Object Attributes

476   The Printer returns the following Document Description Attributes and Job Description Attributes:

3.1.2.1 document-number (integer(1:MAX))   **Document Description attribute**

478   The Printer MUST return the document number of this Document object that was either assigned by the
479   Printer (see section 3.1.1) or supplied by the client (see section 3.1.1.1).

480   **3.1.2.2 document-state (type1 enum)**   **Document Description attribute**

481   The Printer MUST return the state of this Document object (see section 8.3).

482   **3.1.2.3 document-state-reasons (1setOf type2 keyword)**   **Document Description attribute**

483   The Printer MUST return the associated state reasons for this Document (see section 8.5).

484   **3.1.2.4 document-state-message (text(MAX))**   **Document Description attribute**

485   The Printer MAY return the localized description of the "document-state" and "document-state-reasons"
486   values for this Document (see section 8.7).

487   In addition, the Printer MUST return the same attributes that [RFC2911] REQUIRES for the Send-Document and
488   Send-URI operations (which is the same as for the Print-Job response): "**job-uri**" (uri), "**job-id**" (integer(1:MAX)),
489   "**job-state**" (type1 enum), "**job-state-reasons**" (1setOf type2 keyword). The Printer MAY return: "**job-state-**
490   **message**" (text(MAX)) and/or "**number-of-intervening-jobs**" (integer(0:MAX)).

491   3.2   Send-Data Operation

492   This REQUIRED operation allows the client to create a Document object using the Create-Document operation (see
493   section 3.1) that the Printer validates before the client sends any document content data. Then the client can skip
494   sending the data to the Printer, if the Printer rejects the Document Creation operation.

495   Since the Create-Document and the Send-Data operation that follows could occur over an arbitrarily long period of
496   time for a particular Document, a client MUST send the Send-Data operation within an IPP Printer defined minimum
497   time interval after the receipt of the previous request for the job. If a Printer object supports the Document object, the
498   Printer object MUST support the "multiple-operation-time-out" attribute (see [RFC2911] section 4.4.31). This
499   attribute indicates the minimum number of seconds the Printer object will wait for the next send operation before
500   taking some recovery action. See the description under Send-Document in [RFC2911] section 3.3.1, for the possible
501   Printer actions, if client does not supply a Send-Data request in time.

502   *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
503   owner (as determined in the Create-Job operation) or an operator or administrator of the Printer object (see
504   [RFC2911] sections 1 and 8.5). Otherwise, the Printer MUST reject the operation and return: 'client-error-forbidden',
505   'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

506   3.2.1 Send-Data request

507   The following attribute sets are part of the Send-Data Request:

508   **Group 1: Operation Attributes**

509   **Natural Language and Character Set:**
510   The "attributes-charset" and "attributes-natural-language" attributes as described in section [RFC2911]
511   3.1.4.1.

512   **Target:**
513   The "document-number" (integer(1:MAX)) MUST be supplied along with either (1) the "printer-uri" (uri) plus
514   "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) and "operation attribute(s) which define the target Document
515   object for this operation as described in section [RFC2911] 3.1.5.

516 **Requesting User Name:**
517 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
518 [RFC2911] section 8.3.

519 **Group 2: Document Content**

520 The client MUST supply the document data in-line to be processed for this Document.

3.2.2 Send-Data Response

522 The following sets of attributes are part of the Send-Data Response:

523 **Group 1: Operation Attributes**

524 **Status Message:**
525 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
526 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
527 in [RFC2911] sections 13 and 3.1.6.

528 **Natural Language and Character Set:**
529 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
530 3.1.4.2.

531 **Group 2: Unsupported Attributes**

532 See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

533 **Group 3: Job Object Attributes**

534 This is the same set of attributes as described in the Create-Job response (see [RFC2911] section 3.2.1.2).

3.3 Send-Document Operation

536 This REQUIRED[4] operation allows a client to submit multiple documents in a single Job by making a Send-Document
537 request for each Document. In this specification, the Send-Document creates a Document object ([RFC2911] did not
538 have a Document object). A Printer MUST support this operation with the semantics specified in [RFC2911] and with
539 the extension defined in this specification, since this specification REQUIRES the Printer to support multiple
540 document jobs.

541 See [RFC2911] section 3.3.1 for the semantics of the Send-Document operation not reproduced here.

542 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
543 owner (as determined in the Create-Job operation) or an operator or administrator of the Printer object (see
544 [RFC2911] sections 1 and 8.5). Otherwise, the Printer MUST reject the operation and return: 'client-error-forbidden',
545 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

3.3.1 Send-Document Request

547 The following attribute sets are part of the Send-Document Request:

---

[4] The Send-Document operation is REQUIRED in this specification while it was OPTIONAL in [RFC2911]. This
difference is because this specification REQUIRES Printer support of multiple document jobs, while [RFC2911] did
not.

548 **Group 1: Operation Attributes** (as in [RFC2911])

549 As specified in [RFC2911] section 3.3.1, plus any extensions indicated in Table 4. For example,
550 "compression", "document-format", and "document-name".

551 **Group 2: Document Attributes** (new - not in [RFC2911])

552 The client OPTIONALLY supplies a set of Document Template attributes as listed in Table 6. For example,
553 "media" and "number-up". If the client is not supplying any Document Template attributes in the request, the
554 client SHOULD omit Group 2 rather than sending an empty group. However, a Printer object MUST be able
555 to accept an empty group.

556 **Group 3: Document Content** (as in [RFC2911])

557 The client MUST supply the document data in-line to be processed for this Document if the "last-document"
558 flag is set to 'false'. However, since a client might not know that the previous Document object created with a
559 Create-Job, Send-Document, or Send-URI operation was the last document (i.e., the "last-document"
560 attribute was set to 'false'), it is legal to send a Send-Document request with no document data where the
561 "last-document" flag is set to 'true'. For this case, the Printer MUST NOT increment the value of the Job
562 object's "number-of-documents" attribute, since no Document object was added to the job. In addition, it is
563 not an error for a client to submit a job with no actual document data, i.e., only a single Create-Job and
564 Send-Document request with a "last-document" operation attribute set to 'true' with no document data; it is
565 only an empty job which is scheduled and processed normally.

3.3.2 Send-Document Response

567 The following sets of attributes are part of the Send-Document Response:

568 **Group 1: Operation Attributes** (as in [RFC2911])

569 **Status Message:**
570 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
571 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
572 in [RFC2911] sections 13 and 3.1.6.

573 **Natural Language and Character Set:**
574 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
575 3.1.4.2.

576 **Group 2: Unsupported Attributes** (as in [RFC2911])

577 See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

578 **Group 3: Job Object Attributes** (as in [RFC2911])

579 The Printer returns the same set of attributes as described in the Print-Job response (see [RFC2911] section
580 3.2.1.2).

581 **Group 4: Document Object Attributes** (new - as in Create-Document Group 3 - see section 3.1.2)

582 The Printer returns the same set of attributes as described in the Create-Document response (see section
583 3.1.2).

3.4 Send-URI Operation

This OPTIONAL operation is identical to the Send-Document operation (see section 3.2) except that a client MUST supply a URI reference ("document-uri" operation attribute) rather than the document data itself. If a Printer object supports this operation, clients can use both Send-URI or Send-Document operations to add new documents to an existing multi-document Job object. However, if a client needs to indicate that the previous Send-URI or Send-Document was the last document, the client MUST use the Send-Document operation with no document data and the "last-document" flag set to 'true' (rather than using a Send-URI operation with no "document-uri" operation attribute).

If a Printer object supports this operation, it MUST also support the Print-URI operation (see [RFC2911] section 3.2.2).

The Printer object MUST validate the syntax and URI scheme of the supplied URI before returning a response, just as in the Print-URI operation. The IPP Printer MAY validate the accessibility of the document as part of the operation or subsequently (see [RFC2911] section 3.2.2).

3.5 Get-Document-Attributes Operation

This REQUIRED operation allows a client to request the values of selected attributes of a Document object. This operation is almost identical to the Get-Job-Attributes operation (see [RFC2911] section 3.3.4). The only differences are that the operation is directed at a Document object rather than a Job object and the returned attribute group is a set of Document object attributes rather than a set of Job object attributes.

The Printer MUST return the attributes that a client supplied in the Create-Document, Send-Document, or Send-URI operations, plus any Document Description attributes that the Printer has generated. The Printer MUST NOT return any Job Level attributes that the Document object inherits, including "document-overrides" (1setOf collection) member attributes (see [override]), and MUST NOT factor out common Document object attributes and return them as Job object attributes. Thus the Get-Document-Attributes returns to clients the attributes that clients submitted with the Job object and with the Document object.

The client MAY display to the user any Document attributes inherited from the Job object. However, such a client MUST query both the Job object using Get-Job-Attributes and the Document object using Get-Document-Attributes in order to be able to merge the inherited attributes with the explicitly-supplied Document attributes. Furthermore, the client MAY factor out common explicitly-supplied Document object attributes and display them once as Job object attributes, instead of with each Document object. However, any such regularization of the display for users is the policy of the client and is outside the scope of this client-Printer protocol specification. Note: specify any such regularization or canonicalization policy in the Printer response would have been impossible to agree to.

For Document objects, the possible names of attribute groups are:

- 'document-template': the subset of the Document Template attributes that apply to a Document object (the "D" column in Table 6) that the implementation supports for Document objects.

- 'document-description': the subset of the Document Description attributes specified in the "Doc" column of Table 7 that the implementation supports for Document objects.

- 'all': the special group 'all' that includes all attributes that the implementation supports for Document objects.

Since a client MAY request specific attributes or named groups, there is a potential that there is some overlap. For example, if a client requests, 'document-name' and 'document-description', the client is actually requesting the "document-name" attribute once by naming it explicitly, and once by inclusion in the 'document-description' group. In

624 such cases, the Printer object NEED NOT return the attribute only once in the response even if it is requested
625 multiple times. The client SHOULD NOT request the same attribute in multiple ways.

626 It is NOT REQUIRED that a Document object to support all attributes belonging to a group (since some attributes are
627 OPTIONAL). However, it is REQUIRED that the Printer support all these group names for the Document object.

3.5.1 Get-Document-Attributes Request

629 The following groups of attributes are part of the Get-Document-Attributes Request when the request is directed at a
630 Document object:

631 **Group 1: Operation Attributes**

632 **Natural Language and Character Set:**
633 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
634 3.1.4.1.

635 **Target:**
636 The "document-number" (integer(1:MAX)) MUST be supplied along with either (1) the "printer-uri" (uri) plus
637 "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation attribute(s) which define the target Document
638 object for this operation as described in [RFC2911] section 3.1.5.

639 **Requesting User Name:**
640 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
641 [RFC2911] section 8.3.

642 **"requested-attributes" (1setOf keyword):**
643 The client OPTIONALLY supplies this attribute. The Printer MUST support this attribute.   It is a set of
644 attribute names and/or attribute group names in whose values the requester is interested. If the client omits
645 this attribute, the Printer MUST respond as if this attribute had been supplied with a value of 'all'.

3.5.2 Get-Document-Attributes Response

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

648 **Group 1: Operation Attributes**

649 **Status Message:**
650 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
651 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
652 in [RFC2911] sections 13 and 3.1.6.

653 **Natural Language and Character Set:**
654 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
655 3.1.4.2. The "attributes-natural-language" MAY be the natural language of the Document object, rather than
656 the one requested.

657 **Group 2: Unsupported Attributes**

658 See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

659 The response NEED NOT contain the "requested-attributes" operation attribute with any supplied values
660 (attribute keywords) that were requested by the client but are not supported by the Printer. If the Printer
661 object does return unsupported attributes referenced in the "requested-attributes" operation attribute and that

662   attribute included group names, such as 'all', the unsupported attributes MUST NOT include attributes
663   described in the standard but not supported by the implementation.

664 **Group 3: Document Object Attributes**

665   This is the set of requested attributes and their current values. The Printer ignores (does not respond with)
666   any requested attribute or value which is not supported. Furthermore, the Printer MUST NOT return
667   Document Template attributes that were not supplied by a client in a Create-Document, Send-Document, or
668   Send-URI request or set by a Set-Document-Attributes request. So the response reflects what was
669   submitted. The Printer MAY omit returning attributes that are restricted by the Printer's security policy in
670   force, including whether the requesting user is the user that submitted the job (job originating user) or not
671   (see [RFC2911] section 8). However, the Printer MUST respond with the 'unknown' value for any supported
672   attribute (including all REQUIRED attributes) for which the Printer does not know the value, unless it would
673   violate the security policy. See the description of the "out-of-band" values in the beginning of [RFC2911]
674   Section 4.1.

675 3.6 Get-Documents Operation

676 This REQUIRED operation allows a client to retrieve the list of Document objects belonging to the target Job object.
677 The client MAY also supply a list of Document attribute names and/or attribute group names. A group of Document
678 object attributes will be returned for each Document object in the Job.

679 This operation is similar to the Get-Document-Attributes operation (see section 3.5), except that this Get-Documents
680 operation returns attributes from all Document objects contained in the Job object, instead of from a single selected
681 Document object in the Job object. As with the Get-Document-Attributes operation the Printer MUST only return
682 attributes that were submitted by a client when the Document object was created by the Create-Document, Send-
683 Document, or Send-URI operations and possibly modified by the Set-Document-Attributes operation (see section
684 3.7).

685 3.6.1 Get-Documents Request

686 The client submits the Get-Documents request to a Printer object. The Get-Documents is similar to the Get-Jobs
687 operations (see [RFC2911] section 3.2.6) except that there are no equivalents to the "which-jobs" and "my-jobs"
688 operation attributes.

689 The following groups of attributes are part of the Get-Documents Request:

690 **Group 1: Operation Attributes**

691 **Natural Language and Character Set:**
692   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
693   3.1.4.1.

694 **Target:**
695   Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation attribute(s)
696   which define the target Job object for this operation as described in [RFC2911] section 3.1.5.

697 **Requesting User Name:**
698   The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
699   [RFC2911] section 8.3.

700 **"limit" (integer(1:MAX)):**
701 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute. It is an
702 integer value that determines the maximum number of Documents that a client will receive from the Printer.
703 The limit is a "stateless limit" in that if the value supplied by the client is 'N', then only the first 'N' Documents
704 are returned in the Get-Documents Response. There is no mechanism to allow for the next 'M' Documents
705 after the first 'N' Documents. If the client does not supply this attribute, the Printer object responds with all
706 Documents.

707 **"requested-attributes" (1setOf type2 keyword):**
708 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute. It is a set of
709 Document attribute names and/or attribute groups names in whose values the requester is interested. This
710 set of attributes is returned for each Document object that is returned. The allowed attribute group names
711 are the same as those defined in the Get-Document-Attributes operation in section 3.5.1.

712 If the client does not supply this attribute, the Printer MUST respond as if the client had supplied this attribute
713 with the three values: 'document-number', 'document-state', and 'document-state-reasons'. ISSUE 03: Are
714 the 3 attributes: 'document-number', 'document-state', and 'document-state-reasons' the right attributes to
715 return when the client does not supply the "requested-attributes" operation attribute? Should we include the
716 "document-id-uri" (uri) attribute that the Printer generates as well?

3.6.2 Get-Documents Response

718 The Printer object returns all of the Document objects up to the number specified by the "limit" attribute that match
719 the criteria as defined by the attribute values supplied by the client in the request. If the client requests any
720 Document attributes at all, there is a set of Document Object Attributes returned for each Document object.

721 It is not an error for the Printer to return 0 Documents. If the response returns 0 Documents because there are no
722 Documents in the Job, then the status code for 0 Documents MUST be 'successful-ok'.

723 **Group 1: Operation Attributes**

724 **Status Message:**
725 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
726 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
727 in [RFC2911] sections 13 and 3.1.6.

728 **Natural Language and Character Set:**
729 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
730 3.1.4.2.

731 **Group 2: Unsupported Attributes**

732 See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

733 The response NEED NOT contain the "requested-attributes" operation attribute with any supplied values
734 (attribute keywords) that were requested by the client but are not supported by the IPP object. If the Printer
735 object does return unsupported attributes referenced in the "requested-attributes" operation attribute and that
736 attribute included group names, such as 'all', the unsupported attributes MUST NOT include attributes
737 described in the standard but not supported by the implementation.

738 **Groups 3 to N: Document Object Attributes**

739 The Printer object responds with one set of Document Object Attributes for each returned Document object.
740 The Printer object ignores (does not respond with) any requested attribute or value which is not supported or

741   which is restricted by the security policy in force, including whether the requesting user is the user that
742   submitted the job (job originating user) or not (see [RFC2911] section 8). However, the Printer object MUST
743   respond with the 'unknown' value for any supported attribute (including all REQUIRED attributes) for which
744   the Printer object does not know the value, unless it would violate the security policy. See the description of
745   the "out-of-band" values in the beginning of [RFC2911] section 4.1.

746   The Printer MUST return the Groups in order of increasing "document-number" attribute value.

3.7 Set-Document-Attributes Operation

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

752 This operation is almost identical to the Set-Job-Attributes operation and follows the same rules for validation (see
753 [set-ops] section 4.2). The only differences are that the Set-Document-Attributes operation is directed at a Document
754 object rather than a Job object. As with the Set-Job-Attributes operation, The Set-Document-Attributes operation
755 can add an attribute to the Target object, accepts the 'delete-attributes' out-of-band value to remove an attribute from
756 the Target object. In addition the validation is the same as the Create-Document, Send-Document, and Send-URI
757 operations that create Document objects, i.e., the Printer validation depends on the "xxx-supported" Printer
758 Description attributes (see [RFC2911] section 3.1).

759 If a client supplies a document attribute in a Set-Document-Attributes request that the Printer supports, and the
760 document was originally submitted without supplying that attribute, the Printer adds the attribute to the Document
761 object.

762 If the client supplies a document attribute with the "out-of-band" value 'delete-attribute' (see [set-ops] section 8.2),
763 then the Printer MUST remove the attribute and all of its values from the Document object, if present. The semantic
764 effect of the client supplying the 'delete-attribute' value in a Set-Document-Attributes operation MUST be the same as
765 if the attribute had not been supplied with the Document object in the Document Creation operation, i.e., the Printer
766 applies its default attribute or behavior with lower precedence that the PDL (see the beginning of [RFC2911] section
767 4.2 and [RFC2911] 3.2.1.1). Any subsequent query of the Document object using Get-Document-Attributes or Get-
768 Documents MUST NOT return any attribute that has been deleted using the 'delete-attribute' out-of-band value.
769 However, a client can re-establish such a deleted Document attribute with any supported value(s) using a
770 subsequent Set-Document-Attributes operation.

771 If the client supplies an attribute in a Set-Document-Attributes request with the 'delete-attribute' value and that
772 attribute is not present on the Document object, the Printer ignores that supplied attribute in the request, does not
773 return the attribute in the Unsupported Attributes group, and returns the 'successful-ok' status code, if there are no
774 other problems with the request.

775 The validation of the Set-Document-Attributes request is performed by the Printer as if the document had been
776 submitted originally with the new attribute values (and the deleted attributes removed) and with "ipp-attribute-fidelity"
777 set to 'true', i.e., all modified attributes Document attributes and values MUST be supported in combination with the
778 Document attributes not modified. If such a Document Creation operation would have been accepted, then the Set-
779 Document-Attributes MUST be accepted. If such a Document Creation operation would have been rejected, then the
780 Set-Document-Attributes MUST be rejected and the Document MUST be unchanged. In addition, if any of the
781 supplied attributes are not supported, are not settable, or the values are not supported, the Printer object MUST
782 reject the entire operation; the Printer object MUST NOT partially set some of the supplied attributes. In other words,
783 after the operation, all the supplied attributes MUST be set or none of them MUST be set, thus making the Set-
784 Document-Attributes an atomic operation.

785 The IPP object MUST accept or reject this operations when the Document's READ-ONLY "document-state" attribute
786 has the values shown in Table 3. The document's current state MUST affect whether the IPP object accepts or
787 rejects the request. However, the Set-Document-Attributes operation MUST NOT change the state of the Document
788 object (since the Document is a passive object and the Document state is a subset of the Job State). For example,
789 in the case where the operation creates a request for unavailable resources, the Job (but not the Document)
790 transitions to a new state. Table 3 shows the allowed behaviors in each document state.

791 **Table 3 - Document State Table for the Set-Document-Attributes operation**

Current "document-state"	New "document-state" (no change)	IPP object's response status code and "action":
'pending'	'pending'	'successful-ok'
'pending'	'pending'	'successful-ok' - needed resources are not ready (the Job MAY change state, but the Document MUST NOT).
'processing'	'processing'	'successful-ok' or 'client-error-not-possible' depending on implementation, including the attributes being set, whether the document has started marking media, etc.
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

792

793 This operation MUST NOT change the value of attributes not specified in the operation unless the definition of the
794 attribute explicitly specifies such side-effects. In general, Document attribute definitions that are settable will not
795 define side-effects on other attributes that are settable, only side effects on READ-ONLY attributes, if any.

3.7.1 Settable and READ-ONLY Document Description attributes

797 If the Printer supports the Set-Document-Attributes operation, then it SHOULD support setting of:
798   all Document Template document ("xxx") attributes
799 that the implementation supports (see the column labeled "D" in Table 6).

