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The Printer Working Group (PWG) Proposed Standard for The Internet Printing Protocol (IPP): Document oObject

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12   ISSUE 01: Need to add all new attributes to CIP4/PODi/FSG IPP mapping document. When?
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23   Version 0.5, October 25 14, 2002

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

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Version 0.5, October 25, 2002

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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.

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> ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/IPPpwg-ipp-document-object-v05-021025.pdf, .doc, .rtf

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109 Program of the IEEE ISTO." In order to meet this objective, the PWG will document the results of their work as open
110 standards that define print related protocols, interfaces, procedures and conventions. Printer manufacturers and
111 vendors of printer related software will benefit from the interoperability provided by voluntary conformance to these
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114 multiple, independent and interoperable implementations with substantial operational experience, and enjoys
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128 Implementers of this specification are encouraged to join the IPP Mailing List in order to participate in any
129 discussions of clarifications or review of registration proposals for additional names. Requests for additional media
130 names, for inclusion in this specification, should be sent to the IPP Mailing list for consideration.
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1 Introduction and Summary

~~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 can send the data content to that Document object using the new Send-Data operation.

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 intent is to propose this specification as an IPP extension and which will be referenced as part of the PWG Semantic Model. 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 [pwg-sm], the PWG Print Service Interface (PSI) project [pwg-psi], and the Free Standards Group Job Ticket API [fsg-jt] which all have a Document object.

1.1 Scope

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

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

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[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.

290 **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).
Validate-Document	REQUIRED	Validate that the supplied Document attributes are supported.
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~~ REQUIRED	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.

291 * The existing IPP/1.1 operations defined in [RFC2911] with an extension so the client can supply Document
292 Template attributes in a new attribute Group in the request.
293 This specification also specifies the life cycle of the Document object by defining the "document-state", "document-
294 state-reasons", and "document-state-message" attributes. Finally, the analogous Document Descriptions attributes
295 that correspond to the Job Description attributes are defined.

296 # 2 Terminology

297 This section defines terminology used throughout this document.

298 ## 2.1 Conformance Terminology

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

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

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

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[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.

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

2.2 Other Terminology

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

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

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

325 **Document Creation operation** - operations that create Document objects. Specifically: Create-Document, Print-
326 Job, Print-URI, Send-Document and Send-URI. Note: the Print-Job and Print-URI are both **Job Creation** and
327 **Document Creation** operations, since they create both Job and a **Document object** at the same time. Also this
328 specification does not extend the Print-Job and Print-URI operations. However, this specification does extend the
329 Send-Document and Send-URI operations to allow the client to supply **Document Template** attributes in each
330 request.

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

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

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

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

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

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

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

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

357 **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	

358

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

364 # 3 Document Operations

365 The Document object semantics are as parallel to the Job object semantics as possible. Therefore, most of the Job
366 operations have analogous Document operations as shown in Table 14 in section "Appendix A: Document operations
367 compared to Job operations". Operations that can apply only to an entire job, have no analogous document
368 operation as indicated. This extension adds 8 new Document operations that operate on the Document object once
369 it is created by the new Create-Document operation or either of the existing two operations: Send-Document and
370 Send-URI operations.

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

373 The signatures of the operation requests that create and/or validate Document objects are very similar as shown in
374 Table 3 and defined in section 3.1 through section 3.5. The entries in the table show what a client MUST, MAY, or
375 MUST NOT supply in the indicated operation requests.

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[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).

376 **Table 3 - Client-supplied Document Creation and Validation Request Signatures**

	Create-Document	Send-Data	Send-Document	Send-URI	Validate-Document
Target job	MUST	MUST	MUST	MUST	MAY
"input-document-number"	MAY	MUST	MAY	MAY	MAY
"document-uri"	MUST NOT	MUST NOT	MUST NOT	MUST	MAY
Document Template attributes	MAY	MUST NOT	MAY	MAY	MAY
Data	MUST NOT	MUST	MUST	MUST NOT	MUST NOT

377

378 The entries in Table 4 show what a Printer MUST, MAY, or MUST not support and return in the indicated operations
379 responses.

380 **Table 4 - Printer-returned Document Creation and Validation Response Signatures**

	Create-Document	Send-Data	Send-Document	Send-URI	Validate-Document
Status code/message	MUST	MUST	MUST	MUST	MUST
Unsupported Attributes	MUST, if any	MUST, if any	MUST, if any	MUST, if any	MUST, if any
Job status attributes	MUST	MUST	MUST	MUST	MUST NOT
Document status attributes:					
"document-number"	MUST	MUST	MUST	MUST	MUST NOT
"document-id-uri"	MUST	MUST	MUST	MUST	MUST NOT
"document-state"	MUST	MUST	MUST	MUST	MUST NOT
"document-state-reasons	MUST	MUST	MUST	MUST	MUST NOT
"document-state-message	MAY	MAY	MAY	MAY	MUST NOT

381

382 **3.1 Create-Document Operation**

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

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

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

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

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

396   3. MUST support the "multiple-document-jobs-supported" Printer Description attribute (see [RFC2911] section
397   4.4.16) with a 'true' value, that is the Printer MUST support multiple document jobs.

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

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

406 The Printer sets the value of the Document's "document-state" Document Description attribute to 'pending', if the
407 Printer accepts the Create-Document request. A Printer MAY set the 'job-data-insufficient' value of the Document's
408 "document-state-reason" Document Description attribute to indicate that processing cannot begin until sufficient data
409 has arrived and set the "document-state" to 'pending'. A non-spooling printer that doesn't implement the 'pending'
410 document state may even set the "document-state" to 'processing', even though there is not yet any data to process.
411 See sections 8.5 and 8.7.

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

3.1.1 Create-Document Request

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

418 **Group 1: Operation Attributes**

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

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

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

430   **3.1.1.1 input-document-number ~~"document-number"~~ (integer(1:MAX)) _____ operation attribute~~:~~**

431   The client MAY supply the "input-document-number" Operation attribute to indicate which Document object
432   in the Job to which this Create-Document request is to apply. If the Printer supports this attribute, the Printer
433   MUST also support the corresponding "document-number" (text(127)) Document Description attribute (see
434   section 8.1) and copy this value to the "document-number" Document Description attribute. Usually the
435   client omits this Operation attribute, so that the Printer assigns the next integer value starting at 1 for each
436   Job. A client that is creating multiple Document objects in parallel MAY wish to supply this attribute in order
437   to control the order of the Documents in the job. If supplied, the Printer MUST copy~~ies~~ the value to the

438   Document object's "document-number" Document Description attribute. If the Job already contains a
439   Document with the same "document-number" value as the one supplied by this attribute, the Printer MUST
440   reject the request and return the 'client-error-client-error-conflicting-attributes (see [RFC2911] section
441   13.1.4.15) and the "input-document-number" and "document-number" attributes.

442   **3.1.1.2 last-document (boolean):**   **operation attribute**

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

446   **3.1.1.3 document-message (text(127))**   **operation attribute**

447   The client MAY supply this operation attribute. If the Printer supports this attribute, the Printer MUST also
448   support the corresponding "document-message" (text(127)) Document Description attribute (see section
449   8.10) and copy this value to the "document-message" Document Description attribute. The end user can use
450   this Document Description attribute as a message to the operator and the operator can use it as a message
451   to the user. The Printer MAY print this message on a document start sheet for this document, if any.

452   **Additional Operation attributes in any order:**
453   Any of the other Operation attributes indicated in the "Level Supplied" column labeled with a "y" in the "Doc"
454   column in Table 6, such as "document-name" and "document-format". These operation attributes are said to
455   be supplied at the Document Level and apply to the Document object, overriding any operation attributes
456   supplied at the Job Level. For example, if "document-format" = 'application/postscript' at the Job Level and
457   "document-format" = 'text/plain' in this Create-Document request, this Document will be 'text/plain'. If the
458   next Create-Document request for this Job omits the "document-format" operation attribute, that Document
459   will be 'application/postscript'.

460   **Group 2: Document Template Attributes**

461   **Any Document Template attributes in any order:**
462   The client OPTIONALLY supplies a set of Document Template attributes, that is any attributes indicated in
463   Table 8 in the "Defined for use" column labeled with a "y" in the "D" column. These Document Template
464   attributes are said to be supplied at the Document Level and apply to the Document object, overriding any
465   Document Template attributes supplied at the Job Level. For example, if "media" = 'na-letter-white' at the
466   Job Level and "media" = 'na-letter-transparency' in this Create-Document request, this Document will be 'na-
467   letter-transparency'. If the next Create-Document operation for this Job omits the "media" operation attribute,
468   that Document will be 'na-letter-white' which it inherits from the Job.

469   If the client is not supplying any Document Template attributes in the request, the client SHOULD omit Group
470   2 rather than sending an empty group. However, a Printer object MUST be able to accept an empty group.

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

472   **Group 3: Subscription Attributes (see [ntfy] section 11.1.3.1): MUST NOT be present. Notification is only at**
473   **the Job Level.**

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

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

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

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

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

3.1.2 Create-Document Response

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

Group 1: Operation Attributes

491 **Status Message:**
492 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
493 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
494 in [RFC2911] sections 13 and 3.1.6. ~~If the client supplies unsupported or conflicting Job Template attributes~~
495 ~~or values, the Printer object MUST reject or accept the Print-Job request depending on~~

496 The Printer MUST reject the operation:

497 If the client supplies the "ipp-attribute-fidelity" operation attribute (see section 6.2.1) with a 'true'
498 value and the client supplies any unsupported and/or conflicting Job Template or Document
499 Template attributes.