800 Almost all Document Description attributes (see [RFC2911] section 4.3) MUST NOT be settable, i.e., they are
801 defined to be READ-ONLY. Only Document Description attributes marked with "(r/w) in Table 6 MAY be settable
802 using Set-Document-Attributes. The Printer MUST reject a Set-Document-Attributes request that attempts to set any
803 attributes in Table 6 that is not marked "(r/w).

804 Note: From now on, all extensions that define new object attributes will indicate whether or not the attributes are
805 READ-ONLY, by including the "READ-ONLY" adjective in their descriptions and/or explicitly stating whether they
806 MAY be settable.

807 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
808 owner (as determined in the Job Creation operation) or an operator or administrator of the Printer object (see
809 [RFC2911] Sections 1 and 8.5).

810 **3.7.2 Set-Document-Attributes Request**

811 The following sets of attributes are part of the Set-Document-Attributes Request:

812 **Group 1: Operation Attributes**

813 **Natural Language and Character Set:**
814 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
815 3.1.4.1.

816 **Target:**
817 The "document-number" (integer(1:MAX)) MUST be supplied along with either (1) the "printer-uri" (uri) plus
818 "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation attribute(s) which define the target Document
819 object for this operation as described in [RFC2911] section 3.1.5. ISSUE 04: OK that we don't have a way
820 to set all documents in a single request? The Printer MUST reject the request with 'client-error-bad-request',
821 if the client does not supply the "document-number" operation attribute. There is no way to set all documents
822 explicitly in a single request, since a failure would require the Printer to back out all changes in all
823 documents. However, if the client sets the corresponding attribute at the Job Level using the Set-Job-
824 Attributes operation, all documents in the job will be affected that don't have that attribute explicitly supplied
825 at the Document Level.

826 **Requesting User Name:**
827 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
828 [RFC2911] section 8.3.

829 **Group 2: Document Attributes**

830 The client MUST supply a set of Document Template attributes with one or more values (including explicitly
831 allowed out-of-band values) as listed in column labeled "D" in Table 6 - Job Template and Document
832 Template attributes and Document Description attributes flagged with "(r/w)" and listed in the column labeled
833 "Doc" in Table 7 - Job and Document Description attributes, and any attribute extensions supported by the
834 Printer. The value(s) of each Document attribute supplied in Group 2 replaces the value(s) of the
835 corresponding Document attribute on the target Document object. For attributes that can have multiple
836 values (1setOf), all values supplied by the client replace all values of the corresponding Document object
837 attribute.

838

839 If the client supplies an "xxx" attribute with the 'delete-attribute' out-of-band value (see [set-ops] section 8.2),
840 the Printer MUST remove the "xxx" attribute from the Document object, if present.

841

842 **3.7.3 Set-Document-Attributes Response**

843 The IPP object returns the following sets of attributes as part of the Set-Document-Attributes Response:

844 **Group 1: Operation Attributes**

845 **Status Message:**
846 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
847 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
848 in [RFC2911] sections 13 and 3.1.6.

849   **Natural Language and Character Set:**
850   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
851   3.1.4.2.

852   **Group 2: Unsupported Attributes**

853   See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

854   If some of the attributes in the operation fail to validate, the Printer MUST reject the operation, MUST NOT
855   change any Document attributes, and MUST return the indicated status code below. In this group, the
856   Printer MUST also return all attributes that fail to validate. The following are the reasons that an attribute
857   fails to validate and the value returned for the attribute, along with the indicated status code and order of
858   detection:

859   1.   The number of attributes supplied by the client exceeds the maximum number that the Printer
860   supports in a Set-Printer-Attributes request: return the 'client-error-request-entity-too-large' (see
861   [RFC2911] section 13.1.4.9).

862   2.   The Printer doesn't support the attribute: return the attribute with the 'unsupported' out-of-band
863   attribute value (see [RFC2911] section 3.1.7 and [RFC2910]) and the 'client-error-attributes-or-
864   values-not-supported (see [RFC2911] section 13.1.4.12).

865   3.   The attribute is READ-ONLY (in its definition) or is not-settable in this implementation: return the
866   attribute with the 'not-settable' out-of-band attribute value (see [set-ops] section 8.1) and the
867   'client-error-attributes-not-settable' status code (see [set-ops] section 7.1).

868   4.   The Printer doesn't support the value: if the attribute in the operation has a single value return it.
869   If the attribute in the operation is multi-valued, return only those values in a 1setOf that are not
870   supported. Return the 'client-error-attributes-or-values-not-supported' status code (see [RFC2911]
871   section 13.1.4.12).

872   5.   The values of some of the supplied attributes conflict with one another and/or other Document
873   attribute values not being set: if the conflicting attribute in the operation has a single value return
874   the attribute and the value. If the attribute in the operation is multi-valued, return only the attribute
875   and those values in a 1setOf that are conflicting with other attributes. Return the 'client-error-
876   conflicting-attributes' status code (see [RFC2911] section 13.1.4.15).

877   ## 3.8 Cancel-Document Operation

878   This OPTIONAL[5] operation allows a client to cancel a specified Document in a specified Print Job from the time the
879   Document is created up to, but not including, the time it is completed, canceled, or aborted. Since a Document might
880   already be printing by the time a Cancel-Document is received, some media sheet pages might be printed before the
881   document is actually terminated.

882   ISSUE 05: OK, that Cancel-Document operation is OPTIONAL, while the Cancel-Job operation is REQUIRED by
883   [RFC2911]?

884   The Cancel-Document operation does not remove the Document from the Job and Printer, but only sets the specified
885   Document's "document-state" Document Description attribute to 'canceled' and the Document's "document-state-
886   reasons" Document Description attribute to 'canceled-by-user' or 'cancel-by-operator'. If the Job object is printed
887   again using operations such as the Reprocess-Job operation (see [adm-ops] section 4.1) or the Restart-Job
888   operation (see [RFC2911] section 3.3.7), any canceled Documents are also printed again. Thus Cancel-Document

---

[5] The Cancel-Document operation is OPTIONAL, whereas the corresponding Cancel-Job is REQUIRED.

889   has the same semantics as Cancel-Job (see [RFC2911] section 3.3.3), which only cancels the processing of the job,
890   and doesn't delete the Job object itself. See the Delete-Document operation (section 3.10) to remove the Document
891   object itself immediately from the Job and Printer.

892   The Cancel-Document operation does not affect the states of any of the other Document objects in the job. If the Job
893   was processing and there are more Documents to be processed, the Printer does so. If there are no further
894   Documents to process, the Job moves to the 'completed' state as usual whenever there is no more processing to be
895   done.

896   The IPP object MUST accept or reject the request based on the document's current state and transition the
897   document to the indicated new state as follows:

Current "document-state"	New "document-state"	Printer object's response status code and action:
'pending'	'canceled'	'successful-ok'
'processing'	'canceled'	'successful-ok'
'processing'	'processing'	'successful-ok' See Rule 1
'processing'	'processing'	'client-error-not-possible' See Rule 2
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

898   Rule 1: If the implementation requires some measurable time to cancel the document in the 'processing' document
899   states, the Printer object MUST add the 'processing-to-stop-point' value to the document's "document-state-reasons"
900   attribute and then transition the document to the 'canceled' state when the processing ceases (see [RFC2911]
901   section 4.3.8).

902   Rule 2: If the Document object already has the 'processing-to-stop-point' value in its "document-state-reasons"
903   attribute, then the Printer object MUST reject a Cancel-Document operation.

904   *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
905   owner or an operator or administrator of the Printer object (see [RFC2911] sections 1 and 8.5). Otherwise, the IPP
906   object MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-
907   not-authorized' as appropriate.

908   3.8.1 Cancel-Document Request

909   The following groups of attributes are part of the Cancel-Document Request:

910   **Group 1: Operation Attributes**

911   **Natural Language and Character Set:**
912   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
913   3.1.4.1.

Target:
The "document-number" (integer(1:MAX)) MUST be supplied along with either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation attribute(s) which define the target Document object for this operation as described in section [RFC2911] 3.1.5.

Requesting User Name:
The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in [RFC2911] section 8.3.

"message" (text(127)):
The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this attribute. It is a message to the operator. This "message" attribute is not the same as the "job-message-from-operator" attribute. The "job-message-from-operator" attribute is used to report a message from the operator to the end user that queries that attribute. This "message" operation attribute is used to send a message from the client to the operator along with the operation request. It is an implementation decision of how or where to display this message to the operator (if at all). ISSUE 06: OK to have the "message" operation attribute supplied in the Cancel-Document operation be sent to the operator in some unspecified way, like Cancel-Job, which could include setting the Job's "message-to-operator" Job Template Job attribute or should we just do away with the "message" operation attribute in the Cancel-Document operation?

3.8.2 Cancel-Document Response

The following sets of attributes are part of the Cancel-Document Response:

Group 1: Operation Attributes

Status Message:
In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described in [RFC2911] sections 13 and 3.1.6.

Natural Language and Character Set:
The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section 3.1.4.2.

Group 2: Unsupported Attributes

See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

Once a successful response has been sent, the implementation guarantees that the Document will eventually end up in the 'canceled' state. Between the time of the Cancel-Document operation is accepted and when the document enters the 'canceled' document-state (see section 8.3), the "document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' value which indicates to later queries that although the Document might still be 'processing', it will eventually end up in the 'canceled' state, not the 'completed' state.

3.9 Cancel-Current-Document Operation[6]

This OPTIONAL operation allows a client to cancel either (1) any current Document of the current Job on the target Printer or (2) the specified document in a specified job if they are the current document and job on the Printer. One of the uses of this operation is by operators in an emergency, where the job-id and document-number might be

---

[6] In some modeling regimes, the Cancel-Current-Document operation might be a Device method, rather than a Job or Document method.

952   unknown to the operator. See section 3.8 for the semantics of canceling a Document and what values the Printer
953   sets the Document's Document Description attributes. Since a Document might already be marking by the time a
954   Cancel-Current-Document is received, some media sheet pages might be printed before the document is actually
955   terminated.

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

960   Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation and its
961   acceptance, the current document might change to a different document or even a different job. If the user or
962   operator is authenticated to cancel the new job, the wrong document is canceled. To prevent this race from
963   canceling the wrong document, the client MAY supply the "job-id" and "document-number" operation attributes which
964   is checked against the current job's "job-id" and the current Document's "document-number". If the job identified by
965   the "job-id" attribute is not the current job on the Printer and the "document-number" is not the current Document in
966   that current Job, i.e., is not in the 'processing' state, the Printer MUST reject this operation and return the 'client-
967   error-not-possible' status code. Otherwise, the Printer cancels the specified document.

968   *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
969   owner (as determined in the Job Creation operation) or an operator or administrator of the Printer object (see
970   [RFC2911] Sections 1 and 8.5).

971   The Cancel-Current-Document Request and Cancel-Current-Document Response have the same attribute groups
972   and attributes as the Pause-Printer operation (see [RFC2911] section 3.2.8) with the addition of the following Group
973   1 Operation attributes in the request:

974   **"job-id" (integer(1:MAX)):**
975   The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job is still the
976   current job on the target Printer object. The IPP object MUST supports this operation attribute, if it supports
977   this operation.

978   **"document-number (integer(1:MAX))**
979   The client OPTIONALLY supplies this Operation attribute in order to verify that the identified document is still
980   the current document on the target Printer object. The IPP object MUST supports this operation attribute, if it
981   supports this operation.

982   The Printer MUST ignore the new "job-message-from-operator" operation attribute (see [adm-ops] section 6), since
983   that is a job only attribute and Cancel-Current-Document is a Document operation. ISSUE 07: OK not to have a
984   "document-message-from-operator" for use with Document operations, like with the Cancel-Current-Document
985   operation that an operator is likely to use?

986   3.10 Delete-Document Operation

987   This OPTIONAL operation removes the specified Document object and its data immediately from the specified Job.
988   The Printer MUST reject the request if the Document is in any state, but 'pending" (there is no 'pending-held' state for
989   Documents). The Printer does not reassign the "document-number" Document Description attribute values of the
990   remaining Document objects in the Job, so that the deleted Document object leaves a gap in the document
991   numbering space for the Job. The Printer MUST return a 'client-error-not-found' status code, in a subsequent Get-
992   Document-Attributes operation for this Document object specifying its former "document-number". This operation is
993   similar to the Purge-Jobs operation which immediately deletes all jobs from the Printer. However, the Delete-
994   Document operation only deletes a single Document from the specified Job.

995 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation MUST be an operator
996 or administrator of the Printer object (see [RFC2911] sections 1 and 8.5). Otherwise, the Printer MUST reject the
997 operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as
998 appropriate. This operation requires operator/administrator privileges, otherwise a rogue client could submit, then
999 delete, at will using up valuable spooling space. Unprivileged users use Cancel-Document which goes through the
1000 normal accounting, if any.

1001 The Delete-Document request and Delete-Document response have the same attribute groups and attributes as the
1002 Cancel-Document operation (see section 3.8).

3.11 Validate-Document Operation

1004 This REQUIRED operation allows the client to verify capabilities of a Printer against whatever attributes the client
1005 supplies in the Validate-Document request in combination with the previously submitted partial Job, if any. This
1006 operation is the same as the Create-Document operation (section 3.1) except the Printer does not create a new
1007 Document object. The Printer performs the same validation for the Validate-Document operation as for the Create-
1008 Document operation (section 3.1), with the addition that the client MAY supply the "document-uri" operation attribute
1009 (defined in the Send-URI operation in [RFC2911] section 3.3.2). If the client supplies the "document-uri" operation
1010 attribute, the Printer MUST validate that the URI scheme is supported and that the referenced data is accessible[7].

1011 The client MAY supply a Job object Target, that is, either (1) a "printer-uri" and a "job-id" operation attribute or (2) a
1012 "job-uri" operation attribute. If supplied, the Job Target MUST identify a job that has been created by Create-Job
1013 ([RFC2911] section 3.2.4), but not yet closed, that is, the client hasn't yet supplied the "last-document" operation
1014 attribute with a 'true' value. When the client supplies the Job object Target, the Printer MUST validate that an
1015 identical Create-Document, Send-Document, or Send-URI operation would have been accepted in the context of the
1016 specified Job and its other Document objects. If the client omits the Job Target by including only the "printer-uri"
1017 operation attribute, the Printer performs the same validation as for a Create-Document in which there were no Job
1018 attributes supplied in the Create-Job and no other Documents. The Printer MUST support the Validate-Document
1019 operation with or without the Job object Target being present.

1020 If the client discovers that a Validate-Document operation fails, it has the choice of (1) canceling the entire partially
1021 created job, if any, (2) closing the partially created Job as is (with a Send-Document supplying the "last-document"
1022 with a 'true' value) so that the Printer will process the Job, or (3) adding other Document objects (with Create-
1023 Document, Send-Document, and/or Send-URI) and then closing the Job.

1024 By using the Validate-Document operation a client can validate that an identical Create-Document operation (or a
1025 Send-Document operation with the document data or a Send-URI operation) would be accepted by the Printer in the
1026 context of the partially submitted Job. The Validate-Document operation also performs the same security negotiation
1027 as the Create-Document operation (see [RFC2911[section 8), so that a client can check that the client and Printer
1028 object security requirements can be met before performing a Create-Document, Send-Document, or Send-URI
1029 operation.

1030 The Printer object returns the same status codes, Operation Attributes (Group 1) and Unsupported Attributes (Group
1031 2) as the Create-Document operation (see section 3.1.2). However, no Document Object Attributes (Group 3) are
1032 returned, since no Document object is created.

---

[7] The PWG PSI [pwg-psi] specification includes a Validate-Document operation with the "document-uri" operation
attribute that the Printer MUST validate.

4   Semantic extensions to Job operations

This section defines effects that Job operations have on the Document object. Printer and Subscription object (Event Notification [ntfy]) operations MUST have no effect on the Document object and the Document object has no effect on the semantics of the Printer and Subscription operations. The Job operations that MUST NOT have any effect on the Document object because they are defined to affect the Job object as a whole are: **Get-Job-Attributes**[8] ([RFC2911] section 3.3.4)**, Get-Jobs**[9] ([RFC2911] section 3.2.6)**, Hold-Job** ([RFC2911] section 3.3.5)**, Promote-Job** ([adm-ops] section 4.4.1), **Release-Held-New-Jobs** ([adm-ops] section 3.3.2)**, Resume-Job** ([adm-ops] section 4.3.2)**, Schedule-Job-After** ([adm-ops] section 4.4.2)**, Set-Job-Attributes** ([set-ops] section 4.2), and **Validate-Job** ([RFC2911] section 3.2.3).

The Job operations that affect Document objects or that Document objects affect the semantics of the Job operations are, in alphabetical order:

4.1   Cancel-Current-Job ([adm-ops] section 4.2)

The Printer sets the "document-state" Document Description attribute to 'canceled' and the "document-state-reasons" Document Description attribute to 'canceled-by-xxx' for any documents in the current Job that have not yet reached a terminal state ('completed', 'canceled', or 'aborted'), where "xxx" is 'user' or 'operator'. See [adm-ops] section 4.2.

4.2   Cancel-Job ([RFC2911] section 3.3.3)

The Printer sets "document-state" Document Description attribute to 'canceled' and the "document-state-reasons" Document Description attribute to 'canceled-by-user' or 'canceled-by-operator' for *all* Document objects in the identified Job that have not yet reached a terminal state ('completed', 'canceled', or 'aborted').

4.3   Create-Job ([RFC2911] section 3.2.4)

The Printer creates the Job object with all of the mixture of Job and Document attributes supplied in the Create-Job operation. The Document objects that are subsequently created for the specified Job inherit the Document attributes from the Job object. However, the Printer MUST NOT copy down any Job Level attributes, including "document-overrides" ([override]) to the Document object as observable by a client in any Get-Documents or Get-Document-Attributes operation responses.

4.4   Print-Job ([RFC2911] section 3.2.1)

The Printer creates one Document object as a side effect of the Print-Job operation. All of the attributes supplied by the client MUST remain at the Job Level as part of the Job object. Any Document attributes supplied have affect on the Document object because the Document object inherits them from the Job object. The Printer MUST populate the single Document object's "document-state", "document-state-reasons", and "document-number" Document Description attributes with appropriate values. Thus a Get-Documents or Get-Document-Attributes for a Job created by Print-Job will return no attributes supplied by the client, but will return the populated Document Description attributes.

---

[8] The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Document, Send-Document, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

[9] The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Document, Send-Document, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

4.5 **Print-URI** ([RFC2911] section 3.2.2)

The Printer creates one Document object as a side effect of the Print-URI operation. All of the attributes supplied by the client MUST remain at the Job Level as part of the Job object. Any Document attributes supplied have affect on the Document object because the Document object inherits them from the Job object. The Printer MUST populate the Document object's "document-state", "document-state-reasons", and "document-number" Document Description attributes with appropriate values. Thus a Get-Documents or Get-Document-Attributes for a Job created by Print-Job will return no attributes supplied by the client, but will return the populated Document Description attributes.

4.6 **Purge-Jobs** ([RFC2911] section 3.2.9)

The Printer removes all Job and all of their contained Document objects.

4.7 **Release-Job** ([RFC2911] section 3.3.6)

The Printer moves the job to the 'pending' state, if there are no other "job-state-reasons" to hold the job. ISSUE 08: Should a Document's "document-state-reasons" keep a Job from being released with Release-Job? Or should there be no such reasons for the "document-state-reasons" Document Description attribute? For example, what about the 'resources-are-not-ready' value of the "document-state-reasons" Document Description attribute? Or maybe the 'resources-are-not-ready' is only for the "job-state-reasons" Job Description attribute. Then there wouldn't be any "document-state-reasons" that affect job scheduling.

4.8 **Reprocess-Job** ([adm-ops] section 4.1)

The Printer processes the Job again by processing *all* Documents in the Job, including ones that have been canceled by a previous Cancel-Document operation. Therefore, the Printer removes any 'canceled-by-xxx' values from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attributes.

4.9 **Restart-Job** ([RFC2911] section 3.3.7)

The Printer starts the Job over again by processing *all* Documents in the Job, including ones that have been canceled by a previous Cancel-Document operation. Therefore, the Printer removes any 'canceled-by-xxx' values from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attributes and

4.10 **Send-Document** ([RFC2911] section 3.3.1)

The Printer accepts a new Document Attributes group that the client can supply Document Template attribute and creates a Document object (see section 3.3).

4.11 **Send-URI** ([RFC2911] section 3.3.2)

The Printer accepts a new Document Attributes group that the client can supply Document Template attribute and creates a Document object (see section 3.4).

4.12 **Suspend-Current-Job** ([adm-ops] section 4.3.1)

The Printer suspends the current job and sets the Job's "job-state" Job Description attribute to 'processing-stopped' and "job-state-reasons" to 'job-suspended-by-xxx', where 'xxx' is 'user' or 'operator'. The Documents' "document-

1099 state" and "document-state-reasons" Document Description attributes are unaffected (but the Documents are not
1100 processed any further, since the Job is stopped).

1101 5 Attribute Precedence

1102 This section defines the Attribute Precedence rules for Queue Override attributes, Page Override attributes,
1103 Document Object attributes, Document Override attributes, Job Object attributes, PDL instructions, PDL Interpreter
1104 initialization files, and Printer object defaults. Since each attribute can be specified for all of these levels, it is
1105 important to define which level takes precedence when the same attribute occurs at different levels with differing
1106 values.

1107 The attribute precedence model has the following features:

1108   1) In principle, each defined attribute can occur at each of the precedence levels.

1109   2) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print
1110   driver, submission client, protocol, and Printer:

1111   • Attributes are supplied by different agents in the system: application, user, print driver, administrator,
1112   operator, Printer object, and the output device hardware.

1113   • Attributes are supplied at different points in time: PDL generation, job submission, job acceptance, job
1114   pending, job processing.

1115   3) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print
1116   driver, submission client, protocol, and Printer.

1117   4) The later that an attribute is introduced into the work flow or the closer the attribute is to the affected object,
1118   the higher the precedence is assigned to that attribute, since precedence is intended to reflect the user's
1119   wishes.

1120 The following levels of Attribute Precedence are defined in order of decreasing priority:

1121   1. **queue override** - The value that the Printer enforces for any job submitted to it (see [prod-print2] section
1122   3.1). Set by the administrator when configuring the Printer by setting an "xxx-supported" Printer attribute
1123   to contain a single value, i.e., the override value. Example: the administrator sets the Printer's "sides" =
1124   'two-sided-long' so that all jobs submitted to that (logical) Printer are printed two-sided flipped along the
1125   long edge.

1126   Note: The **queue override** level is only available for Printers that support the 'guaranteed' value for
1127   its "pdl-override-supported" attribute (see [prod-print2] section 8). All other levels are available for all
1128   Printers independent of the "pdl-override-supported" value.

1129   **2. Document Level - page override programming** - The special "page-overrides" collection Document
1130   Template attribute (see [override]) supplied at the Document Level, i.e., in a Create-Document, Send-
1131   Document, or Send-URI operation, that contains the attributes that are to have the page override status
1132   for the specified ranges of pages in the Input-Document or the Output-Document. Supplied by the client
1133   when submitting a Document object, or set by the user or operator after the Document has been
1134   accepted either using the Set-Document-Attributes operation, or by the operator using means local to the
1135   Printer. Example: "page-overrides" = {"page-number" = '1'; "media" = 'letterhead'}

1136   **3. Document Level - Document object attributes -** The Document attributes supplied at the Document
1137   Level, i.e., in a Create-Document, Send-Document, or Send-URI operation to apply to the Input
1138   Document. Supplied by the client when submitting a Document object, or set by the user or operator
1139   after the Document has been accepted either using the Set-Job-Attributes operation, or by the operator
1140   using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.

1141   4. **Job Level - page override programming** - A special "page-overrides" collection Job Template attribute
1142   (see [override]) supplied at the Job Level, i.e., in a Job Creation operation, that contains the attributes
1143   that are to have the page override status for the specified ranges of pages in the Input-Document or the
1144   Output-Document. Supplied by the client when submitting a job either in the protocol, or set by the user
1145   or operator after the job has been accepted either using the Set-Job-Attributes operation, or by the
1146   operator using means local to the Printer. Example: "page-overrides" = {"page-number" = '1'; "media" =
1147   'letterhead'}

1148   5. **Job Level - document override programming** - A special "document-overrides" collection Job
1149   Template attribute (see [override]) that contains the attributes that are to have the document override
1150   status for the specified Input-Documents or Output-Documents. Supplied by the client when submitting a
1151   job either in the protocol, or set by the user or operator after the job has been accepted either using the
1152   Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "document-
1153   overrides" = {"document-number" = '5; "media" = 'transparency'}

1154   6. **Job Level - Job object attributes** - The Job attributes supplied at the Job Level, i.e., with a Create-Job,
1155   Print-Job, or Print-URI operation. Supplied by the client when submitting a Job in the protocol, or set by
1156   the user or operator after the job has been accepted either using the Set-Job-Attributes operation, or by
1157   the operator using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.

1158   7. **PDL document data** - an instruction in the PDL document data. Supplied by the application or print
1159   driver that created the PDL. Example: PostScript setPageDevice specifying na-letter media.

1160   8. **PDL Init File data** - a file that the Printer uses to initialize the PDL Interpreter before it starts interpreting
1161   each document in a Job. See description of "pdl-init-file" Job Template attribute in [prod-print2] Section
1162   5.8. It is immaterial how this file is specified, whether it be by a queue override, job object attribute or
1163   printer default – the precedence of the contents of this file is at this level.

1164   9. **printer default** - a Printer "xxx-default" attribute that is applied by the Printer provided that none of the
1165   higher levels have supplied a value. The Printer implementation MUST supply values for all of the
1166   Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For example,
1167   if the output device will use media from the large-capacity input tray if not directed otherwise, the
1168   implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity' keyword
1169   value without requiring the administrator to configure that value. The implementation MUST allow the
1170   administrator to configure the Printer's "xxx-default" attributes to other values, if other value are
1171   supported by the implementation. Example: The administrator changes the Printer's "media-default"
1172   from 'large-capacity' to 'na-letter'.

1173   Note: Because of the requirement that the implementation supply pre-configured values for the
1174   Printer's "xxx-default" attributes, there is no need for a lower "hardware default" precedence
1175   level.

1176   6   Operation Attributes for the Job and Document Creation operations

1177 This section lists *all* the Operation attributes that have been defined in other IPP specifications that are used in Job
1178 Creation operations and extends their use to the Document Creation operations defined in the IPP specification.
1179 Operation attributes relate to the operation and do not depend on the printing capabilities of the Printer.

6.1 Operation Attributes supplied at the Job and Document Levels

Table 4 lists the Operation attributes that clients supply at the Job Level and/or the Document Level. The value of the "ipp-attribute-fidelity" operation attribute does *not* affect the Printer's handling of the other operation attributes, only its handling of the Job Template attributes (see section 7).

The "Level Supplied" column indicates whether the Operation attribute can be supplied at the Job Level (Print-Job, Print-URI, and Create-Job) and at the Document Level (Create-Document, Send-Document, and Send-URI) . The Conformance column indicates the conformance requirements for what the client supplies in a request and the Printer supports in a request. The Reference and Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute

Table 4 - Operation Attributes supplied at the Job and Document Levels

Operation attribute name for Job and Document Creation *requests*	Attribute Syntax	Level Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
attributes-charset *	charset	y	y	MUST	MUST	[RFC2911] §3.1.4
attributes-natural-language *	naturalLanguage	y	y	MUST	MUST	[RFC2911] §3.1.4
compression	type3 keyword	y[10]	y	MAY	MUST	[RFC2911] §3.2.1.1
document-format	mimeMediaType	y[3]	y	MAY	MUST	[RFC2911] §3.2.1.1
document-name	name(MAX)	y[3]	y	MAY	MUST	[RFC2911] §3.2.1.1
document-natural-language	naturalLanguage	y[3]	y	MAY	MAY	[RFC2911] §3.2.1.1
document-overrides	1setOf collection		y[11]	MAY	MAY	[override] §5.1
document-uri	uri	y	y	MAY[12]	MAY	[RFC2911] §3.2.2
input-document-number[13]	integer(1:MAX)	-	y	MAY	MAY	[override] §9.2
ipp-attribute-fidelity	boolean	y	y	MAY	MUST	[RFC2911] §3.2.1.1
job-impressions	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-k-octets	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-media-sheets	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-name	name(MAX)	y	-	MAY	MUST	[RFC2911] §4.3.5

---

[10] The "compression", "document-format", "document-name", and "document-natural-language" MAY be supplied in the Create-Job Job Creation operation as an extension to [RFC2911] as specified in [override]. If supplied in any Job Creation operation, the Printer copies them to corresponding Job Description attributes for subsequent Job query. These supplied attributes become defaults for the Documents in the job and used if the client does not supply the corresponding operation attribute in the Send-Document or Send-URI Document Creation operation.

[11] The "document-overrides" (collection) attribute MAY be supplied by the client in a Send-Document or Send-URI request as an Operation attribute to apply document overrides to this and/or subsequent documents in the job. See the "page-overrides" Job Template attribute in Table 6 for the listing of the member attributes. However, with the introduction of the Document object, the "document-overrides" (collection) attribute SHOULD NOT be used (either as a Job Template attribute or an Operation attribute). Instead, the client simply supplies the Document Template attributes (see Table 6) for each Document Creation request (in a new Document Template attribute group) without needing a collection.

[12] The "document-uri" operation attribute MUST be supplied in the Job Creation operation and MUST NOT be supplied in other Job Creation operations.

[13] The "input-document-number" operation attribute sets the Document's "document-number" Document Description attribute (see section 8.1).

Operation attribute name for Job and Document Creation *requests*	Attribute Syntax	Level Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
job-password	octetString(255)	y	-	MAY	MAY	[prod-print2] §4.1
job-password-encryption	type3 keyword | name(MAX)	y	-	MAY	MAY	[prod-print2] §4.2
last-document	boolean	-	y	MUST	MUST	[RFC2911] §3.3.1.1
job-mandatory-attributes	1setOf type2 keyword	y	y	MAY	MAY	[this spec] §6.2.1
operation-id *	integer(1:0x8FFF)	y	y	MUST	MUST	[RFC2911] §3.1.2
original-requesting-user-name	name(MAX)	y	y	MAY	MAY	[adm-ops] §11.7.2.2
page-overrides	1setOf collection	-	y[14]	MAY	MAY	[override] §
printer-uri *	uri	y	y	MUST	MUST	[RFC2911] §3.1.5
request-id *	integer(1:MAX)	y	y	MUST	MUST	[RFC2911] §3.1.2
requesting-user-name *	name(MAX)	y	y	SHOULD	MUST	[RFC2911] §3.2.1.1
version-number *	X.Y	y	y	MUST	MUST	[RFC2911] §3.1.8

1190 * - indicates attributes that are defined for *all* operations, not just Job Creation and Document Creation operations

6.2 Operation Attributes defined for use with the Document Object

1192 This section defines new Operation attributes defined for use with the Document object.

6.2.1 job-mandatory-attributes (1setOf type2 keyword)

1194 This operation attribute identifies which Job Template and Document Template attributes the Printer MUST honor,
1195 otherwise, the Printer MUST reject the Job Creation for the Job or any subsequent Document Creation operations for
1196 this Job. The Printer MUST ignore this attribute if the "ipp-attribute-fidelity" operation attribute is supplied with a 'true'
1197 value, since that indicates that the Printer MUST honor all supplied Job and Document Template attributes.

1198 The values of the "job-mandatory-attributes" attribute are the keywords that identify attributes, for example, 'copies'
1199 and 'media'. In order to identify a member attribute of a collection attribute, the keyword names of both the collection
1200 attribute and the member attribute are given separated by a period (.) character. For example, to make the "media"
1201 attribute of the "cover-front" collection attribute, supply the keyword value: 'cover-front.media'.

1202 ISSUE 09: Shouldn't we have both a "job-mandatory-attributes" and a "document-management-attributes" operation
1203 attribute, one for use in Job Creation operations and the other for use in Document Creation operations?

6.3 Operation Attributes returned in Job and Document Creation responses

1205 Table 5 lists the Operation attributes that Printers return in Job Creation operation *responses*: Print-Job, Print-URI,
1206 and Create-Job and in Document Creation operation *responses*: Send-Document and Send-URI. The column
1207 labeled "Conformance" indicates the conformance for what the Printer returns and what the Printer supports. The
1208 Reference and Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

1209

---

[14] The "page-overrides" (collection) attribute MAY be supplied by the client in a Send-Document or Send-URI request
as an Operation attribute to apply page overrides to this and/or subsequent documents in the job. See the "page-
overrides" Job Template attribute in Table 6 for the listing of the member attributes. However, with the introduction of
the Document object, the "page-overrides" (collection) attribute SHOULD be more simply supplied as one of the
Document Template attributes for this document only.

1210   **Table 5 - Operation attributes returned in Job and Document Creation operation *responses***

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
attributes-charset *	charset	MUST	MUST	[RFC2911] §3.1.4
	'utf-8'	MAY	MUST	[RFC2911] §4.1.7
	'us-ascii'	MAY	MAY	[RFC2911] §4.1.7
	'iso-8859-1'	MAY	MAY	[RFC2911] §4.1.7
	'iso-10646-ucs-2'	MAY	MAY	[RFC2911] §4.1.7
attributes-natural-language *	naturalLanguage	MUST	MUST	[RFC2911] §3.1.4
	'en-US'	MAY	MAY	[RFC2911] §4.1.8
detailed-status-message *	text	MAY	MAY	[RFC2911] §3.1.6.3
document-access-error	text	MAY	MAY	[RFC2911] §3.1.6.4
document-id-uri	uri	MUST? ISSUE 10	MUST? ISSUE11	[this spec] §8.8
job-id	integer(1:MAX)	MUST	MUST	[RFC2911] §4.3.2
job-uri	uri	MUST	MUST	[RFC2911] §4.3.1
redirect-uri (uri)[15]	uri	MAY	MAY	[not-srv] §5.2
request-id *	integer(1:32767)	MUST	MUST	[RFC2911] §3.1.2
status-code *	integer(0:32767)	MUST	MUST	[RFC2911] §3.1.6.1
status-message *	text(255)	MAY	MAY	[RFC2911] §3.1.6.2
version-number *	integer(1:255), integer(0:255)	MUST	MUST	[RFC2911] §3.1.8

1211   * - indicates attributes that are defined for *all* operations, not just Job Creation operations
1212

7   Job Template and Document Template attributes

1214   Table 6 lists *all* of the Job Template attributes defined in other IPP specifications and lists their corresponding
1215   Document Template attributes defined in this IPP specification. The Job Template attributes can be supplied in the
1216   Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

1217   A subset of these Job Template attributes (e.g., "document-format" and "media", but not "job-priority") are also
1218   defined to apply to Documents and are called Document Template attributes when supplied at the Document Level.
1219   Document Template attribute can be supplied in the Create-Document, Send-Document, and Send-URI operations.

1220   These Document Template attributes can also be supplied as Document Overrides using the "document-overrides"
1221   Job Template attribute (see [overrides]).

1222   A subset of the Document Template attributes that apply to pages (e.g., "media", but not "document-format" or "job-
1223   priority") can also be supplied as Page Overrides using the "page-overrides" Job Template collection attribute (see
1224   [override]) or as a Document Template attribute.

1225   According to [override], the "document-overrides" (collection) attribute MAY be supplied by the client in a Send-
1226   Document or Send-URI request as an Operation attribute to apply document overrides to this and/or subsequent

---

[15] The Printer or Notification Server returns the "redirect-uri" operation attribute in order to redirect the Get-
Notification operation to a Notification Server or back to the original Printer.

1227 documents in the job. See the "document-overrides" Job Template attribute in Table 6 for the listing of the member
1228 attributes. However, with the introduction of the Document object, the "document-overrides" (collection) attribute
1229 SHOULD NOT be used (either as a Job Template attribute or an Operation attribute). Instead, the client simply
1230 supplies the Document Template attributes (see Table 6) for each Document Creation request (in a new Document
1231 Template attribute group) without needing a collection.   A Printer MAY support "document-overrides" as specified in
1232 [override] for backward compatibility with clients that don't support the Document object.

1233 The "document-overrides" attribute is also useful in combination with the "pages-per-subset" attribute (see
1234 [overrides]) which divides up the Input Page stream concatenated across the Input Documents into separate Output
1235 Documents. For example, making every 10 Input Pages be a separate Output Document but the client only wants to
1236 staple the first Output Document.

1237 Similarly, according to [override], the "page-overrides" (collection) attribute MAY be supplied by the client in a Send-
1238 Document or Send-URI request as an Operation attribute to apply page overrides to this and/or subsequent
1239 documents in the job. See the "page-overrides" Job Template attribute in Table 6 for the listing of the member
1240 attributes. However, with the introduction of the Document object, the "page-overrides" (collection) attribute
1241 SHOULD be more simply supplied as one of the Document Template attributes for the document being created only.
1242 However, a Printer MAY also support the "page-overrides" attribute as an operation attribute for backward
1243 compatibility with clients that do not support the Document object.

1244 The "Defined for use" column indicates whether the client MAY supply and the Printer support the attribute at the
1245 Job, Document, or Page Level with the following semantics:

Supplied	Description
J=y:	Job Level: The attributes MAY be supplied as Job Template attributes at the Job Level in a Job Creation request (Print-Job, Print-URI, Create-Job) in which case each Document inherits the Job Template attribute as a default which is used unless an attribute at the document level is also supplied. Note: The "multiple-document-handling" attribute controls whether extensive attributes, such as "finishing", "copies", affect the entire job as a whole ('single-xxx' values) or affect each document separately ('separate-xxx' values).
D=y:	Document Level: The attribute MAY be supplied at the Document Level as Document Template attributes in a Document Creation operation (Send-Document, Send-URI), in which case the supplied Document Templates override any Job Template attributes supplied at the Job Level and any "document-overrides" supplied at the Job or Document level.
P=y:	Page Level: The attribute MAY be supplied as a member of the (1) "page-ranges" Job Template attribute at the Job Level in a Job Creation operation or (2) "page-ranges" Document Template attribute at the Document Level to affect the specified range of pages.

1246
1247 Job Template and Document Template attributes are OPTIONAL for a Printer to support and for a client to supply in
1248 a Job Creation or Document Creation request or a Document Overrides or Page Overrides. If a Printer supports a
1249 Job Template or Document Template attribute, then it MUST copy the supplied attribute to the Job or Document
1250 object, respectively so that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs and Get-
1251 Document-Attributes/Get-Documents operations, respectively. The effect of Job Template Attributes supplied in Job
1252 Creation requests are inherited by the Document objects, unless the Document Creation operation supplies the
1253 attribute with a different value.

1254 If a Job Template collection attribute is supported (see [coll]), then there are conformance requirements for which
1255 member attributes MUST be supported and which member attributes a client MUST supply as indicated in the
1256 Conformance column for each collection member attribute in Table 6.

1257   **Table 6 - Job Template and Document Template attributes**

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
copies	integer(1:MAX)	y[16]	y	n	MAY	MAY	[RFC2911] §4.2.5
cover-back	collection	y	y	n	MAY	MAY	[prod-print] §3.1
cover-type	type2 keyword				MUST	MUST	[prod-print] §3.1.2
media	type3 keyword | name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.1.1
media-col	collection					MAY	[prod-print] §3.1.1
cover-front	collection	y	y	n	MAY	MAY	[prod-print] §3.1
cover-type	type2 keyword				MUST	MUST	[prod-print] §3.1.2
media	type3 keyword | name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.1.1
media-col	collection					MAY	[prod-print] §3.1.1
document-overrides	collection	y	n	n	MAY	MAY	[override] §5.1
input-documents	1setOf rangeOfInteger(MAX)				MUST be one or the other, but NOT both	MUST	[override] §5.1.1
output-documents	1setOf rangeOfInteger(MAX)					MUST	[override] §5.1.2
document-copies	1setOf rangeOfInteger(MAX)				MAY	MAY	[override] §5.1.3
document-format	mimeMediaType				MAY	MUST	[override] §5.1.4
document-name	name (MAX)				MAY	MUST	[override] §5.1.5
compression	type3 keyword				MAY	MUST	[override] §5.1.6
document-natural-language	naturalLanguage				MAY	MAY	[override] §5.1.7
page-ranges	1setOf rangeOfInteger (1:MAX)				MAY	MAY	[override] §5.1.8
any other Job Template attributes that affect documents, such as "media" or "media-col"					MAY	MAY	
feed-orientation	type3 keyword	y	y	n	MAY	MAY	[prod-print2] §5.1
finishings	1setOf type2 enum	y[17]	y	y	MAY be neither or one of, but NOT both	MAY, MUST if "finishing-col" is supported	[RFC2911] §4.2.6 [finish] §2
finishings-col	collection	y[9]	y	y		MAY	[prod-print] §3.2

---

[16] The IPP "copies" attribute is an *extensive* attribute, so its effect when supplied at the job level is not always inherited by the documents in a multi-document job. Instead, its effect depends on the value of the "multiple-document-handling" Job Template attribute. The 'single-document' and 'single-document-new-sheet' values produce copies of the job as a whole with the multiple input documents concatenated into a single output document for each job copy. The 'separate-document-uncollated-copies' value produce N copies of the first input document followed by N copies of the second input document, etc. The 'separate-document-collated-copies' produce N successive job copies, each job copy consisting of 1 copy of the first document followed by 1 copy of the second document, etc.