500 If the client omits or supplies the "ipp-attribute-fidelity" operation attribute (section 6.2.3) with a 'false'
501 value and supplies keyword values of the "document-mandatory-attributes" operation attribute that
502 are unsupported and/or conflicting.

503 Otherwise, the Printer MUST accept the operation and ignore or substitute unsupported and/or conflicting
504 attribute values supplied by the client. ~~the whether the client supplied a 'true' or 'false' value for the "ipp-~~
505 ~~attribute-fidelity" operation attribute or the name of one of the attributes with unsupported values in the "job-~~
506 ~~mandatory-attributes" operation attribute.~~ See the Implementer's Guide [RFC3196] for a complete
507 description of the suggested steps for processing the attributes in a create request.

508 **Natural Language and Character Set:**
509 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
510 3.1.4.2.

Group 2: Unsupported Attributes

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

513 The value of the "ipp-attribute-fidelity" and "~~job~~document-mandatory-attributes" operation attributes supplied
514 by the client does not affect what attributes the Printer object returns in this group. The value of these two
515 operation attributes only affects whether the Create-Job operation is accepted or rejected. If the Document
516 is accepted, the client may query the Document object using the Get-Document-Attributes operation (see
517 section 3.5) requesting the unsupported attributes that were returned in the create response to see which

518 attributes were ignored (not stored on the Document object) and which attributes were stored with other
519 (substituted) values.

520 **Group 3: Job Object Attributes**

521 In addition, the Printer MUST return the same Job status attributes that [RFC2911] REQUIRES for the Send-
522 Document and Send-URI operation responses (which are the same as for the Print-Job response -
523 [RFC2911] section 3.2.1.2):

524 "job-uri" (uri) - see [RFC2911] section 4.3.1
525 "job-id" (integer(1:MAX)) - see [RFC2911] section 4.3.2
526 "job-state" (type1 enum) - see [RFC2911] section 4.3.7
527 "job-state-reasons" (1setOf type2 keyword) - see [RFC2911] section 4.3.8
528
529 The Printer MAY return:

530 "job-state-message" (text(MAX)) - see [RFC2911] section 4.3.9
531 "number-of-intervening-jobs" (integer(0:MAX)) - see [RFC2911] section 4.3.15
532
533 **Group 43: Document Object Attributes**

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

535 **3.1.2.1 document-number (integer(1:MAX))** **Document Description attribute**

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

538 **3.1.2.2 document-id-uri (uri)** **Document Description attribute**

539 The Printer MUST return the document id of this Document object as a URI as assigned by the Printer (see
540 section 8.2).

541 **3.1.2.3 document-state (type1 enum)** **Document Description attribute**

542 The Printer MUST return the state of this Document object (see section 8.5).

543 **3.1.2.4 document-state-reasons (1setOf type2 keyword)** **Document Description attribute**

544 The Printer MUST return the associated state reasons for this Document (see section 8.7).

545 **3.1.2.5 document-state-message (text(MAX))** **Document Description attribute**

546 The Printer MAY return the localized description of the "document-state" and "document-state-reasons"
547 values for this Document (see section 8.9).

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

3.2 Send-Data Operation

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

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

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

3.2.1 Send-Data request

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

Group 1: Operation Attributes

Natural Language and Character Set:
571 The "attributes-charset" and "attributes-natural-language" attributes as described in section [RFC2911]
572 3.1.4.1.

Target:
574 The "document-number" (integer(1:MAX)) operation attribute MUST be supplied along with immediately after
575 either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) and "operation attribute(s)
576 which define the target Document object for this operation as described in section [RFC2911] 3.1.5. If the
577 client omits the "document-number" operation attribute, the Printer MUST reject the request and return the
578 'client-error-bad-request' status code.

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

Group 2: Document Content

583 The client MUST supply the document data in-line to be processed for this Document, just like supplying
584 data in the Send-Document and Print-Job requests.

3.2.2 Send-Data Response

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

587   **Group 1: Operation Attributes**

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

592   **Natural Language and Character Set:**
593   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
594   3.1.4.2.

595   **Group 2: Unsupported Attributes**

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

597   **Group 3: Job Object Attributes**

598   The Printer MUST return ~~This is~~ the same set of Job status attributes as for the Print-Job, Send-Document,
599   and Create-Document responses (see section 3.1.2)~~described in the Create-Job response (see [RFC2911]~~
600   ~~section 3.2.1.2)~~.

601   **Group 4: Document Object Attributes**

602   The Printer MUST return the same set of Document status attributes as for the Create-Document operation
603   response (see section 3.1.2)

604   ISSUE 01: OK for the Send-Data operation to return Document status attributes (as well as Job status
605   attributes) so at to be like the other Document operations?

606 ## 3.3 Send-Document Operation

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

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

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

617 ### 3.3.1 Send-Document Request

618 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.

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

As specified in [RFC2911] section 3.3.1 Send-Document request, plus any extensions indicated in Table 6. For example, "compression", "document-format", and "document-name". So this group is the same as for Create-Document (see section 3.1.1).

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

The client OPTIONALLY supplies a set of Document Template attributes as listed in Table 8. For example, "media" and "number-up". If the client is not supplying any Document Template attributes in the request, the client SHOULD omit Group 2 rather than sending an empty group. However, a Printer object MUST be able to accept an empty group.

Group 3: Document Content (as in [RFC2911] Group 2)

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

3.3.2 Send-Document Response

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

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

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 (as in [RFC2911] Group 2)

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

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

The Printer MUST returns the same set of Job status attributes as described in for the Print-Job, Send-Document, and Create-Document responses (see [RFC2911] section 3.1.23.2.1.2).

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

The Printer MUST returns the same set of Document status attributes as described in for the Create-Document operation response (see section 3.1.2).

3.4 Send-URI Operation

This OPTIONAL operation is identical has the same request and response semantics as to the Send-Document operation (see section 3.33.2) 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 Validate-Document Operation

This REQUIRED operation allows the client to verify capabilities of a Printer against whatever attributes the client supplies in the Validate-Document request in combination with the previously submitted partial Job, if any. This operation is has the same inputs as the Create-Document operation request (section 3.1) except the Printer does not create a new Document object. The Printer object returns the same status codes, Operation Attributes (Group 1) and Unsupported Attributes (Group 2) as the Create-Document operation (see section 3.1.2). However, no Job Object Attributes (Group 3) and no Document Object Attributes (Group 43) are returned, since no Document object is created.

The Printer performs the same validation for the Validate-Document operation as for the Create-Document operation (section 3.1), with the addition that the client MAY supply the "document-uri" operation attribute (defined in the Send-URI operation in [RFC2911] section 3.3.2). If the client supplies the "document-uri" operation attribute, the Printer MUST validate that the URI scheme is supported and that the referenced data is accessible.

The client MAY supply a Job object Target, that is, MUST be either (1) a "printer-uri" and a "job-id" operation attribute or (2) a "job-uri" operation attribute. If supplied, the Job Target MUST identify a job that has been created by Create-Job ([RFC2911] section 3.2.4), but not yet closed, that is, the client hasn't yet supplied the "last-document" operation attribute with a 'true' value. When the client supplies the Job object Target, the Printer MUST validate that an identical Create-Document, Send-Document, or Send-URI operation would have been accepted in the context of the specified Job and its other Document objects.

If the client omits the Job Target by including only the "printer-uri" operation attribute, the Printer performs the same validation as for a Create-Document in which there were no Job attributes supplied in the Create-Job and no other Documents. The Printer MUST support the Validate-Document operation with or and without the Job object Target being present.

In addition to the attributes and groups defined for a Create-Document request (see section 3.1.1), the client MAY supply the "document-uri" operation attribute (defined in the Send-URI operation in [RFC2911] section 3.3.2). If the client supplies the "document-uri" operation attribute, the Printer MUST validate that the URI scheme is supported and that the referenced data is accessible[5].

---

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

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

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

3.6 Get-Document-Attributes Operation

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

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

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

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

724   - 'document-template': the subset of the Document Template attributes that apply to a Document object (the "D"
725   column in Table 8) that the implementation supports for Document objects.

726   - 'document-description': the subset of the Document Description attributes specified in the "Doc" column of
727   Table 9 that the implementation supports for Document objects.

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

729 Since a client MAY request specific attributes or named groups, there is a potential that there is some overlap. For
730 example, if a client requests, 'document-name' and 'document-description', the client is actually requesting the
731 "document-name" attribute once by naming it explicitly, and once by inclusion in the 'document-description' group. In
732 such cases, the Printer object NEED NOT return the attribute only once in the response even if it is requested
733 multiple times. The client SHOULD NOT request the same attribute in multiple ways.

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

736 ### 3.6.1 Get-Document-Attributes Request

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

739 **Group 1: Operation Attributes**

740 **Natural Language and Character Set:**
741 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
742 3.1.4.1.

743 **Target:**
744 The "document-number" (integer(1:MAX)) operation attribute MUST be supplied immediately after along with
745 either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation attribute(s)
746 which define the target Document object for this operation as described in [RFC2911] section 3.1.5. If the
747 client omits the "document-number" operation attribute, the Printer MUST reject the request and return the
748 'client-error-bad-request' status code.