[17] The IPP "finishings" and "finishings-col" attributes are *extensive* attributes, so their effect when supplied at the job level is not always inherited by the documents in a multi-document job. Instead, their effect depends on the value of the "multiple-document-handling" Job Template attribute. The 'single-document' and 'single-document-new-sheet' cause the finishing to be applied to each job copy as a whole. The 'separate-documents-collated-copies' and 'separate-document-uncollated-copies' values cause the finishing to be applied to each document.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
finishing-template	name(MAX)				MAY	MAY	[prod-print] §3.2.1
stitching	collection				MAY	MAY	[prod-print] §3.2.2
stitching-reference-edge	type2 keyword				MUST	MUST	[prod-print] §3.2.2.1
stitching-offset	integer (0:MAX)				MUST	MUST	[prod-print] §3.2.2.2
stitching-locations	1setOf integer(0:MAX)				MUST	MUST	[prod-print] §3.2.2.3
font-name-requested	name(MAX)	y	y	y	MAY	MAY	[prod-print2] §5.2
font-size-requested	integer (1:MAX)	y	y	y	MAY	MAY	[prod-print2] §5.3
force-front-side	1setOf integer(1:MAX)	y[18]	y	y	MAY	MAY	[prod-print] §3.3
imposition-template	type2 keyword | name(MAX)	y	y	y	MAY	MAY	[prod-print] §3.4
insert-sheet	1setOf collection	y[10]	y	y	MAY	MAY	[prod-print] §3.5
insert-after-page-number	integer(0:MAX)				MUST	MUST	[prod-print] §3.5.1
insert-count	integer(0:MAX)				MAY	MUST	[prod-print] §3.5.2
media	type3 keyword | name(MAX)				MUST be one or the other, but NOT both	MUST	[prod-print] §3.5.3
media-col	collection					MAY	[prod-print] §3.5.3
job-account-id	name(MAX)	y	n	n	MAY	MAY	[prod-print] §3.6
job-accounting-sheets	collection	y	n	n	MAY	MAY	[prod-print] §3.8
job-accounting-sheets-type	type3 keyword | name(MAX)				MUST	MUST	[prod-print] §3.8.1
media	type3 keyword | name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.8.2
media-col	collection					MAY	[prod-print] §3.8.2
job-accounting-output-bin	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.8.3
job-accounting-user-id	name(MAX)	y	n	n	MAY	MAY	[prod-print] §3.7
job-copies	integer(1:MAX)	y	n[19]	n	MAY	MAY	[this spec] §7.1.1
job-cover-back	collection	y	n[20]	n	MAY	MAY	[this spec] §7.1.2
same as cover-back	**see cover-back**						
job-cover-front	collection	y	n[21]	n	MAY	MAY	[this spec] §7.1.3
same as cover-front	**see cover-front**						
job-error-sheet	collection	y	n	n	MAY	MAY	[prod-print] §3.9

---

[18] The effect of the IPP "force-front-side" and "insert-sheet" attributes when supplied at the job level of a multi-document job depends on the value of the "multiple-document-handling" Job Template attribute. For the 'single-document' and 'single-document-new-sheet' values, the pages are numbered as a single set from 1 to n for the job as a whole. For the 'separate-documents-collated-copies' and 'separate-document-uncollated-copies' values, the pages are numbered from 1 to n for each document separately.

[19] The "job-copies" Job Template attribute MUST NOT be supplied at the Document or Page Level. The "job-copies" Job Template attribute was introduced for use in clients or Printers that don't support "multiple-document-handling" = 'single-document' or 'single-document-new-sheet'.

[20] The "job-cover-back" Job Template attribute MUST NOT be supplied at the Document or Page Level. The "job-cover-back" Job Template attribute was introduced for use in clients or Printers that don't support "multiple-document-handling" = 'single-document' or 'single-document-new-sheet'.

[21] The "job-cover-front" Job Template attribute MUST NOT be supplied at the Document or Page Level. The "job-cover-front" Job Template attribute was introduced for use with clients or Printers that don't support "multiple-document-handling" = 'single-document' or 'single-document-new-sheet'.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
job-error-sheet-type	type3 keyword | name(MAX)				MUST	MUST	[prod-print] §3.9.1
job-error-sheet-when	type2 keyword				MAY	MAY	[prod-print] §3.9.2
media	type3 keyword | name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.9.3
media-col	collection					MAY	[prod-print] §3.9.3
job-finishings	1setOf type2 enum	y	n[22]	n	MAY	MAY	[this spec] §7.1.4
job-finishings-col	collection	y	n[23]	n	MAY	MAY	[this spec] §7.1.5
same as finishings-col	**see finishings-col**						
job-hold-until	type3 keyword | name(MAX)	y	n	n	MAY	MAY	[RFC2911] §4.2.2
job-hold-until-time	dateTime	y	n	n	MAY	MAY	[prod-print2] §5.4
job-message-to-operator	text(MAX)	y	n	n	MAY	MAY	[prod-print] §3.10
job-phone-number	text(127)	y	n	n	MAY	MAY	[prod-print2] §5.5
job-priority	integer(1:100	y	n	n	MAY	MAY	[RFC2911] §4.2.1
job-recipient-name	name(MAX)	y	n	n	MAY	MAY	[prod-print2] §5.6
job-save-disposition	collection	y	n	n	MAY	MAY	[prod-print2] §5.7
save-disposition	type3 keyword	y	n	n	MAY	MAY	[prod-print2] §5.7.1.1
save-info	1setOf collection	y	n	n	MAY	MAY	[prod-print2] §5.7.1.2
save-location	uri	y	n	n	MAY	MAY	[prod-print2] §5.7.1.2.3.1
save-name	name(MAX)	y	n	n	MAY	MAY	[prod-print2] §5.7.1.2.3.2
save-document-format	mimeMediaType	y	n	n	MAY	MAY	[prod-print2] §5.7.1.2.3.3
job-sheet-message	text(MAX)	y	n	n	MAY	MAY	[prod-print] §3.12
job-sheets	type3 keyword | name(MAX)	y	n	n	MAY be neither or one of, but NOT both	MAY, MUST if "job-sheets-col" supported	[RFC2911] §4.2.3
job-sheets-col	collection	y	n	n		MAY	[prod-print] §3.11
job-sheets	type3 keyword | name(MAX)				MUST	MUST	[prod-print] §3.11.1
media	type3 keyword | name(MAX)				MUST be one or the other, but NOT both	MUST	[prod-print] §3.11.2
media-col	collection					MAY	[prod-print] §3.11.2
media	type3 keyword | name(MAX)	y	y	y	MAY be neither or one of, but NOT both	MAY, MUST if "media-col" supported	[RFC2911] §4.2.11
media-col	collection	y	y	y		MAY	[prod-print] §3.13

---

[22] The "job-finishing" Job Template attribute MUST NOT be supplied at the Document or Page Level. The "job-finishings" Job Template attribute was introduced for use with clients or Printers that don't support "multiple-document-handling" = 'single-document' or 'single-document-new-sheet'.

[23] The "job-finishing-col" Job Template attribute MUST NOT be supplied at the Document or Page Level. The "job-finishings-col" Job Template attribute was introduced for use with clients or Printers that don't support "multiple-document-handling" = 'single-document' or 'single-document-new-sheet'.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
media-back-coating	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.10
media-color	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.4
media-front-coating	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.10
media-grain	type3 keyword | name(MAX)				MAY	MAY	[prod-print2] §8.4.2
media-hole-count	integer(0:MAX)				MAY	MAY	[prod-print] §3.13.6
media-info	text(255)				MAY	MAY	[prod-print] §3.13.3
media-key	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.1
media-material	type3 keyword | name(MAX)				MAY	MAY	[prod-print2] §8.4.3
media-order-count	integer(1:MAX)				MAY	MAY	[prod-print] §3.13.7
media-preprinted	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.5
media-recycled	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.11
media-size	collection				MAY	MUST	[prod-print] §3.13.8
x-dimension	integer(0:MAX)				MUST	MUST	[prod-print] §3.13.8.1
y-dimension	integer(0:MAX)				MUST	MUST	[prod-print] §3.13.8.2
media-tooth	type3 keyword | name(MAX)				MAY	MAY	[prod-print2] §8.4.1
media-thickness	integer(1:MAX				MAY	MAY	[prod-print2] §8.4.4
media-type	type3 keyword | name(MAX)				MAY	MAY	[prod-print] §3.13.2
media-weight-metric	integer(0:MAX)				MAY	MAY	[prod-print] §3.13.9
media-input-tray-check	type3 keyword | name(MAX)	y	y	y	MAY	MAY	[prod-print] §3.14
multiple-document-handling	type2 keyword	y	n	n	MAY	MUST if multiple document jobs supported	[RFC2911] §4.2.4
number-up	integer(1:MAX)	y	y	y	MAY	MAY	[RFC2911] §4.2.9
orientation-requested	type2 enum	y	y	y	MAY	MAY	[RFC2911] §4.2.10
output-bin	type2 keyword | name(MAX)	y	y	n	MAY	MAY	[output-bin] §2.1
page-delivery	type2 keyword	y	y	n	MAY	MAY	[prod-print] §3.15
page-order-received	type2 keyword	y	y	n	MAY	MAY	[prod-print] §3.16
page-overrides	1setOf collection	y[24]	y	n	MAY	MAY	[override] §5.2

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
input-documents	1setOf rangeOfInteger(MAX)				MUST be one or the other, but NOT both	MUST	[override] §5.2.1
output-documents	1setOf rangeOfInteger(MAX)					MUST	[override] §5.2.2
document-copies	1setOf rangeOfInteger(MAX)				MAY	MAY	[override] §5.2.3
pages	1setOf rangeOfInteger(MAX)				MUST	MUST	[override] §5.2.4
any other Job Template attributes that affect pages, such as "media" or "media-col"					MAY	MAY	
page-ranges	1setOf rangeOfInteger(1:MAX)	y[25]	y	y	MAY	MAY	[RFC2911] §4.2.7
pages-per-subset	1setOf integer(1:MAX)	y[26]		n	MAY	MAY	[prod-print] §5.3
pdl-init-file	1setOf collection	y	y	n	MAY	MAY	[prod-print2] §5.8
pdl-init-file-location	uri				MAY	MAY	[prod-print2] §5.8.1.1
pdl-init-file-name	name(MAX)				MAY	MAY	[prod-print2] §5.8.1.2
pdl-init-file-entry	name(MAX)				MAY	MAY	[prod-print2] §5.8.1.3
presentation-direction-number-up	type2 keyword	y	y	y	MAY	MAY	[prod-print] §3.17
print-quality	type2 enum	y	y	y	MAY	MAY	[RFC2911] §4.2.13
printer-resolution	resolution	y	y	y	MAY	MAY	[RFC2911] §4.2.12
proof-print	collection	y	n	n	MAY	MAY	[prod-print2] §5.9
proof-print-copies	integer (0:MAX)	y	n	n	MAY	MAY	[prod-print2] §5.9.1.1
media	type3 keyword | name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print2] §5.8.1.2
media-col	collection					MAY	[prod-print2] §5.8.1.2
separator-sheets	collection	y	y	y	MAY	MAY	[prod-print] §3.18
separator-sheets-type	type3 keyword | name(MAX)				MUST	MUST	[prod-print] §3.18.1
media	type3 keyword | name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.18.2
media-col	collection					MAY	[prod-print] §3.18.2
sheet-collate	type2 keyword	y	y	n	MAY	MAY	[job-prog] §3.1
sides	type2 keyword	y	y	y	MAY	MAY	[RFC2911] §4.2.8
x-image-position	type2 keyword	y	y	y	MAY	MAY	[prod-print] §3.19.2
x-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.3
x-side1-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.4
x-side2-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.5
y-image-position	type2 keyword	y	y	y	MAY	MAY	[prod-print] §3.19.6
y-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.7

---

[25] The effect of the IPP "page-ranges" Job Template attribute when supplied at the job level of a multi-document job depends on the value of the "multiple-document-handling" Job Template attribute. For the 'single-document' and 'single-document-new-sheet' values, the pages are numbered as a single set from 1 to n for the job as a whole. For the 'separate-documents-collated-copies' and 'separate-document-uncollated-copies' values, the pages are numbered from 1 to n for each document separately.

[26] The IPP "pages-per-subset" Job Template attribute MUST be supplied at the Job Level and can only be used when the "multiple-document-handling" Job Template attribute is 'separate-documents-collated-copies' or 'separate-documents-uncollated-copes', since the purpose of the "pages-per-subset" attribute is to produce separate output documents for each subset. Otherwise, the Printer MUST ignore the "pages-per-subset" attribute.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
y-side1-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.8
y-side2-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.9

1258

7.1 Job Template attributes defined for use with the Document object

1260 This section defines additional Job Template attributes for use with the Document object.

7.1.1 job-copies (integer(1:MAX)) Job Template attribute

1262 This attribute specifies the number of job copies, i.e., with all of the Document objects taken together. Its
1263 interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the
1264 "copies" Job Template attribute defined in [RFC2911] section 4.2.5 which switches between job copies and
1265 document copies depending on the value of the "multiple-document-handling" Job Template attribute.

7.1.2 job-cover-back (collection) Job Template attribute

1267 This attribute specifies the cover for the back of the job, i.e., with all of the Document objects taken together and is
1268 independent of the value of the "multiple-document-handling" Job Template attribute. The member attributes are the
1269 same as "cover-back" (see [prod-print] section 3.1). However, the "cover-back" Job Template attribute switches
1270 between a job back cover and a document back cover depending on the value of the "multiple-document-handling"
1271 Job Template attribute.

7.1.3 job-cover-front (collection) Job Template attribute

1273 This attribute specifies the cover for the front of the job, i.e., with all of the Document objects taken together and is
1274 independent of the value of the "multiple-document-handling" Job Template attribute. The member attributes are the
1275 same as the "cover-front" Job Template attribute (see [prod-print] section 3.2). However, the "cover-front" Job
1276 Template attribute switches between a job front cover and a document front cover depending on the value of the
1277 "multiple-document-handling" Job Template attribute.

7.1.4 job-finishings (1setOf type2 enum) Job Template attribute

1279 This attribute specifies the job finishings, i.e., with all of the Document objects taken together. Its interpretation is
1280 independent of the value of the "multiple-document-handling" Job Template attribute. See the "finishings" Job
1281 Template attribute defined in [RFC2911] section 4.2.6 which switches between job finishings and document
1282 finishings depending on the value of the "multiple-document-handling" Job Template attribute.

7.1.5 job-finishings-col (1setOf collection) Job Template attribute

1284 This attribute specifies the job finishings collection, i.e., with all of the Document objects taken together. Its
1285 interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the
1286 "finishings" Job Template attribute defined in [RFC2911] section 4.2.6 which switches between job finishings
1287 collection and document finishings collection depending on the value of the "multiple-document-handling" Job
1288 Template attribute.

1289

1290

8 Job Description and Document Description attributes

Table 7 lists all the Job Description defined in other IPP specifications and the corresponding Document Description attributes defined in this IPP specification. Job Description and Document Description attributes are Job object and Document object attributes, respectively, that are filled in by the Printer. Some Job/Document Description attribute values are supplied by the client in the Job/Document Creation operation using corresponding Operation attributes as flagged with "**".

The column labeled "attribute syntax" indicates the attribute syntax (see [RFC2911] section 4.1). The Printer conformance is indicated along with the reference to the specification in which the attribute is defined. The conformance for Document Description attributes (if the Printer supports the Document object) is the same as the corresponding Job Description attributes.

Note: There are no corresponding Page Range (or Page Override) Description attributes. The Page Range is not an object with a state and it cannot be queried.

Legend:
[job-] indicates an attribute that shouldn't have had a "job-" prefix in its name in [RFC2911], so that the same attribute could also apply to the Document object as a Document Description attribute. Note: For the PWG Semantic Model, the "job-" prefix is proposed to be dropped.

"-" indicates that the Job or Document attribute is *not* defined.
** indicates a Job and/or Document Description attribute that the client MAY supply the values for in a corresponding Operation attribute.
(r/w) indicates that the Job Description or Document Description attribute is read/write, so that the client can changes its value using the Set-Job-Attributes or Set-Document-Attributes operation (see section 3.7).
ISSUE 12: The "document-name" Document Description attribute is settable by Set-Document-Attributes (like "job-name")? But It's the only Document Description attribute that is marked (r/w)? Do we really need to be able to let a client change the "document-name" with the Set-Document-Attributes operation?

Table 7 - Job and Document Description attributes

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference
attributes-charset	charset	y	y	MUST	[RFC2911] §4.3.19
attributes-natural-language	naturalLanguage	y	y	MUST	[RFC2911] §4.3.20
compression**	type3 keyword	y	y	MUST	[RFC2911] §3.2.1.1
current-page-order	type2 keyword	y[27]	y	MAY	[prod-print] §4.1
date-time-at-completed	dateTime	y	y	MAY	[RFC2911] §4.3.14.7
date-time-at-creation	dateTime	y	y	MAY	[RFC2911] §4.3.14.5
date-time-at-processing	dateTime	y	y	MAY	[RFC2911] §4.3.14.6
document-format**	documentFormat	y	y	MUST	[RFC2911] §3.2.1.1

---

[27] When documents in a multiple document job have the same page order, the Printer populates both the Job and Document "current-page-order" with the same value, so that clients that only know about the Job Description attribute will get a value. When the page orders differ, the Printer doesn't populate the "current-page-order" Job Description attribute, but only the Document Description attribute of each Document.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference
document-id-uri	uri	-	y	MUST? ISSUE 13	[this spec] §8.8
**document-name (r/w) **	name(MAX)	y	y	MUST	[RFC2911] §3.2.1.1
document-natural-language**	naturalLanguage	y	y	MAY	[RFC2911] §3.2.1.1
document-number	integer(0:MAX)	-	y	MUST	[this spec] §8.1
document-state	type1 enum	-	y	MUST	[this spec] §8.3.2
document-state-message	text(MAX)	-	y	MAY	[this spec] §8.7
document-state-reasons	1setOf type2 keyword	-	y	MUST	[this spec] §8.5
**document-uri **	uri	-	y	MAY	[this spec] §8.9
impressions-completed-current-copy	integer(0:MAX)	y	y	MAY	[job-prog] §4.4
job-collation-type	type2 enum	y	-	MAY	[job-prog] §4.1
[job-]detailed-status-message	1setOf text (MAX)	y	y	MAY	[RFC2911] §4.3.10
[job-]document-access-errors	1setOf text(MAX)	y	y	MAY	[RFC2911] §4.3.11
job-id	integer(1:MAX)	y	-28	MUST	[RFC2911] §4.3.2
**[job-]impressions **	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.2
[job-]impressions-completed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.2
**[job-]k-octets **	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.1
[job-]k-octets-processed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.1
**[job-]media-sheets **	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.3
[job-]media-sheets-completed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.3
job-message-from-operator	text(127)	y	- ISSUE 14	MAY	[RFC2911] §4.3.16
[job-]more-info	uri	y	y	MAY	[RFC2911] §4.3.4
job-name (r/w) ISSUE	name(MAX)	y	-29	MUST	[RFC2911] §4.3.5
job-originating-user-name	name (MAX)	y	-	MUST	[RFC2911] §4.3.6
job-printer-make-and-model	text(127)	y	-	CMUST30	[RFC2911] §4.3.14.4
[job-]printer-up-time	integer (1:MAX)	y	y	MUST	[RFC2911] §4.3.14.4
job-printer-uri	uri	y	-	MUST	[RFC2911] §4.3.3
job-state	type1 enum	y	-31	MUST	[RFC2911] §4.3.7
job-state-message	text(MAX)	y	-32	MAY	[RFC2911] §4.3.9
job-state-reasons	1setOf type2 keyword	y	-33	MUST	[RFC2911] §4.3.8
job-uri	uri	y	-34	MUST	[RFC2911] §4.3.1

---

28 The Document Description attribute that corresponds to the "job-id" Job Description attribute is the (new) "document-number" attribute.

29 The Document Description attribute that corresponds to the "job-name" Job Description attribute is the (existing) "document-name" attribute defined in [RFC2911].

30 The "job-printer-make-and-model" Job Description attribute MUST be supported if the "job-save-disposition" Job Template attribute is supported.

31 The Document Description attribute that corresponds to the "job-state" Job Description attribute is the (new) "document-state" attribute.

32 There is no Document Description attribute that corresponds to the "job-state-message". Printers can use the "job-state-message" to describe any document level conditions.

33 The Document Description attribute that corresponds to the "job-state-reasons" Job Description attribute is the (new) "document-state-reasons" attribute.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference
[job-]warnings-count	integer(0:MAX)	y	y	MAY	[override] §6.1
last-document **	boolean	-	y	MAY	[RFC2911] §4.3.12
number-of-documents	integer(0:MAX)	y	-	MAY	[RFC2911] §4.3.15
number-of-intervening-jobs	integer(0:MAX)	y	-	MAY	[RFC2911] §4.3.13
output-device-assigned	name(127)	y	-	MAY	[RFC2911] §4.3.7.2
sheet-completed-copy-number	integer(0:MAX)	y	y	MAY	[job-prog] §4.2
sheet-completed-document-number	integer(0:MAX)	y	-	MAY	[job-prog] §4.3
time-at-completed	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.3
time-at-creation	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.1
time-at-processing	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.2

1319   "**"   See the description in the Legend before the table.
1320

1321 Most of the existing "job-state" and "job-state-reasons" Job Description attribute values apply equally well to
1322 individual documents in a multi-document job (with removal of the 'job-' prefix for those that apply to both Job and
1323 Document). Furthermore, the job states are completely service-type neutral, so they can apply to scanning. faxing,
1324 formatting processes as well. The job state reasons have a number of reasons that are print service specific, but
1325 most can apply to other types of service as well. The reason for separating state from reasons, is so that the states
1326 can be the fundamental states that most implementations have, while the state reasons can vary depending on the
1327 sophistication of the system. The states are the ones that clients are most likely to base actions upon, and the state
1328 reasons are more information, both for programs and people.

1329 The descriptions of the new "document-state" and "document-state-reasons" attributes are merged in with the
1330 existing "job-state" and "job-state-reasons". Such merging shows the parallelism in the description to aid
1331 understanding and implementation and so that future maintenance will continue this strong parallelism. The "/"
1332 character separates the words: Job from Document so that the same description can serve for both Job and
1333 Document objects.

8.1 document-number (integer(1:MAX))   Document Description attribute

1335 This Document Description attribute is the ordinal number of the document within the job which determines its order
1336 of being printed in a multi-document job. The Printer generates the values monotonically increasing from 1 for a job.
1337 However, the client MAY supply the value in the "input-document-number" operation attribute.

8.2 job-state (type1 enum)   Job Description attribute

8.3 document-state (type1 enum)   Document Description attribute

1340 The REQUIRED "job-state" and the REQUIRED "document-state" attribute identify the current state of the job and
1341 document, respectively. Even though IPP defines seven values for job/document states (plus the out-of-band
1342 'unknown' value - see [RFC2911] section 4.1), implementations only need to support those states which are
1343 appropriate for the particular implementation. In other words, an IPP Printer object implementation supports only
1344 those job/document states implemented by the output device and available to the IPP Printer object implementation.

1345 Table 8 lists the "job-state" and "document-state" attribute values.

---

[34] The "job-uri" Job Description attribute does not have a corresponding Document Description attribute. The "job-uri" has proved problematic enough.

1346   **Table 8 - "job-state" and "document-state" attribute values**

Values	"job-state"	"document-state"
3 pending	y	y
4 pending-held	y	n/a
5 processing	y	y
6 processing-stopped	y	n/a
7 canceled	y	y
8 aborted	y	y
9 completed	y	y

1347

1348   The (JD) and (J) notation below indicates whether the keyword is defined for the "job-state" and "document-state"
1349   attributes or just the "job-state" attribute as indicated in Table 8. Standard enum values are:

Value	Symbolic Name and Description
'3'	**'pending'** (JD): The job is a candidate to start processing, but is not yet processing. The document has not started to be processed at all.
'4'	**'pending-held"** (J): The job is not a candidate for processing for any number of reasons but will return to the 'pending' state as soon as the reasons are no longer present. The job's "job-state-reason" attribute MUST indicate why the job is no longer a candidate for processing. The 'pending-held' state does not apply to the Document object's "document-state" attribute.
'5'	**'processing'** (JD): One or more of:

1.   The job is using, or is attempting to use, one or more purely software processes that are analyzing, creating, or interpreting a PDL, etc.,
2.   The job is using, or is attempting to use, one or more hardware devices that are interpreting a PDL, making marks on a medium, and/or performing finishing, such as stapling, etc.,
3.   The Printer object has made the job ready for printing, but the output device is not yet printing it, either because the job hasn't reached the output device or because the job is queued in the output device or some other spooler, awaiting the output device to print it.

When the job is in the 'processing' state, the entire job/document state includes the detailed status represented in the Printer object's "printer-state", "printer-state-reasons", and "printer-state-message" attributes.

On the other hand, the 'processing' state for the Document indicates that the Document has begun to be processed. Even if the job stops being processed, the Document remains in the 'processing' state until it moves to one of the three terminal states.

Implementations MAY, though they NEED NOT, include additional values in the job's/document's "job-state-reasons"/"document-state-reasons" attribute to indicate the progress of the job/document, such as adding the 'job-printing'/'printing' value to indicate when the output device is actually making marks on paper and/or the 'processing-to-stop-point' value to indicate that the Printer is in the process of canceling or aborting the job/document. Most implementations won't bother with this nuance.

| '6' | **'processing-stopped'** (J): The job has stopped while processing for any number of reasons and will return to the 'processing' state as soon as the reasons are no longer present. |

Value	Symbolic Name and Description

The job's "job-state-reason" attribute MAY indicate why the job has stopped processing. For example, if the output device is stopped, the 'printer-stopped' value MAY be included in the job's "job-state-reasons" attribute.

Note: When an output device is stopped, the device usually indicates its condition in human readable form locally at the device. A client can obtain more complete device status remotely by querying the Printer object's "printer-state", "printer-state-reasons" and "printer-state-message" attributes.

The 'processing-stopped' state does not apply to the Document object's "document-state" attribute.

'7'   **'canceled'** (JD): The job/document has been canceled by a Cancel-Job/Cancel-Document operation and the Printer object has completed canceling the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is canceling the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' value and one of the 'canceled-by-user', 'canceled-by-operator', or 'canceled-at-device' value. When the job/document moves to the 'canceled' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'canceled-by-xxx', if present, MUST remain.

'8'   **'aborted'** (JD): The job/document has been aborted by the system, usually while the job/document was in the 'processing' or 'processing-stopped' state and the Printer has completed aborting the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is aborting the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' and 'aborted-by-system' values. When the job/document moves to the 'aborted' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'aborted-by-system' value, if present, MUST remain.

'9'   **'completed'** (JD): The job/document has completed successfully or with warnings or errors after processing and all of the job/document media sheets have been successfully stacked in the appropriate output bin(s) and all job/document status attributes have reached their final values for the job/document. The job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain one of: 'completed-successfully', 'completed-with-warnings', or 'completed-with-errors' values.

The final value for this attribute MUST be one of: 'completed', 'canceled', or 'aborted' before the Printer removes the job/document altogether. The length of time that jobs/document remain in the 'canceled', 'aborted', and 'completed' states depends on implementation.

Jobs/documents reach one of the three terminal states: 'completed', 'canceled', or 'aborted', after the jobs/documents have completed all activity, including stacking output media, after the jobs/documents have completed all activity, and all job/document status attributes have reached their final values for the job/document.

8.3.1 The "job-state" Job Description attribute and the Job Life Cycle

The "job-state" attribute is one of the most important Job Description attributes. Figure 1 shows the values of the "job-state" attribute and the Job object life cycle as affected by actions on the Job, Printer, and job processing.
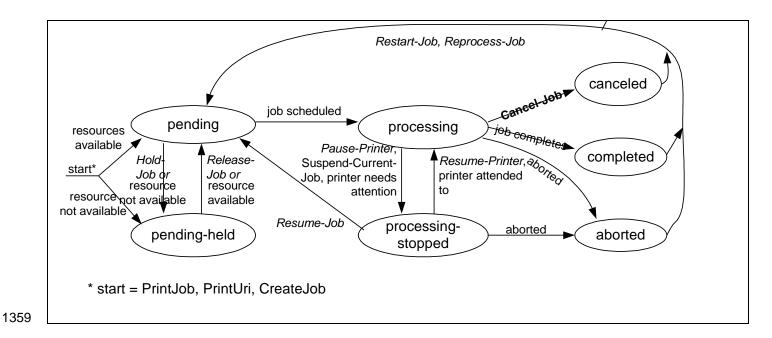
1359

* start = PrintJob, PrintUri, CreateJob

1360   **Figure 1 - The "job-state" Job Description attribute and the Job object life cycle**

1361   Normally a job progresses from left to right. Other state transitions are unlikely, but are not forbidden. Not shown
1362   are the transitions to the 'canceled' state from the 'pending', 'pending-held', and 'processing-stopped' states.

1363   **8.3.2 The "document-state" Document Description attribute and the Document object life**
1364   **Cycle**

1365   The "document-state" attribute is one of the most important Document Description attributes. Figure 2 shows the
1366   values of the "document-state" attribute and the Document object life cycle as affected by actions on the Job,
1367   Document, Printer, and job processing. Documents are not active objects and their life cycle is closely tied to the
1368   lifecycle of a Job[35]. Documents basically have three states.   The first is waiting to be processed by a Job (i.e.
1369   pending). The second state is from the time the Job first starts processing the Document (i.e., processing) and until it
1370   reaches one of its terminal states. The third state for a Document is one of its terminal states (i.e., completed,
1371   canceled, or aborted).

1372
1373

---

[35] The Document object is not really a sub-job. If the Document object were its own independent active object, i.e.,
were a sub-job, then the Document state would affect the job state and there would be complex and debatable roll-up
rules for how the various "document-state" values of all of the Job's document are rolled up to give a single value for
the Job's "job-state" attribute. Instead, the Job state reflects the overall processing of the job and is the same
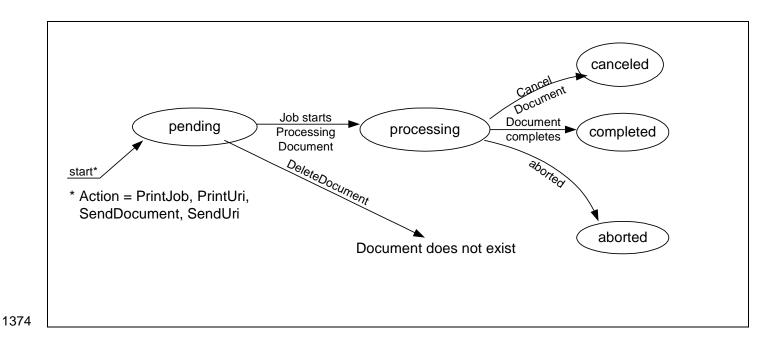whether or not the Document object is supported.

canceled

pending

processing

completed

aborted

Cancel
Document

Document
completes

aborted

Job starts
Processing
Document

start*

* Action = PrintJob, PrintUri,
SendDocument, SendUri

DeleteDocument

Document does not exist

1374

Figure 2 - The "document-state" Document Description attribute and the Document object life Cycle

A Document object has a much simpler life cycle than a Job object. A Document always progresses from left to right in the state diagram. No other state transitions are defined.

8.3.3 Forwarding Servers

As with all other IPP attributes, if the implementation can not determine the correct value for this attribute, it SHOULD respond with the out-of-band value 'unknown' (see [RFC2911] Section 4.1) rather than try to guess at some possibly incorrect value and give the end user the wrong impression about the state of the Job/Document object. For example, if the implementation is just a gateway into some printing system from which it can normally get status, but temporarily is unable, then the implementation should return the 'unknown' value. However, if the implementation is a gateway to a printing system that never provides detailed status about the print job/document, the implementation MAY set the IPP Job/Document object's state to 'completed', provided that it also sets the 'queued-in-device' value in the job's/document's "job-state-reasons"/"document-state-reasons" attribute (see "job-state-reasons"/"document-state-reasons" attribute below).

8.3.4 Partitioning of Job/Document States

This section partitions the job/document states into phases: Job/Document Not Completed, Job/Document Retention, Job/Document History, and Job/Document Removal. This section also explains the 'job-restartable' value of the "job-state-reasons" Job Description attribute for use with the Restart-Job operation.

Job/Document **Not Completed**: When a job is in the 'pending', 'pending-held', 'processing', or 'processing-stopped' states, the job is not completed. When a Document is in the 'pending' or 'processing' state, it is not completed.

Job Retention: When a job enters one of the three terminal job states: 'completed', 'canceled', or 'aborted', the IPP Printer object MAY "retain" the job in a restartable condition for an implementation-defined time period. This time period MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention. While in the Job Retention phase, the job's document data is retained and a client may restart the job using the Restart-Job operation. If the Printer supports the Restart-Job operation, then it SHOULD indicate that the job is restartable by

1399 adding the 'job-restartable' value to the job's "job-state-reasons" attribute (see Section 8.4) during the Job Retention
1400 phase. If the Printer supports the Document object, then the Get-Document-Attributes and Get-Documents
1401 operations MUST be supported while the job is in the Job Retention phase.

1402 **Job History**: After the Job Retention phase expires for a job, the Printer object deletes the document data for the
1403 job and the job becomes part of the Job History. The Printer object MAY also delete any number of the job and
1404 document attributes. Since the job is no longer restartable, the Printer object MUST remove the 'job-restartable'
1405 value from the job's "job-state-reasons" attribute, if present. If the implementation supports the Document object, it
1406 SHOULD retain at least the "document-state" and "document-state-reasons" attributes on the Document object
1407 during the Job History phase which can be queried using the Get-Document-Attributes and Get-Documents
1408 operations.

1409 **Job Removal**: After the job has remained in the Job History for an implementation-defined time, such as when the
1410 number of jobs exceeds a fixed number or after a fixed time period (which MAY be zero seconds), the IPP Printer
1411 removes the Job and Document objects from the system.

1412 Using the Get-Jobs/Get-Documents operation and supplying the 'not-completed' value for the "which-jobs" operation
1413 attribute, a client is requesting jobs/documents in the Job/Document Not Completed phase. Using the Get-Jobs/Get-
1414 Documents operation and supplying the 'completed' value for the "which-jobs" operation attribute, a client is
1415 requesting jobs/documents in the Job Retention and Job History phases. Using the Get-Job-Attributes/Get-
1416 Document-Attributes operation, a client is requesting a job/documents in any phase except Job Removal. After Job
1417 Removal, the Get-Job-Attributes/Get-Document-Attributes and Get-Jobs/Get-Documents operations no longer are
1418 capable of returning any information about a job/document.

1419 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

1420 8.4 job-state-reasons (1setOf type2 keyword) Job Description attribute

1421 8.5 document-state-reasons (1setOf type2 keyword) Document Description attribute

1422 The REQUIRED "job-state-reasons" and the REQUIRED "document-state-reasons" attributes provide additional
1423 information about the job's and each document's current state, i.e., information that augments the value of the job's
1424 "job-state" attribute and each Document's "document-state" attribute, respectively. The Printer SHOULD support the
1425 same values for both the "job-state-reasons" and the "document-state-reasons" attribute for those attributes that are
1426 defined for both as indicated in the "Job" and "Doc" columns in Table 9.

1427 These values MAY be used with any job or document state or states for which the reason makes sense. Some of
1428 these value definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when
1429 implemented, the Printer MUST return these values when the reason applies and MUST NOT return them when the
1430 reason no longer applies whether the value of the Job's "job-state" attribute or the Document's "document-state"
1431 attribute changed or not. When the Job or Document does not have any reasons for being in its current state, the
1432 value of the Job's "job-state-reasons" attribute or Document's "document-state-reasons" attribute MUST be 'none'.

1433 Note: While values cannot be added to the "job-state" or "document-state" attributes without impacting deployed
1434 clients that take actions upon receiving "job-state" or "document-state" values, it is the intent that additional "job-
1435 state-reasons" and "document-state-reasons' values can be defined and registered without impacting such deployed
1436 clients. In other words, the "job-state-reasons" and the "document-state-reasons" attributes are intended to be
1437 extensible.

1438 The following standard keyword values are defined for the "job-state-reasons" and/or "document-state-reasons"
1439 attributes as shown in Table 9. In Table 9 the keywords are listed in alphabetic order (observing the "[job-]" prefix),
1440 while in their descriptions following, they are listed in the most likely order of occurrence.

1441   When the Document object is supported, the Printer implementation SHOULD still support the corresponding Job
1442   level "job-state-reasons", so that clients that do not support the Document object will receive the same information.
1443   Also it is usually more convenient for the client to obtain just the Job level status.

1444   **Notation:**
1445   [job-]   indicates a state reason keyword value that has the 'job-' prefix when it is a value of the "job-state-reasons"
1446   attribute, but does not have the 'job-' prefix when it is a value of the "document-state-reasons" attribute[36].
1447   For purposes of sorting in Table 9, the "[job-]" prefix is observed, since this is an IPP specification.
1448
1449
1450
1451
1452   "-"   indicates that the Job or Document value is *not* defined.
1453

1454   **Table 9 - "job-state-reasons" and "document-state-reasons" attribute values**

IPP Job Description / Document Description attribute name	IPP Attribute Syntax plus Values	Job	Doc	Printer conformance	Reference
job-state-reasons	1setOf type2 keyword	y	-[37]	MUST	[RFC2911] §4.3.8
document-state-reasons	1setOf type2 keyword	-	y	MUST	[this spec] §8.5
	aborted-by-system	y	y	MAY	[RFC2911] §4.3.8
	compression-error	y	y	MAY	[RFC2911] §4.3.8
	document-access-error	y	y	MAY	[RFC2911] §4.3.8
	document-format-error	y	y	MAY	[RFC2911] §4.3.8
	[job-]canceled-at-device	y	y	MAY	[RFC2911] §4.3.8
	[job-]canceled-by-operator	y	y	MAY	[RFC2911] §4.3.8
	[job-]canceled-by-user	y	y	MAY	[RFC2911] §4.3.8
	[job-]completed-successfully	y	y	MAY	[RFC2911] §4.3.8
	[job-]completed-with-errors	y	y	MAY	[RFC2911] §4.3.8
	[job-]completed-with-warnings	y	y	MAY	[RFC2911] §4.3.8
	job-data-insufficient	y	-	MAY	[RFC2911] §4.3.8
	job-hold-until-specified	y	-	MAY	[RFC2911] §4.3.8
	[job-]incoming	y	y	MAY	[RFC2911] §4.3.8
	[job-]interpreting	y	y	MAY	[RFC2911] §4.3.8
	[job-]outgoing	y	y	MAY	[RFC2911] §4.3.8
	job-password-wait	y	-	MAY	[prod-print2] §8.3.1
	[job-]printing	y	y	MAY	[RFC2911] §4.3.8
	[job-]queued	y	y	MAY	[RFC2911] §4.3.8
	[job-]queued-for-marker	y	y	MAY	[RFC2911] §4.3.8
	job-restartable	y	-	MAY	[RFC2911] §4.3.8
	job-resuming	y	-	MAY	[prod-print2] §8.3.1
	job-saved-successfully	y	-	MAY	[prod-print2] §8.3.1
	job-save-error	y	-	MAY	[prod-print2] §8.3.1
	job-saving	y	-	MAY	[prod-print2] §8.3.1
	job-scheduling	y	-	MAY	[prod-print2] §8.3.1

---
[36] For the PWG Semantic Model [pwg-sm], the "job-" prefix is being dropped altogether so that the same values can be used for both the JobStateReasons and DocumentStateReasons attributes.
[37] The Document Description attribute that corresponds to the "job-state-reasons" Job Description attribute is the (new) "document-state-reasons" attribute.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax plus Values	Job	Doc	Printer conformance	Reference
	[job-]spooling	y	y	MAY	[prod-print2] §8.3.1
	[job-]streaming	y	y	MAY	[prod-print2] §8.3.1
	job-suspended	y	-	MAY	[adm-ops] §9.1
	job-suspended-by-operator	y	-	MAY	[prod-print2] §8.3.1
	job-suspended-by-system	y	-	MAY	[prod-print2] §8.3.1
	job-suspended-by-user	y	-	MAY	[prod-print2] §8.3.1
	job-suspending	y	-	MAY	[prod-print2] §8.3.1
	[job-]transforming	y	y	MAY	[RFC2911] §4.3.8
	[job-]warnings-detected	y	y	MAY	[override] §7.1
	none	y	y	MUST	[RFC2911] §4.3.8
	printer-stopped	y	-	MAY	[RFC2911] §4.3.8
	printer-stopped-partly	y	-	MAY	[RFC2911] §4.3.8
	processing-to-stop-point	y	-	MAY	[RFC2911] §4.3.8
	proof-print-wait	y	-	MAY	[prod-print2] §8.3.1
	queued-in-device	y	y	MAY	[RFC2911] §4.3.8
	resources-are-not-ready	y	y ISSUE 15	MAY	[RFC2911] §4.3.8
	resources-are-not-supported	y	y	MAY	[prod-print] §6.1
	service-off-line	y	-	MAY	[RFC2911] §4.3.8
	submission-interrupted	y	y	MAY	[RFC2911] §4.3.8
	unsupported-compression	y	y	MUST	[RFC2911] §4.3.8
	unsupported-document-format	y	y	MUST	[RFC2911] §4.3.8

1455

1456 For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely
1457 to occur (if implemented), starting with the 'none' value. Note: The order is improved over that in [RFC2911]. The
1458 (JD), (J), and (D) notation is identical to the "Job" and "Doc" columns in Table 9 indicating whether the keyword is
1459 defined for the "job-state-reasons" and/or "document-state-reasons" attributes:

1460 **'none' (JD):** There are no reasons for the job's or document's current state. This state reason is
1461 semantically equivalent to "job-state-reasons" or "document-state-reasons" attribute without any
1462 value and MUST be used when there is no other value, since the 1setOf attribute syntax requires at
1463 least one value.

1464 **'job-hold-until-specified' (J)**: The value of the job's "job-hold-until" attribute was specified with a time
1465 period that is still in the future. The job MUST NOT be a candidate for processing until this reason is
1466 removed and there are no other reasons to hold the job. This value SHOULD be supported if the
1467 "job-hold-until" Job Template attribute is supported.

1468 **'job-password-wait' (J)**: The Job is currently being held until the correct password is entered at the device.
1469 If the "job-password" (octetString(255)) Operation attribute (See [prod-print2] section 4.1) is
1470 supported, this value MUST be supported.

1471 **'proof-print-wait' (J)**: The job is currently being held until the operator verifies the output of the proof print
1472 and performs a Release-Job operation. If the "proof-print" (collection) Job Template attribute (See
1473 [prod-print2] section 5.9) is supported, this value MUST be supported.

1474 **'resources-are-not-supported' (JD)**: At least one of the resources needed by the job/document, such as
1475 media, fonts, resource objects, etc., is not supported on any of the physical printers for which the
1476 job/document is a candidate. This condition MAY be detected when the job/document is accepted,
1477 or subsequently while the job/document is pending or processing, depending on implementation.
1478 The job/document may (1) remain in its current state, (2) be moved to the 'pending-held' state,

1479   depending on implementation and/or job scheduling policy, or (3) scheduled normally, but the Printer
1480   is put into the 'stopped' state when the job/document is attempted to be processed on the Printer.
1481   This value is intended for use with an implementation that supports the "user-defined-values-
1482   supported" Printer attribute (see [prod-print] section 6.1) which allows a job to be accepted with an
1483   unsupported 'name' value.