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

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

756 ### 3.6.2 Get-Document-Attributes Response

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

758 **Group 1: Operation Attributes**

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

763 **Natural Language and Character Set:**
764 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
765 3.1.4.2. The "attributes-natural-language" MAY be the natural language of the Document object, rather than
766 the one requested.

767 **Group 2: Unsupported Attributes**

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

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

774   **Group 3: Document Object Attributes**

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

785   3.7 Get-Documents Operation

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

789   This operation is similar to the Get-Document-Attributes operation (see section 3.5), except that this Get-Documents
790   operation returns attributes from all Document objects contained in the Job object, instead of from a single selected
791   Document object in the Job object. As with the Get-Document-Attributes operation the Printer MUST only return
792   attributes that were submitted by a client when the Document object was created by the Create-Document, Send-
793   Document, or Send-URI operations and possibly modified by the Set-Document-Attributes operation (see section
794   3.8).

795   3.7.1 Get-Documents Request

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

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

800   **Group 1: Operation Attributes**

801   **Natural Language and Character Set:**
802   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
803   3.1.4.1.

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

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

810   **"limit" (integer(1:MAX)):**
811   The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute. It is an
812   integer value that determines the maximum number of Documents that a client will receive from the Printer.
813   The limit is a "stateless limit" in that if the value supplied by the client is 'N', then only the first 'N' Documents
814   are returned in the Get-Documents Response. There is no mechanism to allow for the next 'M' Documents

815 after the first 'N' Documents. If the client does not supply this attribute, the Printer object responds with all
816 Documents.

817 **"requested-attributes" (1setOf type2 keyword):**
818 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute. It is a set of
819 Document attribute names and/or attribute groups names in whose values the requester is interested. This
820 set of attributes is returned for each Document object that is returned. The allowed attribute group names
821 are the same as those defined in the Get-Document-Attributes operation in section 3.6.1.

822 If the client does not supply this attribute, the Printer MUST respond as if the client had supplied this attribute
823 with the ~~three~~ two values:

824 'document-number' (see section 8.1)
825 'document-id-uri' (see section 8.2)~~, 'document-state', and 'document-state-reasons'. ISSUE 03: Are~~
826 ~~the 3 attributes: 'document-number', 'document-state', and 'document-state-reasons' the right~~
827 ~~attributes to return when the client does not supply the "requested-attributes" operation attribute?~~
828 ~~Should we include the "document-id-uri" (uri) attribute that the Printer generates as well?~~
829

830 3.7.2 Get-Documents Response

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

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

836 **Group 1: Operation Attributes**

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

841 **Natural Language and Character Set:**
842 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
843 3.1.4.2.

844 **Group 2: Unsupported Attributes**

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

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

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

852 The Printer object responds with one set of Document Object Attributes for each returned Document object.
853 The Printer object ignores (does not respond with) any requested attribute or value which is not supported or
854 which is restricted by the security policy in force, including whether the requesting user is the user that
855 submitted the job (job originating user) or not (see [RFC2911] section 8). However, the Printer object MUST

856 respond with the 'unknown' value for any supported attribute (including all REQUIRED attributes) for which
857 the Printer object does not know the value, unless it would violate the security policy. See the description of
858 the "out-of-band" values in the beginning of [RFC2911] section 4.1.

859 The Printer MUST return the Groups for the requested Job in order of increasing "document-number"
860 Document Description attribute value.

3.8 Set-Document-Attributes Operation

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

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

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

876 If the client supplies a document attribute with the "out-of-band" value 'delete-attribute' (see [set-ops] section 8.2),
877 then the Printer MUST remove the attribute and all of its values from the Document object, if present. The semantic
878 effect of the client supplying the 'delete-attribute' value in a Set-Document-Attributes operation MUST be the same as
879 if the attribute had not been supplied with the Document object in the Document Creation operation, i.e., the Printer
880 applies its default attribute or behavior with lower precedence that the PDL (see the beginning of [RFC2911] section
881 4.2 and [RFC2911] 3.2.1.1). Any subsequent query of the Document object using Get-Document-Attributes or Get-
882 Documents MUST NOT return any attribute that has been deleted using the 'delete-attribute' out-of-band value.
883 However, a client can re-establish such a deleted Document attribute with any supported value(s) using a
884 subsequent Set-Document-Attributes operation.

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

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

899 The IPP objectPrinter MUST accept or reject this operations when the Document's READ-ONLY "document-state"
900 attribute has the values shown in Table 5. The document's current state MUST affect whether the IPP objectPrinter

901 accepts or rejects the request. However, the Set-Document-Attributes operation MUST NOT change the state of the
902 Document object (since the Document is a passive object and the Document state is a subset of the Job State). For
903 example, in the case where the operation creates a request for unavailable resources, the Job (but not the
904 Document) transitions to a new state. Table 5 shows the allowed behaviors in each document state.