1484   **'resources-are-not-ready' (JD)**: At least one of the resources needed by the job/document, such as media,
1485   fonts, resource objects, etc., is not ready on any of the physical printer's for which the job/document
1486   is a candidate. This condition MAY be detected when the job/document is accepted, or
1487   subsequently while the job/document is pending or processing, depending on implementation. The
1488   job/document may remain in its current state or be moved to the 'pending-held' state, depending on
1489   implementation and/or job/document scheduling policy.

1490   **'[job-]incoming' (JD)**: Either (1) the Printer has accepted the Create-Job operation and is expecting
1491   additional Send-Document and/or Send-URI operations or (2) the Printer is retrieving/accepting
1492   document data as a result of a Print-Job, Print-URI, Send-Document or Send-URI operation.

1493   **'[job-]spooling' (JD)**: Same as 'job-incoming' with the specialization that the Printer is spooling the
1494   Job/Document data before processing it. This value corresponds to the 'spool' or 'automatic' value of
1495   the "job-spooling-supported" Printer Description attribute.

1496   **'[job-]streaming' (JD)**: Same as 'job-incoming' with the specialization that the Printer is processing the
1497   Job/Document data as it is being received (that is, the document is not being spooled, but rather is
1498   being processed in chunks by the output device and is being imaged during reception). This value
1499   corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer Description
1500   attribute.

1501   **'job-data-insufficient' (J)**: The Create-Job operation has been accepted by the Printer, but the Printer is
1502   expecting additional document data before it can move the job into the 'processing' state. If a Printer
1503   starts processing before it has received all data, the Printer removes the 'job-data-insufficient'
1504   reason, but the 'job-incoming' remains. If a Printer starts processing after it has received all data, the
1505   Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at the same time.

1506   **'unsupported-compression' (JD)**: The job/document was aborted by the system because the Printer
1507   determined while attempting to decompress the document-data's that the compression is actually not
1508   among those supported by the Printer. This value MUST be supported, since "compressions is a
1509   REQUIRED operation attribute.

1510   **'compression-error' (JD)**: The job/document was aborted by the system because the Printer encountered
1511   an error in the document-data while decompressing it. If the Printer posts this reason, the document-
1512   data has already passed any tests that would have led to the 'unsupported-compression' job-state-
1513   reason/document-state-reason.

1514   **'document-access-error' (JD)**: After accepting a Print-URI or Send-URI request, the Printer could not
1515   access one or more documents passed by reference. This reason is intended to cover any file
1516   access problem, including file does not exist and access denied because of an access control
1517   problem. The Printer MAY also indicate the document access error using the "job-document-access-
1518   errors" Job Description attribute (see the description of "job-document-access-errors" above).
1519   Whether the Printer aborts the job/document and moves the job/document to the 'aborted' job state
1520   or prints all documents that are accessible and moves the job/document to the 'completed'
1521   job/document state and adds the 'completed-with-errors' value in the job's "job-state-reasons" or
1522   document's "document-state-reasons" attribute depends on implementation and/or site policy. This
1523   value SHOULD be supported if the Print-URI or Send-URI operations are supported.

1524   **'unsupported-document-format' (JD)**: The job/document was aborted by the system because the
1525   document-data's document-format is not among those supported by the Printer. If the client
1526   specifies the document-format as 'application/octet-stream', the printer MAY abort the job/document
1527   and post this reason even though the format is a member of the "document-format-supported" printer

1528   attribute, but not among the auto-sensed document-formats. This value MUST be supported, since
1529   "document-format" is a REQUIRED operation attribute.

1530   **'document-format-error' (JD)**: The job/document was aborted by the system because the Printer
1531   encountered an error in the document-data while processing it. If the Printer posts this reason, the
1532   document-data has already passed any tests that would have led to the 'unsupported-document-
1533   format' job-state-reason/document-state-reason.

1534   **'submission-interrupted' (JD)**: The job or document was not completely submitted for some unforeseen
1535   reason, such as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or
1536   the document transfer method has crashed in some non-recoverable way before the document data
1537   was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-
1538   out period. See the description of the "multiple-operation-time-out" Printer attribute in [RFC2911]
1539   Section 4.4.31.

1540   **'[job-]outgoing' (JD)**: The Printer is transmitting the job/document to the output device.

1541   **'job-scheduling' (J)**: The printer is in the process of scheduling the processing for the Job.

1542   **'[job-]queued' (JD)**: Job is in the 'processing' state, but more specifically, the Printer has queued the
1543   Document data.

1544   **'[job-]transforming' (JD)**: Job/document is in the 'processing' state, but more specifically, the Printer is
1545   interpreting document data and producing another electronic representation.

1546   **'[job-]interpreting' (JD)**: Job/document is in the 'processing' state, but more specifically, the Printer is
1547   interpreting the document data.

1548   **'[job-]queued-for-marker' (JD)**: Job/document is in any of the 'pending-held', 'pending', or 'processing'
1549   states, but more specifically, the Printer has completed enough processing of the document to be
1550   able to start marking and the job/document is waiting for the marker. Systems that require human
1551   intervention to release jobs using the Release-Job operation, put the job into the 'pending-held' job
1552   state. Systems that automatically select a job to use the marker put the job into the 'pending' job
1553   state or keep the job in the 'processing' job state while waiting for the marker, depending on
1554   implementation. All implementations put the job/document into (or back into) the 'processing' state
1555   when marking does begin.

1556   **'[job-]printing' (JD)**: The output device is marking media. This value is useful for Printers which spend a
1557   great deal of time processing (1) when no marking is happening and then want to show that marking
1558   is now happening or (2) when the job/document is in the process of being canceled or aborted while
1559   the job/document remains in the 'processing' state, but the marking has not yet stopped so that
1560   impression or sheet counts are still increasing for the job/document.

1561   **'printer-stopped-partly' (J)**: The value of the Printer's "printer-state-reasons" attribute contains the value
1562   'stopped-partly'.

1563   'printer-stopped' (J): The value of the Printer's "printer-state" attribute is 'stopped'.

1564   **'job-suspending' (J)**: The printer is in the process of moving the Job from a processing condition to a
1565   suspended condition where other jobs can be processed.

1566   **'job-suspended' (J)**: The job has been suspended while processing using the Suspend-Current-Job
1567   operation and other jobs can be processed on the Printer. The Job can be resumed using the
1568   Resume-Job operation which removes this value. Note: Documents cannot be suspended and there
1569   is no Suspend-Current-Document operation.

1570   **'job-suspended-by-operator' (J)**: The Job has been indefinitely suspended by the printer operator.

1571   **'job-suspended-by-user' (J)**: The Job has been indefinitely suspended by the user.

1572   **'job-suspended-by-system' (J)**: The Job has been indefinitely suspended by the Printer's system software
1573   during normal processing of the job.

1574 **'job-resuming' (J)**: The printer is in the process of moving the Job from a suspended condition to become a
1575 candidate for processing.

1576 **'[job-]canceled-by-user' (JD)**: The job/document was canceled by the owner of the job using the Cancel-
1577 Job/Cancel-Document request, i.e., by a user whose authenticated identity is the same as the value
1578 of the originating user that created the Job object, or by some other authorized end-user, such as a
1579 member of the job owner's security group. This 'job-canceled' value SHOULD be supported. The
1580 'canceled-by-user' value SHOULD be supported for the "document-state-reasons" attributes if the
1581 Cancel-Document operation is supported.

1582 **'[job-]canceled-by-operator' (JD)**: The job/document was canceled by the operator using the Cancel-
1583 Job/Cancel-Document request, i.e., by a user who has been authenticated as having operator
1584 privileges (whether local or remote). If the security policy is to allow anyone to cancel anyone's
1585 job/document, then these values may be used when the job/document is canceled by other than the
1586 owner of the job. For such a security policy, in effect, everyone is an operator as far as canceling
1587 jobs/documents is concerned. These values SHOULD be supported if the implementation permits
1588 canceling by other than the owner of the job.

1589 **'[job-]canceled-at-device' (JD)**: The job/document was canceled by an unidentified local user, i.e., a user
1590 at a console at the device. This value SHOULD be supported if the implementation supports
1591 canceling jobs/documents at the console.

1592 **'aborted-by-system' (JD)**: The job/document (1) is in the process of being aborted, (2) has been aborted by
1593 the system and placed in the 'aborted' state, or (3) has been aborted by the system and placed in the
1594 'pending-held' state, so that a user or operator can manually try the job/document again. This value
1595 SHOULD be supported.

1596 **'processing-to-stop-point' (J)**: The requester has issued a Cancel-Job/Cancel-Document operation or the
1597 Printer object has aborted the job/document, but is still performing some actions on the job/document
1598 until a specified stop point occurs or job/document termination/cleanup is completed.
1599 If the implementation requires some measurable time to cancel the job/document in the 'processing'
1600 or 'processing-stopped' job/document states, the Printer MUST use this value to indicate that the
1601 Printer object is still performing some actions on the job/document while the job/document remains in
1602 the 'processing' or 'processing-stopped' state. After all the job's/document's job/document
1603 description attributes have stopped incrementing, the Printer object moves the job/document from
1604 the 'processing' state to the 'canceled' or 'aborted' job/document states.

1605 **'service-off-line' (J)**: The Printer is off-line and accepting no jobs. All 'pending' jobs are put into the
1606 'pending-held' state. This situation could be true if the service's or document transform's input is
1607 impaired or broken.

1608 **'[job-]warnings-detected' (JD)**: If the Printer supports these values, the Printer MUST add the value to "job-
1609 state-reasons" / "document-state-reasons" when it generates the first warning message. That is, a
1610 single occurrence of this value is present in the "job-state-reasons" / "document-state-reasons" if the
1611 Printer has generated one or more warnings.

1612 **'[job-]completed-successfully' (JD)**: The job/document completed successfully. There were no warnings
1613 or errors in printing. This value SHOULD be supported.

1614 **'[job-]completed-with-warnings' (JD)**: The print part of the job/document completed with warnings
1615 (whether or not there were save errors). This value SHOULD be supported if the implementation
1616 detects warnings. [RFC2911]

1617 **'[job-]completed-with-errors' (JD)**: The print part of the job/document completed with errors (and possibly
1618 warnings too) (whether or not there were save errors). This value SHOULD be supported if the
1619 implementation detects errors. [RFC2911]

1620 **'job-saving' (J)**: The Printer is transmitting the Job to the save location. This is similar to the 'job-printing'
1621 value.

1622 **'job-saved-successfully' (J)**: The Printer saved the Job successfully.

1623 **'job-save-error' (J)**: The Printer did not save the Job successfully (whether or not it was printed successfully,
1624   printed with warnings, printed with errors, or not printed). The Printer MUST ensure that none of the
1625   saved job is accessible, if it was unable to successfully save all of the job.

1626 **'job-restartable' (J)**: This job is retained (see the description of "job-state" above, specifically "Partitioning of
1627   Job States") and is currently able to be restarted using the Restart-Job operation (see [RFC2911]
1628   Section 3.3.7). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the Printer
1629   MUST accept a Restart-Job operation for that job. This value SHOULD be supported if the Restart-
1630   Job operation is supported.

1631 **'queued-in-device' (JD)**: The job/document has been forwarded to a device or print system that is unable to
1632   send back status. The Printer sets the job's/document's "job-state" / "document-state" attribute to
1633   'completed' and adds the 'queued-in-device' value to the job's/document's "job-state-reasons" /
1634   "document-state-reasons" attribute to indicate that the Printer has no additional information about the
1635   job/document and never will have any better information. See the description of the "job-state" /
1636   "document-state" attribute above, specifically the portion on "Forwarding Servers".

1637 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

8.6   job-state-message (text(MAX))   Job Description attribute

8.7   document-state-message (text(MAX))   Document Description attribute

1640 This attribute specifies information about the "job-state"/"document-state" and "job-state-reasons"/"document-state-
1641 reasons" attributes in human readable text. If the Printer object supports this attribute, the Printer object MUST be
1642 able to generate this message in any of the natural languages identified by the Printer's "generated-natural-
1643 language-supported" attribute (see the "attributes-natural-language" operation attribute specified in [RFC2911]
1644 Section 3.1.4.1).

1645 The value SHOULD NOT contain additional information not contained in the values of the "job-state" and "job-states-
1646 reasons" attributes, such as interpreter error information. Otherwise, application programs might attempt to parse the
1647 (localized text). For such additional information such as interpreter errors for application program consumption or
1648 specific document access errors, new attributes with keyword values, needs to be developed and registered.

8.8   document-id-uri (uri)   Document Description attribute

1650 This Document Description attribute is generated by the Printer as a unique URI to identify a Document object, in the
1651 same way that the "job-uri" (uri) Job Description attribute uniquely identifies a Job object.

1652 ISSUE 16: Should the "document-id-uri" Document Description attribute be REQUIRED for the Printer to support in
1653 any Document Creation operation, as a way of uniquely identifying a Document object across all Printers?

1654 ISSUE 17: Should we REQUIRE the Printer to accept a "document-id-uri" as an alternative way for clients to specify
1655 the target of Document object operations? I know that implementers have grumbled about the "job-uri" being
1656 REQUIRED for the Printer to support and accept as the target.

8.9   document-uri (uri)   Document Description attribute

1658 This Document Description attribute is the URI that the client supplied in a Send-URI operation. The Printer MUST
1659 support this attribute if the Printer supports the Send-URI operation (see section 3.4).

9 Printer attributes

This section lists *all* of the Printer attributes defined in other IPP documents. Printer attributes are divided into three disjoint groups:

Job Template attributes (JT)	These Printer attributes are related directly to the "xxx" Job Template attributes that a client can supply in a Job Creation request as follows: 1. "xxx-supported" indicate the supported values 2. "xxx-default" indicate the values that will be used if the client and the PDL omit the attribute. 3. "xxx-ready" indicate the supported values that are available without human intervention, for those few attributes that require human intervention, such as "media" and possibly "finishing".
Printer Description attributes (PD)	These Printer attributes describe the Printer, such as "printer-name" and "printer-location". Some of them are "xxx-supported" and "xxx-default" for Operation attributes that the client can supply in a Job Creation request.
neither (-)	These Printer attributes describe supported and defaults for member attributes of collection Job Template attributes.

In a Get-Printer-Attributes request, a client can request all of the Printer attributes in the Job Template (JT) or Printer Description (PD) groups by supplying the 'job-template' or 'printer-description' group name, respectively. The client can also request "all". The column labels are:

"**Attribute Syntax**" - indicates the attribute syntax (see [RFC2911] section 4.1). Many "xxx-default" and "xxx-supported" attributes have the 'collection' syntax which consists of a number of member attributes. These member attributes are not listed in this table when they are the same as the corresponding "xxx" attribute in Table 6. Only those few Printer attribute collection attributes that do not have a corresponding Job Template attributes show the member attributes in this table.

"**Grp**" - indicates to which group the attribute belongs.

"**Printer Conf.**" - indicates the IPP/1.1 Printer conformance requirements for supporting the attribute. Those attributes labeled as "MAY" may have conditional requirements that require their support, if the Printer supports a related attribute, operation, or feature. For example, all Job Template attributes are OPTIONAL for a Printer to support. However, if a Printer supports Job Template attribute "xxx", then it MUST also support the corresponding "xxx-default" and "xxx-supported" attributes. Similarly, if Event Notification is supported, then some of the attributes indicated as "MAY" in this table become MUST.

"**Reference**" - lists the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

Table 10 - Printer attributes (Job Template and Printer Description)

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
charset-configured	charset	PD	MUST	[RFC2911] §4.4.17
charset-supported	1setOf charset	PD	MUST	[RFC2911] §4.4.18
color-supported	boolean	PD	MAY	[RFC2911] §4.4.26
compression-supported	type3 keyword	PD	MUST	[RFC2911] §4.4.32
copies-default	integer(1:MAX)	JT	MAY	[RFC2911] §4.2.5
copies-supported	rangeOfInteger(1:MAX)	JT	MAY	[RFC2911] §4.2.5

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
cover-back-default	collection	JT	MAY	[prod-print] §3.1.3
cover-back-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.1.4
cover-front-default	collection	JT	MAY	[prod-print] §3.1.3
cover-front-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.1.4
cover-type-supported	1setOf type2 keyword	-	MAY	[prod-print] §3.1.2.1
document-creation-attributes-supported	1setOf type2 keyword	PD	MAY	[this-spec] §9.1
document-format-default	mimeMediaType	PD	MUST	[RFC2911] §4.4.21
document-format-supported	1setOf mimeMediaType	PD	MUST	[RFC2911] §4.4.22
document-format-varying-attributes	1setOf type2 keyword	PD	MAY	[set-ops] §6.3
document-overrides-supported	1setOf type2 keyword		MAY	[override] §5.1.14
finishings-col-default	collection	JT	MAY	[prod-print] §3.2.3
finishings-col-ready	1setOf collection	JT	MAY	[prod-print] §3.2.4
finishings-col-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.2.5
finishings-default	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.6
finishings-ready	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.6
finishings-supported	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.6
finishing-template-supported	1setOf name(MAX)	-	MAY	[prod-print] §3.2.1.1
force-front-side-default	1setOf integer(1:MAX)	JT	MAY	[prod-print] §3.3
force-front-side-supported	rangeOfInteger(1:MAX)	JT	MAY	[prod-print] §3.3
generated-natural-language-supported	1setOf naturalLanguage	PD	MUST	[RFC2911] §4.4.20
imposition-template-default	type3 keyword | name(MAX)	-	MAY	[prod-print] §3.4
imposition-template-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.4
insert-after-page-number-supported	rangeOfInteger(0:MAX)	-	MAY	[prod-print] §3.5.1.1
insert-count-supported	rangeOfInteger(0:MAX)	-	MAY	[prod-print] §3.5.2.1
insert-sheet-default	1setOf collection	JT	MAY	[prod-print] §3.5.4
insert-sheet-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.5.5
ippget-event-life	integer(15:MAX)	PD	MAY	[get-method] §8.1
ipp-versions-supported	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.20
job-account-id-default	name(MAX)	JT	MAY	[prod-print] §3.6
job-account-id-supported	boolean	JT	MAY	[prod-print] §3.6
job-accounting-output-bin-default	type3 keyword | name(MAX)	-	MAY	[prod-print] §3.8.3.1
job-accounting-output-bin-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.8.3.2
job-accounting-sheets-default	collection	JT	MAY	[prod-print] §3.8.4
job-accounting-sheets-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.8.5
job-accounting-sheets-type-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.8.1.1
job-accounting-user-id-default	name(MAX)	JT	MAY	[prod-print] §3.7
job-accounting-user-id-supported	boolean	JT	MAY	[prod-print] §3.7
job-creation-attributes-supported	1setOf type2 keyword	PD	MAY	[prod-print2] §7.1
job-error-sheet-default	collection	JT	MAY	[prod-print] §3.7
job-error-sheet-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.9.5
job-error-sheet-type-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.9.1.1
job-error-sheet-when-supported	1setOf type2 keyword	-	MAY	[prod-print] §3.9.2.1
job-hold-until-default	type3 keyword | name(MAX)	JT	MAY	[RFC2911] §4.2.2
job-hold-until-supported	1setOf (type3 keyword |	JT	MAY	[RFC2911] §4.2.2

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
	name(MAX))			
job-impressions-supported	rangeOfInteger(0:MAX)	PD	MAY	[RFC2911] §4.4.34
job-k-octets-supported	rangeOfInteger(0:MAX)	PD	MAY	[RFC2911] §4.4.33
job-media-sheets-supported	rangeOfInteger(0:MAX)	PD	MAY	[RFC2911] §4.4.35
job-message-to-operator-default	text(MAX)	JT	MAY	[prod-print] §3.12
job-message-to-operator-supported	boolean	JT	MAY	[prod-print] §3.12
job-password-supported	integer(0:127)	PD	MAY	[prod-print2] §7.2
job-password-encryption-supported	1setOf (type3 keyword | name(MAX))	PD	MAY	[prod-print2] §7.3
job-priority-default	integer(1:100)	JT	MAY	[RFC2911] §4.2.1
job-priority-supported	1setOf integer(1:100)	JT	MAY	[RFC2911] §4.2.1
job-settable-attributes-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.2
job-sheet-message-default	text(MAX)		MAY	[prod-print] §3.12
job-sheet-message-supported	boolean		MAY	[prod-print] §3.12
job-sheets-col-default	collection	JT	MAY	[prod-print] §3.11.3
job-sheets-col-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.11.4
job-sheets-default	type3 keyword | name(MAX)	JT	MAY	[RFC2911] §4.2.3
job-sheets-supported	1setOf (type3 keyword | name(MAX))	JT	MAY	[RFC2911] §4.2.3
job-spooling-supported	type2 keyword	PD	MAY	[prod-print2] §7.4
max-save-info-supported	integer(1:MAX)	PD	MAY	[prod-print2] §7.5
max-stitching-locations-supported	integer(1:MAX)	PD	MAY	[prod-print] §5.2
media-back-coating-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.13.10.2
media-col-database	1setOf collection	-[38]	MAY	[prod-print2] §7.6
any "media-col" member attribute				
media-col-default	collection	JT	MAY	[prod-print] §3.13.12
media-color-supported	1setOf type2 keyword	-	MAY	[prod-print] §3.13.4.1
media-col-ready	1setOf collection	JT	MAY	[prod-print] §3.13.13
media-col-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.13.14
media-default	type3 keyword | name(MAX)	JT	MAY	[RFC2911] §4.2.11
media-front-coating-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.13.10.1
media-hole-count-supported	1setOf rangeOfInteger(0:MAX)	-	MAY	[prod-print] §3.13.6.1
media-info-supported	boolean	-	MAY	[prod-print] §3.13.3.1
media-input-tray-check-default	type3 keyword | name(MAX)	JT	MAY	[prod-print] §3.14
media-input-tray-check-supported	1setOf (type3 keyword | name(MAX))	JT	MAY	[prod-print] §3.14
media-key-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.13.1.1
media-order-count-supported	1setOf rangeOfInteger(1:MAX)	-	MAY	[prod-print] §3.13.7.1
media-pre-printed-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.13.5.1
media-ready	1setOf (type3 keyword | name(MAX))	JT	MAY	[RFC2911] §4.2.11
media-recycled-supported	1setOf (type3 keyword |	-	MAY	[prod-print] §3.13.11.1

---

[38] The "media-col-database" attribute is not returned when the client requests 'all' or 'printer-description' attribute group because there MAY be a large number of values. Instead the client MUST query "media-col-database" explicitly in a Get-Printer-Attributes request.

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
	name(MAX))			
media-size-supported	1setOf collection	-	MAY	[prod-print] §3.13.8.3
media-supported	1setOf (type3 keyword | name(MAX))	JT	MAY	[RFC2911] §4.2.11
media-type-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.13.2.1
media-weight-metric-supported	1setOf rangeOfInteger(1:MAX)	-	MAY	[prod-print] §3.13.9.1
multiple-document-handling-default	type2 keyword	JT	MAY	[RFC2911] §4.2.4
multiple-document-handling-supported	1setOf type2 keyword	JT	MAY	[RFC2911] §4.2.4
multiple-document-jobs-supported	boolean	PD	MAY	[RFC2911] §4.4.16
multiple-operation-time-out	integer(1:MAX)	PD	MAY	[RFC2911] §4.4.31
natural-language-configured	naturalLanguage	PD	MUST	[RFC2911] §4.4.19
notify-attributes-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.4
notify-events-default	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.3
notify-events-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.3
notify-lease-duration-default	integer(0:67108863)	PD	MAY	[ntfy] §5.3.8
notify-lease-duration-supported	1setOf (integer(0: 67108863) | rangeOfInteger(0:67108863))	PD	MAY	[ntfy] §5.3.8
notify-lease-expiration-time	integer(0:MAX)	PD	MAY	[ntfy] §5.4.3
notify-max-events-supported	integer(2:MAX)	PD	MAY	[ntfy] §5.3.3
notify-pull-method-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.2
notify-schemes-supported	1setOf uriScheme	PD	MAY	[ntfy] §5.3.1
number-up-default	integer(1:MAX)	JT	MAY	[RFC2911] §4.2.9
number-up-supported	1setOf (integer(1:MAX) | rangeOfInteger(1:MAX))	JT	MAY	[RFC2911] §4.2.9
operations-supported	1setOf type2 enum	PD	MUST	[RFC2911] §4.4.15
orientation-requested-default	type2 enum	JT	MAY	[RFC2911] §4.2.10
orientation-requested-supported	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.10
output-bin-default	type2 keyword | name(MAX)	JT	MAY	[output-bin] §2.1
output-bin-supported	1setOf (type2 keyword | name(MAX))	JT	MAY	[output-bin] §2.1
page-delivery-default	type2 keyword	JT	MAY	[prod-print] §3.15
page-delivery-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.15
page-order-received-default	type2 keyword	JT	MAY	[prod-print] §3.16
page-order-received-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.16
page-overrides-supported	1setOf type2 keyword	PD	MAY	[override] §5.2.9
page-ranges-supported	boolean	JT	MAY	[RFC2911] §4.2.7
pages-per-minute	integer(0:MAX)	PD	MAY	[RFC2911] §4.4.36
pages-per-minute-color	integer(0:MAX)	PD	MAY	[RFC2911] §4.4.37
pages-per-subset-supported	boolean	PD	MAY	[override] §5.3.2
parent-printers-supported	1setOf uri	PD	MAY	[adm-ops] §7.2
pdl-override-supported	type2 keyword	PD	MUST	[RFC2911] §4.4.28
presentation-direction-number-up-default	type2 keyword	JT	MAY	[prod-print] §3.17
presentation-direction-number-up-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.17
printer-current-time	dateTime	PD	MAY	[RFC2911] §4.4.30
printer-detailed-status-messages	1setOf text(MAX)	PD	MAY	[prod-print2] §7.7
printer-driver-installer	uri	PD	MAY	[RFC2911] §4.4.8

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
printer-info	text(127)	PD	MAY	[RFC2911] §4.4.6
printer-is-accepting-jobs	boolean	PD	MUST	[RFC2911] §4.4.23
printer-location	text(127)	PD	MAY	[RFC2911] §4.4.5
printer-make-and-model	text(127)	PD	MAY	[RFC2911] §4.4.9
printer-message-date-time	dateTime	PD	MAY	[set-ops] §6.5
printer-message-from-operator	text(127)	PD	MAY	[RFC2911] §4.4.25
printer-message-time	integer(MIN:MAX)	PD	MAY	[set-ops] §6.4
printer-more-info	uri	PD	MAY	[RFC2911] §4.4.7
printer-more-info-manufacturer	uri	PD	MAY	[RFC2911] §4.4.10
printer-name	name(127)	PD	MUST	[RFC2911] §4.4.4
printer-notify-server-uri	uri	PD	MAY	[not-srv] §4.1
printer-resolution-default	resolution	JT	MAY	[RFC2911] §4.2.12
printer-resolution-supported	1setOf resolution	JT	MAY	[RFC2911] §4.2.12
printer-settable-attributes-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.1
printer-state	type1 enum	PD	MUST	[RFC2911] §4.4.11
printer-state-change-date-time	dateTime	PD	MAY	[ntfy] §6.2
printer-state-change-time	integer(1:MAX)	PD	MAY	[ntfy] §6.1
printer-state-message	text(MAX)	PD	MAY	[RFC2911] §4.4.13
printer-state-reasons	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.12
printer-up-time	integer(1:MAX))	PD	MUST	[RFC2911] §4.4.29
printer-uri-supported	1setOf uri	PD	MUST	[RFC2911] §4.4.1
printer-xri-supported	1setOf collection	PD	MAY	[set-ops] §6.6
xri-uri	uri	PD	MUST	[set-ops] §6.6
xri-authentication	1setOf type2 keyword	PD	MUST	[set-ops] §6.6
xri-security	1setOf type2 keyword	PD	MUST	[set-ops] §6.6
print-quality-default	type2 enum	JT	MAY	[RFC2911] §4.2.13
print-quality-supported	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.13
queued-job-count	integer(0:MAX)	PD	MUST	[RFC2911] §4.4.24
reference-uri-schemes-supported	1setOf uriScheme	PD	MAY	[RFC2911] §4.4.27
separator-sheets-default	collection	JT	MAY	[prod-print] §3.18.3
separator-sheets-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.18.4
separator-sheets-type-supported	1setOf (type3 keyword | name(MAX))	-	MAY	[prod-print] §3.18.1.1
sheet-collate-default	type2 keyword	JT	MAY	[job-prog] §3.1
sheet-collate-supported	1setOf type2 keyword	JT	MAY	[job-prog] §3.1
sides-default	type2 keyword	JT	MAY	[RFC2911] §4.2.8
sides-supported	1setOf type2 keyword	JT	MAY	[RFC2911] §4.2.8
stitching-locations-supported	1setOf (integer(0:MAX) | rangeOfInteger(0:MAX))	-	MAY	[prod-print] §3.2.2.3.1
stitching-offset-supported	1setOf (integer (0:MAX) | rangeOfInteger(0:MAX))	-	MAY	[prod-print] §3.2.2.2.1
stitching-reference-edge-supported	1setOf type2 keyword		MAY	[prod-print] §3.2.2.1.1
subordinate-printers-supported	1setOf uri	PD	MAY	[adm-ops] §7.1
uri-authentication-supported	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.2
uri-security-supported	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.3
user-defined-values-supported	1setOf type2 keyword	PD	MAY	[prod-print] §5.1
which-jobs-supported	1setOf type2 keyword	PD	MAY	[prod-print2] §7.8
x-image-position-default	type2 keyword	JT	MAY	[prod-print] §3.19.2
x-image-position-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.19.2
x-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.3

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
x-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.3
xri-authentication-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.8
xri-security-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.9
xri-uri-scheme-supported	1setOf uriScheme	PD	MAY	[set-ops] §6.7
x-side1-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.4
x-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.4
x-side2-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.5
x-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.5
y-image-position-default	type2 keyword	JT	MAY	[prod-print] §3.19.6
y-image-position-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.19.6
y-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.7
y-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.7
y-side1-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.8
y-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.8
y-side2-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.9
y-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.9

1684

1685 9.1 document-creation-attributes-supported (1setOf type2 keyword)

1686 This Printer Description attribute lists the keyword names of the Document Template and Operation attributes that
1687 the Printer will accept in the Create-Document, Send-Document, and Send-URI Document Creation operations.

1688 9.2 printer-state-reasons (1setOf type2 keyword)

IPP Printer Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
printer-state-reasons	1setOf type2 keyword	MUST	[RFC2911] §4.4.12
	other	MAY	[RFC2911] §4.4.12
	none	MUST	[RFC2911] §4.4.12
	connecting-to-device	MAY	[RFC2911] §4.4.12
	cover-open	MAY	[RFC2911] §4.4.12
	deactivated	MAY	[adm-ops] §8.2
	developer-empty	MAY	[RFC2911] §4.4.12
	developer-low	MAY	[RFC2911] §4.4.12
	door-open	MAY	[RFC2911] §4.4.12
	fuser-over-temp	MAY	[RFC2911] §4.4.12
	fuser-under-temp	MAY	[RFC2911] §4.4.12
	hold-new-jobs	MAY	[adm-ops] §8.1
	input-tray-missing	MAY	[RFC2911] §4.4.12
	interlock-open	MAY	[RFC2911] §4.4.12
	interpreter-resource-unavailable	MAY	[RFC2911] §4.4.12
	marker-supply-empty	MAY	[RFC2911] §4.4.12
	marker-supply-low	MAY	[RFC2911] §4.4.12
	marker-waste-almost-full	MAY	[RFC2911] §4.4.12
	marker-waste-full	MAY	[RFC2911] §4.4.12
	media-empty	MAY	[RFC2911] §4.4.12

IPP Printer Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
	media-jam	MAY	[RFC2911] §4.4.12
	media-low	MAY	[RFC2911] §4.4.12
	media-needed	MAY	[RFC2911] §4.4.12
	moving-to-paused	CMUST[39]	[RFC2911] §4.4.12
	opc-life-over	MAY	[RFC2911] §4.4.12
	opc-near-eol	MAY	[RFC2911] §4.4.12
	output-area-almost-full	MAY	[RFC2911] §4.4.12
	output-area-full	MAY	[RFC2911] §4.4.12
	output-tray-missing	MAY	[RFC2911] §4.4.12
	paused	CMUST[40]	[RFC2911] §4.4.12
	shutdown	MAY	[RFC2911] §4.4.12
	spool-area-full	SHOULD	[RFC2911] §4.4.12
	stopped-partly	MAY	[RFC2911] §4.4.12
	stopping	MAY	[RFC2911] §4.4.12
	timed-out	MAY	[RFC2911] §4.4.12
	toner-empty	MAY	[RFC2911] §4.4.12
	toner-low	MAY	[RFC2911] §4.4.12

1689

1690 This description is taken from [RFC2911] with additions from other IPP extension documents:

1691 This REQUIRED Printer attribute supplies additional detail about the device's state. Some of the these value
1692 definitions indicate conformance requirements; the rest are OPTIONAL.

1693 Each keyword value MAY have a suffix to indicate its level of severity. The three levels are: report (least severe),
1694 warning, and error (most severe).

1695 **'-report'**: This suffix indicates that the reason is a "report". An implementation may choose to omit some or
1696 all reports. Some reports specify finer granularity about the printer state; others serve as a precursor
1697 to a warning. A report MUST contain nothing that could affect the printed output.

1698 **'-warning'**: This suffix indicates that the reason is a "warning". An implementation may choose to omit some
1699 or all warnings. Warnings serve as a precursor to an error. A warning MUST contain nothing that
1700 prevents a job from completing, though in some cases the output may be of lower quality.

1701 **'-error'**: This suffix indicates that the reason is an "error". An implementation MUST include all errors. If this
1702 attribute contains one or more errors, printer MUST be in the stopped state.

1703 If the implementation does not add any one of the three suffixes, all parties MUST assume that the reason is an
1704 "error".

1705 If a Printer object controls more than one output device, each value of this attribute MAY apply to one or more of the
1706 output devices. An error on one output device that does not stop the Printer object as a whole MAY appear as a
1707 warning in the Printer's "printer-state-reasons attribute". If the "printer-state" for such a Printer has a value of
1708 'stopped', then there MUST be an error reason among the values in the "printer-state-reasons" attribute.

1709 The following standard keyword values are defined (in alphabetical order):

---

[39] The 'moving-to-paused' value MUST be supported if the Pause-Printer operation is supported and it takes
significant time to move to paused.
[40] The 'paused' value MUST be supported if the Pause-Printer operation is supported.

1710   **'other'**: The device has detected an error other than one listed in this document.

1711   **'none'**: There are not reasons. This state reason is semantically equivalent to "printer-state-reasons" without
1712   any value and MUST be used, since the 1setOf attribute syntax requires at least one value.

1713   **'connecting-to-device'**: The Printer object has scheduled a job on the output device and is in the process of
1714   connecting to a shared network output device (and might not be able to actually start printing the job
1715   for an arbitrarily long time depending on the usage of the output device by other servers on the
1716   network).

1717   **'cover-open'**: One or more covers on the device are open.

1718   **'deactivated'**: A client has issued a Deactivate-Printer operation for the Printer object (see [adm-ops]
1719   section 3.4.1) and the Printer is in the process of becoming deactivated or has become deactivated.
1720   The Printer MUST reject all requests except Activate-Printer, queries (Get-Printer-Attributes, Get-
1721   Job-Attributes, Get-Jobs, etc.), Send-Document, and Send-URI (so that partial job submission can
1722   be completed - see [adm-ops] section 3.1.1) and return the 'server-error-service-unavailable' status
1723   code.

1724   **'developer-empty'**: The device is out of developer.

1725   **'developer-low'**: The device is low on developer.

1726   **'door-open'**: One or more doors on the device are open.

1727   **'fuser-over-temp'**: The fuser temperature is above normal.

1728   **'fuser-under-temp'**: The fuser temperature is below normal.

1729   **'hold-new-jobs'**: The operator has issued the Hold-New-Jobs operation (see [adm-ops] section 3.3.1) or
1730   other means, but the output-device(s) are taking an appreciable time to stop. Later, when all output
1731   has stopped, the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-
1732   paused' value in the "printer-state-reasons" attribute. This value MUST be supported, if the Hold-
1733   New-Jobs operation is supported and the implementation takes significant time to pause a device in
1734   certain circumstances.

1735   **'input-tray-missing'**: One or more input trays are not in the device.

1736   **'interlock-open'**: One or more interlock devices on the printer are unlocked.

1737   **'interpreter-resource-unavailable'**: An interpreter resource is unavailable (i.e. font, form)

1738   **'marker-supply-empty'**: The device is out of at least one marker supply. (e.g. toner, ink, ribbon)

1739   **'marker-supply-low'**: The device is low on at least one marker supply. (e.g. toner, ink, ribbon)

1740   **'marker-waste-almost-full'**: The device marker supply waste receptacle is almost full.

1741   **'marker-waste-full'**: The device marker supply waste receptacle is full.

1742   **'media-empty'**: At least one input tray is empty.

1743   **'media-jam'**: The device has a media jam.

1744   **'media-low'**: At least one input tray is low on media.

1745   **'media-needed'**: A tray has run out of media.

1746   **'moving-to-paused'**: Someone has paused the Printer object using the Pause-Printer operation (see
1747   [RFC2911] section 3.2.7) or other means, but the device(s) are taking an appreciable time to stop.
1748   Later, when all output has stopped, the "printer-state" becomes 'stopped', and the 'paused' value
1749   replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute. This value MUST be
1750   supported, if the Pause-Printer operation is supported and the implementation takes significant time
1751   to pause a device in certain circumstances.

1752   **'opc-life-over'**: The optical photo conductor is no longer functioning.

1753   **'opc-near-eol'**: The optical photo conductor is near end of life.

1754   **'output-area-almost-full'**: One or more output area is almost full (e.g. tray, stacker, collator).

1755   **'output-area-full'**: One or more output area is full. (e.g. tray, stacker, collator)

1756   **'output-tray-missing'**: One or more output trays are not in the device

1757   **'paused'**: Someone has paused the Printer object using the Pause-Printer operation (see [RFC2911] section
1758   3.2.7) or other means and the Printer object's "printer-state" is 'stopped'. In this state, a Printer
1759   MUST NOT produce printed output, but it MUST perform other operations requested by a client. If a
1760   Printer had been printing a job when the Printer was paused, the Printer MUST resume printing that
1761   job when the Printer is no longer paused and leave no evidence in the printed output of such a
1762   pause. This value MUST be supported, if the Pause-Printer operation is supported.

1763   **'shutdown'**: Someone has removed a Printer object from service, and the device may be powered down or
1764   physically removed. In this state, a Printer object MUST NOT produce printed output, and unless the
1765   Printer object is realized by a print server that is still active, the Printer object MUST perform no other
1766   operations requested by a client, including returning this value. If a Printer object had been printing a
1767   job when it was shutdown, the Printer NEED NOT resume printing that job when the Printer is no
1768   longer shutdown. If the Printer resumes printing such a job, it may leave evidence in the printed
1769   output of such a shutdown, e.g. the part printed before the shutdown may be printed a second time
1770   after the shutdown.

1771   **'spool-area-full'**: The limit of persistent storage allocated for spooling has been reached. The Printer is
1772   temporarily unable to accept more jobs. The Printer will remove this value when it is able to accept
1773   more jobs. This value SHOULD be used by a non-spooling Printer that only accepts one or a small
1774   number jobs at a time or a spooling Printer that has filled the spool space.

1775   **'stopped-partly'**: When a Printer object controls more than one output device, this reason indicates that one
1776   or more output devices are stopped. If the reason is a report, fewer than half of the output devices
1777   are stopped. If the reason is a warning, fewer than all of the output devices are stopped.

1778   **'stopping'**: The Printer object is in the process of stopping the device and will be stopped in a while. When
1779   the device is stopped, the Printer object will change the Printer object's state to 'stopped'. The
1780   'stopping-warning' reason is never an error, even for a Printer with a single output device. When an
1781   output-device ceases accepting jobs, the Printer will have this reason while the output device
1782   completes printing.

1783   **'timed-out'**: The server was able to connect to the output device (or is always connected), but was unable to
1784   get a response from the output device.

1785   **'toner-empty'**: The device is out of toner.

1786   **'toner-low'**: The device is low on toner.

10 New Values for Existing Printer Description Attributes

1788   This section contains those attributes for which additional values are added.

10.1 operations-supported (1setOf type2 enum)

1790   The following "operation-id" values are added in order to support the new operations defined in this document:

1791 **Table 11 – Operation-id assignments**

Value	Operation Name	Reference
0x0032	Cancel-Current-Document	[this-doc] §3.9
0x0033	Cancel-Document	[this-doc] §3.8
0x0034	Get-Document-Attributes	[this-doc] §3.5
0x0035	Get-Documents	[this-doc] §3.6
0x0036	Delete-Document	[this-doc] §3.10
0x0037	Set-Document-Attributes	[this-doc] §3.7
0x0038	Validate-Document	[this-doc] §3.11
0x0039	Create-Document	[this-doc] §3.1
0x003A	Send-Data	[this-doc] §3.2

1792 # 11 Conformance Requirements

1793 This section specifies the conformance requirements for Printers and clients.

1794 ## 11.1 Printer conformance requirements

1795 In order to conform to this specification, a Printer:

1796 1. MUST meet the conformance requirements for Printers specified in [RFC2911].

1797 2. MUST support the Document operations that section 3 REQUIRES a Printer to support.

1798 3. MUST support the operation attributes in the Send-Document operation and, if supported, the Send-URI
1799 operation that section 6 REQUIRES a Printer to support.

1800 4. MAY support any of the Document Template attributes in Document Creation operations as indicated in
1801 section 7 and MUST NOT support them for contexts for where they are not defined as indicated in the Table
1802 7 with an "n".

1803 5. MUST support the Document Description attributes that section 8 REQUIRES a Printer to support.

1804 6. MUST support the Printer attributes that section 9 REQUIRES a Printer to support.

1805 7. MUST support the values of Printer Descriptions attribute that section 10 REQUIRES a Printer to support.

1806 ## 11.2 Client conformance requirements

1807 In order to conform to this specification, a client:

1808 1. MUST meet the conformance requirements for clients specified in [RFC2911]

1809 2. MAY support any of the Document operations defined in section 3. ISSUE 18: Or should the client be
1810 REQUIRED to support some of the Document operations?

1811 3. MUST supply the operation attributes that section 6 REQUIRES a client to supply in operation requests.