905 **Table 5 - Document State Table for the Set-Document-Attributes operation**

Current "document-state"	New "document-state" (no change)	~~IPP object~~Printer'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'

906

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

3.8.1 Settable and READ-ONLY Document Description attributes

911 If the Printer supports the Set-Document-Attributes operation, then it SHOULD support setting of:
912   all Document Template document ("xxx") attributes
913 that the implementation supports (see the column labeled "D" in Table 8).

914 Almost all Document Description attributes (see [RFC2911] section 4.3) MUST NOT be settable, i.e., they are
915 defined to be READ-ONLY. Only Document Description attributes marked with "(r/w) in Table 8 MAY be settable
916 using Set-Document-Attributes. The Printer MUST reject a Set-Document-Attributes request that attempts to set any
917 attributes in Table 8 that is not marked "(r/w).

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

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

3.8.2 Set-Document-Attributes Request

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

926 **Group 1: Operation Attributes**

927   **Natural Language and Character Set:**
928   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
929   3.1.4.1.

Target:
930
931   The client MUST supply the "document-number" (integer(1:MAX)) MUST be supplied operation attribute
932   immediately after along with either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri"
933   (uri) operation attribute(s) which define the target Document object for this operation as described in
934   [RFC2911] section 3.1.5. If the client omits the "document-number" operation attribute, the Printer MUST
935   reject the request and return the 'client-error-bad-request' status code.

936   Note: There is no way in a single operation for the client to set all of a Job's Document objects to the same
937   attribute value. Either (1) the client sets the corresponding attribute in each Document object in the Job with
938   separate Set-Document-Attributes requests, or (2) the client sets the corresponding attribute at the Job Level
939   using the Set-Job-Attributes operation. Setting the corresponding attribute at the Job Level (or supplying that
940   attribute initially in the Job Creation operation) causes each Document object to inherit the Job Level
941   attribute value, if the Document object doesn't have a corresponding explicit attribute supplied at the
942   Document Level. In other words, supplying an attribute at the Job Levels will affect all the Job's Document
943   objects that don't have that attribute also explicitly supplied at the Document Level. ISSUE 04: OK that we
944   don't have a way to set all documents in a single request? The Printer MUST reject the request with 'client-
945   error-bad-request', if the client does not supply the "document-number" operation attribute. There is no way
946   to set all documents explicitly in a single request, since a failure would require the Printer to back out all
947   changes in all documents. However, if the client sets the corresponding attribute at the Job Level using the
948   Set-Job-Attributes operation, all documents in the job will be affected that don't have that attribute explicitly
949   supplied at the Document Level.

Requesting User Name:
950
951   The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
952   [RFC2911] section 8.3.

953 **Group 2: Document Attributes**

954   The client MUST supply a set of Document Template attributes with one or more values (including explicitly
955   allowed out-of-band values) as listed in column labeled "D" in Table 8 - Job Template and Document
956   Template attributes and Document Description attributes flagged with "(r/w)" and listed in the column labeled
957   "Doc" in Table 9 - Job and Document Description attributes, and any attribute extensions supported by the
958   Printer. The value(s) of each Document attribute supplied in Group 2 replaces the value(s) of the
959   corresponding Document attribute on the target Document object. For attributes that can have multiple
960   values (1setOf), all values supplied by the client replace all values of the corresponding Document object
961   attribute.

962   In order to set the Document's "document-message" Document Description attribute (see section 8.10), the
963   client MUST supply the attribute in Group 2, rather than supplying a "document-message" operation attribute
964   in Group 1.

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

3.8.3 Set-Document-Attributes Response
967

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

969 **Group 1: Operation Attributes**

Status Message:
970
971   In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
972   "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
973   in [RFC2911] sections 13 and 3.1.6.

974   **Natural Language and Character Set:**
975   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
976   3.1.4.2.

977 **Group 2: Unsupported Attributes**

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

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

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

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

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

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

997   5. The values of some of the supplied attributes conflict with one another and/or other Document
998   attribute values not being set: if the conflicting attribute in the operation has a single value return
999   the attribute and the value. If the attribute in the operation is multi-valued, return only the attribute
1000   and those values in a 1setOf that are conflicting with other attributes. Return the 'client-error-
1001   conflicting-attributes' status code (see [RFC2911] section 13.1.4.15).

1002   **3.9 Cancel-Document Operation**

1003 This REQUIRED ~~OPTIONAL~~[6] operation allows a client to cancel a specified Document in a specified Print Job from
1004 the time the Document is created up to, but not including, the time it is completed, canceled, or aborted. Since a
1005 Document might already be printing by the time a Cancel-Document is received, some media sheet pages might be
1006 printed before the document processing is actually terminated.