1812   4. MUST supply any Document Template attributes in the format that section 7 REQUIRES a client to supply in
1813   Document Creation operations and MUST NOT support them for contexts for where they are not defined as
1814   indicated in the Table 7 with an "n".

1815   5. SHOULD support any of the Document Description attributes that section 8 REQUIRES a Printer to support.

1816   6. MAY support any of the Printer attributes listed in section 9.

1817   7. MAY support any of the values of the Printer Descriptions attributes in section 10.

12 Normative References

1818

1819 Note: The references in the body of this IEEE-ISTO document use the more reader-friendly mnemonic symbols
1820 below, rather than the RFC number (except for [RFC2910] and [RFC2911]). IETF RFCs and IANA registrations
1821 require using the RFC numbers in the body of the document for references.

1822 [adm-ops]
1823   Kugler, C, Hastings, T., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Administrative
1824   Operations", <draft-ietf-ipp-ops-set2-03.txt>, July 17, 2001.

1825 [coll]
1826   deBry, R., Hastings, T., Herriot, R., Ocke, K., and P. Zehler, "Internet Printing Protocol (IPP): The 'collection'
1827   attribute syntax", <draft-ietf-ipp-collection-05.txt>, work in progress, July 17, 2001.

1828 [finish]
1829   Hastings, T., Fullman, D., "Internet Printing Protocol (IPP): "finishings" attribute values extension", IEEE-
1830   ISTO 5100.1-2001, February 5, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.1.pdf

1831 [get-method]
1832   Herriot, R., and T. Hastings, "Internet Printing Protocol (IPP): The 'ippget' Delivery Method for Event
1833   Notifications", <draft-ietf-ipp-notify-get-08.txt>, September 5, 2002.

1834 [job-prog]
1835   Hastings, T., Lewis, H., and R. Bergman, "Internet Printing Protocol (IPP): Job Progress Attributes",
1836   RFC3381, September 2002.

1837 [not-srv]
1838   Hastings, T., Lewis, H, and Ira McDonald, "Distributed Notification Server", September 26, 2002, work in
1839   progress to become IEEE-ISTO 5100.6-2002, ftp://ftp.pwg/org/pub/pwg/ipp/new_NOT/ipp-dist-not-service-
1840   020926.doc

1841 [ntfy]
1842   Herriot, R., Hastings, T., Shepherd, M., deBry, R., Isaacson, S., Martin, J., and R. Bergman, "Internet
1843   Printing Protocol/1.1: Event Notifications and Subscriptions", <draft-ietf-ipp-not-spec-08.txt>, November 19,
1844   2001.

1845 [output-bin]
1846 　　　　Hastings, T., and R. Bergman, "Internet Printing Protocol (IPP): output-bin attribute extension", IEEE-ISTO
1847 　　　　5100.2-2001, February 7, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.2.pdf.

1848 [override]
1849 　　　　Herriot, R., Ocke, K., "Internet Printing Protocol (IPP): Override Attributes for Documents and Pages", IEEE-
1850 　　　　ISTO 5100.4-2001, February 7, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.4.pdf.

1851 [prod-print]
1852 　　　　Ocke, K., Hastings, T., "Internet Printing Protocol (IPP): Production Printing Attributes - Set1", IEEE-ISTO
1853 　　　　5100.3-2001, February 12, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf.

1854 [prod-print2] Hastings, T., and D. Fullman, "Internet Printing Protocol (IPP): Production Printing Attributes - Set 2", to
1855 　　　　become a PWG IEEE-ISTO standard, work in progress, August 21, 2002,
1856 　　　　ftp://ftp.pwg.org/pub/pwg/ipp/new_PPE/pwg-ipp-prod-print-set2-draft-v0_1-020821.pdf.

1857 [RFC2911]
1858 　　　　R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.1: Model and
1859 　　　　Semantics", RFC 2911, September 2000.

1860 [set-ops]
1861 　　　　Hastings, T., Herriot, R., Kugler, C., and H. Lewis, "Internet Printing Protocol (IPP): Job and Printer Set
1862 　　　　Operations", RFC 3380, September 2002.

1863 # 13 Informative References

1864 [fsg-jt]
1865 　　　　Free Software Group, Open Printing Job Ticket API, Visit: http://www.freestandards.org/openprinting/

1866 [pwg-psi]
1867 　　　　"Print Service Interface (PSI)", work in progress to become a PWG IEEE-ISTO standard. Visit
1868 　　　　http://www.pwg.org/.

1869 [pwg-sm]
1870 　　　　Zehler, P., and S. Albright, "PWG Semantic Model", work in progress to become a PWG IEEE-ISTO
1871 　　　　standard, version 0.11, September 27, 2002. ftp://ftp.pwg.org/pub/pwg/Semantic-Model/PWG-Semantic-
1872 　　　　Model.pdf

1873 [RFC2565]
1874 　　　　Herriot, R., Butler, S., Moore, P., and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport",
1875 　　　　RFC 2565, April 1999.

1876 [RFC2566]
1877 　　　　R. deBry, T. Hastings, R. Herriot, S. Isaacson, and P. Powell, "Internet Printing Protocol/1.0: Model and
1878 　　　　Semantics", RFC 2566, April 1999.

1879 [RFC2567]
1880 　　　　Wright, D., "Design Goals for an Internet Printing Protocol", RFC 2567, April 1999.

1881 [RFC2568]
1882   Zilles, S., "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol", RFC 2568,
1883   April 1999.

1884 [RFC2569]
1885   Herriot, R., Hastings, T., Jacobs, N., Martin, J., "Mapping between LPD and IPP Protocols", RFC 2569, April
1886   1999.

1887 [RFC2616]
1888   R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee, "Hypertext Transfer
1889   Protocol - HTTP/1.1", RFC 2616, June 1999.

1890 [RFC3196]
1891   Hastings, T., Manros, C., Zehler, P., Kugler, C., and H. Holst, "Internet Printing Protocol/1.1: Implementer's
1892   Guide", RFC 3196, November 2001.

1893 [RFC3239]
1894   Kugler, C., Lewis, H. and T. Hastings, "Internet Printing Protocol (IPP): Requirements for Job, Printer, and
1895   Device Administrative Operations", RFC 3239, February 2002.

1896 # 14 IANA Considerations

1897 This section contains the registration information for IANA to add to the various IPP Registries according to the
1898 procedures defined in RFC 2911 [RFC2911] section 6 to cover the definitions in this document.

1899   *Note Replace the References below with the RFC number for the appropriate document, so that it accurately*
1900   *reflects the content of the information for the IANA Registry.*

1901 ## 14.1 Attribute Registrations

1902 The following table lists all the attributes defined in this document.   These are to be registered according to the
1903 procedures in RFC 2911 [RFC2911] section 6.2.
1904
1905 ```
Document Description attributes:
```
1906 ```
Document Description attributes:                    Reference:    Section
```
1907 ```
attributes-charset (charset)   [RFC2911]   4.3.19
```
1908 ```
attributes-natural-language (naturalLanguage)       [RFC2911]     4.3.20
```
1909 ```
compression (type3 keyword)   [RFC2911]   3.2.1.1
```
1910 ```
current-page-order (type2 keyword)                  [prod-print]  4.1
```
1911 ```
date-time-at-completed (dateTime)   [RFC2911]   4.3.14.7
```
1912 ```
date-time-at-creation (dateTime)                    [RFC2911]     4.3.14.5
```
1913 ```
date-time-at-processing (dateTime)   [RFC2911]   4.3.14.6
```
1914 ```
detailed-status-message (1setOf text (MAX))         [RFC2911]     4.3.10
```
1915 ```
document-access-errors (1setOf text(MAX))   [RFC2911]   4.3.11
```
1916 ```
document-format (documentFormat)                    [RFC2911]     3.2.1.1
```
1917 ```
document-name (name(MAX))   [RFC2911]   3.2.1.1
```
1918 ```
document-natural-language (naturalLanguage)         [RFC2911]     3.2.1.1
```
1919 ```
document-number (integer(0:MAX))   [this spec]   8.1
```

```
1920   document-state (type1 enum)                      [this spec]   8.3
1921   document-state-reasons (1setOf type2 keyword)    [this spec]   8.5!
1922   impressions  (integer(0:MAX))                    [RFC2911]     4.3.17.2
1923   impressions-completed (integer(0:MAX))           [RFC2911]     4.3.18.2
1924   impressions-completed-current-copy               [job-prog]    4.4
1925        (integer(0:MAX))
1926   k-octets  (integer(0:MAX))                       [RFC2911]     4.3.17.1
1927   k-octets-processed (integer(0:MAX))              [RFC2911]     4.3.18.1
1928   last-document  (boolean)                         [RFC2911]     4.3.12
1929   media-sheets  (integer(0:MAX))                   [RFC2911]     4.3.17.3
1930   media-sheets-completed (integer(0:MAX))          [RFC2911]     4.3.18.3
1931   more-info (uri)                                  [RFC2911]     4.3.4
1932   printer-up-time (integer (1:MAX))                [RFC2911]     4.3.14.4
1933   sheet-completed-copy-number (integer(0:MAX))     [job-prog]    4.2
1934   time-at-completed (integer (MIN:MAX))            [RFC2911]     4.3.14.3
1935   time-at-creation (integer (MIN:MAX))             [RFC2911]     4.3.14.1
1936   time-at-processing (integer (MIN:MAX))           [RFC2911]     4.3.14.2
1937   warnings-count (integer(0:MAX))                  [override]    6.1
1938
1939
1940   Document Templates attributes:                   Reference:    Section:
1941   copies (integer(1:MAX))                          [RFC2911]     4.2.5
1942   cover-back (collection)                          [prod-print]  3.1
1943   media (type3 keyword | name(MAX))                [prod-print]  3.1.1
1944   media-col (collection)                           [prod-print]  3.1.1
1945     cover-front (collection)                       [prod-print]  3.1
1946     cover-type (type2 keyword)                     [prod-print]  3.1.2
1947     media (type3 keyword | name(MAX))             [prod-print]  3.1.1
1948     media-col (collection)                         [prod-print]  3.1.1
1949   cover-type (type2 keyword)                       [prod-print]  3.1.2
1950   finishings (1setOf type2 enum)                   [RFC2911]     4.2.6
1951                                                    [finish]      2
1952   finishings-col (collection)                      [prod-print]  3.2
1953     finishing-template (name(MAX))                 [prod-print]  3.2.1
1954     stitching (collection)                         [prod-print]  3.2.2
1955       stitching-locations (1setOf integer(0:MAX)) [prod-print]  3.2.2.3
1956       stitching-offset (integer (0:MAX))          [prod-print]  3.2.2.2
1957       stitching-reference-edge (type2 keyword)    [prod-print]  3.2.2.1
1958   force-front-side (1setOf integer(1:MAX))         [prod-print]  3.3
1959   imposition-template (type2 keyword | name(MAX))  [prod-print]  3.4
1960   insert-sheet (1setOf collection)                 [prod-print]  3.5
1961     insert-after-page-number (integer(0:MAX))      [prod-print]  3.5.1
1962     insert-count (integer(0:MAX))                  [prod-print]  3.5.2
1963     media (type3 keyword | name(MAX))             [prod-print]  3.5.3
1964     media-col (collection)                         [prod-print]  3.5.3
1965   media (type3 keyword | name(MAX))                [RFC2911]     4.2.11
```

```
1966  media-col (collection)                         [prod-print] 3.13
1967    media-back-coating (type3 keyword |          [prod-print] 3.13.10
1968        name(MAX))
1969    media-color (type3 keyword | name(MAX))       [prod-print] 3.13.4
1970    media-front-coating (type3 keyword |          [prod-print] 3.13.10
1971        name(MAX))
1972    media-hole-count (integer(0:MAX))             [prod-print] 3.13.6
1973    media-info (text(255))                        [prod-print] 3.13.3
1974    media-key (type3 keyword | name(MAX))         [prod-print] 3.13.1
1975    media-order-count (integer(1:MAX))            [prod-print] 3.13.7
1976    media-preprinted (type3 keyword | name(MAX))  [prod-print] 3.13.5
1977    media-recycled (type3 keyword | name(MAX))    [prod-print] 3.13.11
1978    media-size (collection)                       [prod-print] 3.13.8
1979      x-dimension (integer(0:MAX))                [prod-print] 3.13.8.1
1980      y-dimension (integer(0:MAX))                [prod-print] 3.13.8.2
1981    media-type (type3 keyword | name(MAX)         [prod-print] 3.13.2
1982    media-weight-metric (integer(0:MAX))          [prod-print] 3.13.9
1983  media-input-tray-check (type3 keyword |         [prod-print] 3.14
1984        name(MAX))
1985  number-up (integer(1:MAX))                      [RFC2911]    4.2.9
1986  orientation-requested (type2 enum)              [RFC2911]    4.2.10
1987  output-bin (type2 keyword | name(MAX))          [output-bin] 2.1
1988  page-delivery (type2 keyword)                   [prod-print] 3.15
1989  page-order-received (type2 keyword)             [prod-print] 3.16
1990  page-overrides (1setOf collection)              [override]   5.2
1991    document-copies (1setOf rangeOfInteger(MAX))  [override]   5.2.3
1992    input-documents (1setOf rangeOfInteger(MAX))  [override]   5.2.1
1993    output-documents (1setOf rangeOfInteger(MAX)) [override]   5.2.2
1994    pages (1setOf rangeOfInteger(MAX))            [override]   5.2.4
1995    <any other Job Template attributes that
1996  affect pages, such as media or media-col (
1997  page-ranges (1setOf rangeOfInteger(1:MAX))      [RFC2911]    4.2.7
1998  pages-per-subset (1setOf integer(1:MAX))        [prod-print] 5.3
1999  presentation-direction-number-up (type2         [prod-print] 3.17
2000  keyword)
2001  print-quality (type2 enum)                      [RFC2911]    4.2.13
2002  printer-resolution (resolution)                 [RFC2911]    4.2.12
2003  separator-sheets (collection)                   [prod-print] 3.18
2004    media (type3 keyword | name(MAX))             [prod-print] 3.18.2
2005    media-col (collection)                        [prod-print] 3.18.2
2006    separator-sheets-type (type3 keyword |        [prod-print] 3.18.1
2007        name(MAX))
2008  sheet-collate (type2 keyword)                   [job-prog]   3.1
2009  sides (type2 keyword)                           [RFC2911]    4.2.8
2010  x-image-position (type2 keyword)                [prod-print] 3.19.2
2011  x-image-shift (integer(MIN:MAX))                [prod-print] 3.19.3
```

```
2012  x-side1-image-shift (integer(MIN:MAX))           [prod-print] 3.19.4
2013  x-side2-image-shift (integer(MIN:MAX))           [prod-print] 3.19.5
2014  y-image-position (type2 keyword)                 [prod-print] 3.19.6
2015  y-image-shift (integer(MIN:MAX))                 [prod-print] 3.19.7
2016  y-side1-image-shift (integer(MIN:MAX))           [prod-print] 3.19.8
2017  y-side2-image-shift (integer(MIN:MAX))           [prod-print] 3.19.9
2018
2019
2020  Operation attributes:
2021  document-number                                  [this spec]   3
2022
```

2023 14.2 Additional Enum Attribute Value Registrations for the "operations-supported"
2024   Printer Attribute

2025 The following table lists all the new enum attribute values defined in this document as additional type2 enum values
2026 for use with the "operations-supported" Printer Description attribute. These are to be registered according to the
2027 procedures in RFC 2911 [RFC2911] section 6.1.
2028

```
2029    Value          Name                          Reference    Section:
2030    --------       ----------------------        ---------    -------
2031  operations-supported (type2 enum):
2032    0x0032      Cancel-Current-Document          [this-spec]    §3.9
2033    0x0033      Cancel-Document                  [this-spec]    §3.8
2034    0x0034      Get-Document-Attributes          [this-spec]    §3.5
2035    0x0035      Get-Documents                    [this-spec]    §3.6
2036    0x0036      Delete-Document                  [this-spec]    §3.10
2037    0x0037      Set-Document-Attributes          [this-spec]    §3.7
2038    0x0038      Validate-Document                [this-spec]    §3.11
2039    0x0039      Create-Document                  [this-spec]    §3.1
2040    0x003A      Send-Data                        [this-spec]    §3.1
2041
```

2042   The resulting enum attribute value registrations will be published in the
2043   http://www.iana.org/assignments/ipp-registrations registry.
2044

2045 14.3 Operation Registrations

2046 The following table lists all of the operations defined in this document. These are to be registered according to the
2047 procedures in RFC 2911 [RFC2911] section 6.4.
2048

```
2049  Operations:                                    Reference:   Section:
2050  Cancel-Current-Document                        [this-spec]    §3
2051  Cancel-Document                                [this-spec]    §3
2052  Get-Document-Attributes                        [this-spec]    §3
2053  Get-Documents                                  [this-spec]    §3
2054  Delete-Document                                [this-spec]    §3
2055  Set-Document-Attributes                        [this-spec]    §3
```

```
2056   Validate-Document                              [this-spec]    §3
2057   Create-Document                                [this-spec]    §
2058   Send-Data                                      [this-spec]    §
2059
```

15 Internationalization Considerations

The internationalization considerations for this extension for handling the Document object are the same as for handling the Job object in [RFC2911].

16 Security Considerations

The Document object should provide no more increased security considerations than the Job object. The Printer MUST provide the same access control for Document objects as for Job objects.

17 Contributors

18 Acknowledgments

19 Author's Address

Tom Hastings
Xerox Corporation
737 Hawaii St.
El Segundo, CA 90245

Phone: 310 333-6413
Fax: 310 333-5514
e-mail: hastings@cp10.es.xerox.com

Peter Zehler
Xerox Corporation
MS: 0128-30E
800 Phillips Road
Webster, NY 14580-9701

Phone: 1+585+2658755
Fax:
e-mail: PZehler@crt.xerox.com

Additional contributors:

Don Fullman, Xerox
Ira McDonald, High North

2092 ## 20 Appendix A: Document operations compared to Job operations

2093 This appendix compares the Document operations with the existing Job operations to show the parallelism.

2094 Table 12 compares the Job and Document operations. The two Conf. columns indicate the conformance
2095 requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ"
2096 in the Document Conformance column means if the Document object is supported. Whether a Document operation
2097 is a method on the Job object or the Document object depends on the modeling regime and is not an essential part
2098 of the semantics described here, since these semantics are intended to apply to both to object-oriented and object-
2099 based protocols, APIs, and implementations.

2100 **Table 12 - Document operations compared to Job operations**

Job operations	Job Conf.	Document operations	Doc Conf
Cancel-Current-Job	OPT	**Cancel-Current-Document**	OPT
Cancel-Job	REQ	**Cancel-Document**	OPT
Create-Job	OPT	**Create-Document**	REQ
Get-Job-Attributes	REQ	**Get-Document-Attributes**	REQ
Get-Jobs	REQ	**Get-Documents**	REQ
Hold-Job		*N/A, can only hold an entire job.*	
Print-Job	REQ	**Send-Document** (existing operation - see [RFC2911] with an additional Document attributes group defined in section 3.3)	REQ[41]
Print-URI	OPT	**Send-URI** (existing operation - see [RFC2911] with an additional Document attributes group defined in section 3.4)	OPT
N/A		**Send-Data**	REQ
Promote-Job	OPT	*N/A, can only promote an entire job*	
Purge-Jobs	OPT	**Delete-Document**	OPT
Release-Held-New-Jobs	OPT	*N/A, can only release entire jobs*	
Release-Job	OPT	*N/A, can only release an entire job*	
Reprocess-Job	OPT	*N/A, can only reprocess an entire job*	
Restart-Job	OPT	*N/A, can only restart an entire job*	
Resume-Job	OPT	*N/A, can only resume an entire job*	
Schedule-Job-After	OPT	*N/A, can only schedule an entire job*	
Set-Job-Attributes	OPT	**Set-Document-Attributes**	OPT
Suspend-Current-Job	OPT	*N/A, can only suspend an entire job in order to run another one*	
Validate-Job	REQ	**Validate-Document**	REQ

2101
2102

2103 ## 21 Annex B: Change Log (informative)

2104 Version 0.4, 14 September 2002:
2105   1. Added the operation specifications.
2106   2. Added the Create-Document and Send-Data to be more parallel with Jobs and support PWG PSI.
2107   3. Resolved the 15 issues in version 0.3 as discussed on the mailing list.

---

41 The Send-Document operation is OPTIONAL for a Printer to conform to [RFC2911], but is REQUIRED for a Printer to conform to this Document object specification.

2108   4.   Added the Attribute Precedence section 5.
2109   5.   Added [prod-print2] attributes.
2110   6.   Added job-mandatory-attributes, job-cover-back, job-cover-front, job-copies, job-finishings, job-finishings-col.
2111   document-id-uri, and redirect-uri.
2112
2113   Version 0.3, 9 September 2002:
2114   1.   Reformatted as an IEEE-ISTO standard and added the usual sections for a standard.
2115   2.   Added "original-requesting-user-name" Operation attribute to Table 4.
2116   3.   Added "y" to "output-bin" in Table 6 so it MAY be a Document Template attribute.
2117   4.   Clarified the * and ** in Table 7 - Job and Document Description attributes.
2118   5.   Added section 9 all of the Printer attributes defined In any IPP standard.
2119   6.   Allocated operation-id enums in section 10 to the 7 Document operations.
2120   7.   Added the conformance section 11
2121   8.   Completed the IANA Considerations section 14.
2122
2123