1007 ~~ISSUE 05: OK, that Cancel-Document operation is OPTIONAL, while the Cancel-Job operation is REQUIRED by~~
1008 ~~[RFC2911]?~~

1009 The Cancel-Document operation does not remove the Document from the Job and Printer, but only sets the specified
1010 Document's "document-state" Document Description attribute to 'canceled' and the Document's "document-state-
1011 reasons" Document Description attribute to 'canceled-by-user' or 'cancel-by-operator'. If the Job object is printed
1012 again using operations such as the Reprocess-Job operation (see [adm-ops] section 4.1) or the Restart-Job
1013 operation (see [RFC2911] section 3.3.7), any canceled Documents are also printed again. Thus Cancel-Document

---

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

1014 has the same semantics as Cancel-Job (see [RFC2911] section 3.3.3), which only cancels the processing of the job,
1015 and doesn't delete the Job object itself. See the Delete-Document operation (section 3.11) to remove the Document
1016 object itself immediately from the Job and Printer.

1017 The Cancel-Document operation does not affect the states of any of the other Document objects in the job. If the Job
1018 was processing and there are more Documents to be processed, the Printer does so. If there are no further
1019 Documents to process, the Job moves to the 'completed' state as usual whenever there is no more processing to be
1020 done.

1021 The IPP objectPrinter MUST accept or reject the request based on the document's current state and transition the
1022 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'

1023 Rule 1: If the implementation requires some measurable time to cancel the document in the 'processing' document
1024 states, the Printer object MUST add the 'processing-to-stop-point' value to the document's "document-state-reasons"
1025 attribute and then transition the document to the 'canceled' state when the processing ceases (see [RFC2911]
1026 section 4.3.8).

1027 Rule 2: If the Document object already has the 'processing-to-stop-point' value in its "document-state-reasons"
1028 attribute, then the Printer object MUST reject a Cancel-Document operation.

1029 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
1030 owner or an operator or administrator of the Printer object (see [RFC2911] sections 1 and 8.5). Otherwise, the IPP
1031 objectPrinter MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-
1032 error-not-authorized' as appropriate.

1033 ## 3.9.1 Cancel-Document Request

1034 The following groups of attributes are part of the Cancel-Document Request:

1035 **Group 1: Operation Attributes**

1036 **Natural Language and Character Set:**
1037 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
1038 3.1.4.1.

1039 **Target:**
1040 The client MUST supply the "document-number" (integer(1:MAX)) operation attribute MUST be supplied
1041 immediately after along with either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri"
1042 (uri) operation attribute(s) which define the target Document object for this operation as described in section
1043 [RFC2911] 3.1.5. If the client omits the "document-number" operation attribute, the Printer MUST reject the
1044 request and return the 'client-error-bad-request' status code.

1045   **Requesting User Name:**
1046   The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
1047   [RFC2911] section 8.3.

1048   **3.9.1.1 document-message (text(127))**   **operation attribute:**

1049   The client ~~OPTIONALLY~~ MAY suppl~~ies~~ this operation attribute. ~~The Printer object OPTIONALLY supports~~
1050   ~~this attribute.~~ If the Printer supports this attribute, the Printer MUST also support the corresponding
1051   "document-message" (text(127)) Document Description attribute (see section 8.10) and copy this value to the
1052   "document-message" Document Description attribute. The end user can use this Document Description
1053   attribute as a message to the operator and the operator can use it as a message to the user. The Printer
1054   MAY print this message on a document start sheet for this document, if any.

1055   ~~It is a message to the operator. This "message" attribute is not the same as the "job-message-from-~~
1056   ~~operator" attribute. The "job-message-from-operator" attribute is used to report a message from the operator~~
1057   ~~to the end user that queries that attribute. This "message" operation attribute is used to send a message~~
1058   ~~from the client to the operator along with the operation request. It is an implementation decision of how or~~
1059   ~~where to display this message to the operator (if at all). ISSUE 06: OK to have the "message" operation~~
1060   ~~attribute supplied in the Cancel-Document operation be sent to the operator in some unspecified way, like~~
1061   ~~Cancel-Job, which could include setting the Job's "message-to-operator" Job Template Job attribute or~~
1062   ~~should we just do away with the "message" operation attribute in the Cancel-Document operation?~~

1063   The Printer MUST ignore the new "job-message-from-operator" operation attribute (see [adm-ops] section 6)
1064   for this operation, since that is a job only attribute and Cancel-Document is a Document operation.

1065 ## 3.9.2 Cancel-Document Response

1066 The following sets of attributes are part of the Cancel-Document Response:

1067 **Group 1: Operation Attributes**

1068   **Status Message:**
1069   In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
1070   "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
1071   in [RFC2911] sections 13 and 3.1.6.

1072   **Natural Language and Character Set:**
1073   The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
1074   3.1.4.2.

1075 **Group 2: Unsupported Attributes**

1076   See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

1077 Once a successful response has been sent, the implementation guarantees that the Document will eventually end up
1078 in the 'canceled' state. Between the time of the Cancel-Document operation is accepted and when the document
1079 enters the 'canceled' document-state (see section 8.5), the "document-state-reasons" attribute (see section 8.7)
1080 SHOULD contain the 'processing-to-stop-point' value which indicates to later queries that although the Document
1081 might still be 'processing', it will eventually end up in the 'canceled' state, not the 'completed' state.

1082 ## 3.10 Cancel-Current-Document Operation[7]

1083 This OPTIONAL operation allows a client to cancel either (1) any current Document of the current Job on the target
1084 Printer or (2) the specified document in a specified job if they are the current document and job on the Printer. One
1085 of the uses of this operation is by operators in an emergency, where the job-id and document-number might be
1086 unknown to the operator. See section 3.9 for the semantics of canceling a Document and what values the Printer
1087 sets the Document's Document Description attributes. Since a Document might already be marking by the time a
1088 Cancel-Current-Document is received, some media sheet pages might be printed before the document is actually
1089 terminated.

1090 If the client does not supply a "job-id" and "document-number" operation attributes, the Printer MUST accept the
1091 request and cancel the current document if there is a current document in the 'processing' state; otherwise, it MUST
1092 reject the request and return the 'client-error-not-possible' status code. If more than one document is in the
1093 'processing' or 'processing-stopped' states, the one that is marking is canceled and the others are unaffected.

1094 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation and its
1095 acceptance, the current document might change to a different document or even a different job. If the user or
1096 operator is authenticated to cancel the new job, the wrong document is canceled. To prevent this race from
1097 canceling the wrong document, the client MAY supply the "job-id" and "document-number" operation attributes which
1098 is checked against the current job's "job-id" and the current Document's "document-number". If the job identified by
1099 the "job-id" attribute is not the current job on the Printer and the "document-number" is not the current Document in
1100 that current Job, i.e., is not in the 'processing' state, the Printer MUST reject this operation and return the 'client-
1101 error-not-possible' status code. Otherwise, the Printer cancels the specified document.

1102 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
1103 owner (as determined in the Job Creation operation) or an operator or administrator of the Printer object (see
1104 [RFC2911] Sections 1 and 8.5).

1105 The Cancel-Current-Document Request and Cancel-Current-Document Response have the same attribute groups
1106 and attributes as the Pause-Printer operation (see [RFC2911] section 3.2.8) with the addition of the following Group
1107 1 Operation attributes in the request:

1108 ### 3.10.1 job-id (integer(1:MAX))_____**operation attribute**

1109 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job is still the
1110 current job on the target Printer object. The ~~IPP object~~Printer MUST supports this operation attribute, if it
1111 supports this operation.

1112 ### 3.10.2 document-number (integer(1:MAX))_____**operation attribute**

1113 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified document is still
1114 the current document on the target Printer object. The ~~IPP object~~ Printer MUST supports this operation
1115 attribute, if it supports this operation.

1116 ### 3.10.3 document-message (text(127))_____**operation attribute**

1117 The client MAY supply this operation attribute. If the Printer supports this attribute, the Printer MUST also
1118 support the corresponding "document-message" (text(127)) Document Description attribute (see section
1119 8.10) and copy this value to the "document-message" Document Description attribute. The end user can use
1120 this Document Description attribute as a message to the operator and the operator can use it as a message
1121 to the user. The Printer MAY print this message on a document start sheet for this document, if any.

---

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

1122 The Printer MUST ignore the new "job-message-from-operator" operation attribute (see [adm-ops] section 6) for this
1123 operation, since that is a job only attribute and Cancel-Current-Document is a Document operation. ~~ISSUE 07: OK~~
1124 ~~not to have a "document-message-from-operator" for use with Document operations, like with the Cancel-Current-~~
1125 ~~Document operation that an operator is likely to use?~~

3.11 Delete-Document Operation

1127 This OPTIONAL operation removes the specified Document object and its data immediately from the specified Job.
1128 The Printer MUST reject the request if the Document is in any state, but 'pending" (there is no 'pending-held' state for
1129 Documents). The Printer does not reassign the "document-number" Document Description attribute values of the
1130 remaining Document objects in the Job, so that the deleted Document object leaves a gap in the document
1131 numbering space for the Job. The Printer MUST return a 'client-error-not-found' status code, in a subsequent Get-
1132 Document-Attributes operation for this Document object specifying its former "document-number". This operation is
1133 similar to the Purge-Jobs operation which immediately deletes all jobs from the Printer. However, the Delete-
1134 Document operation only deletes a single Document from the specified Job.

1135 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation MUST be an operator
1136 or administrator of the Printer object (see [RFC2911] sections 1 and 8.5). Otherwise, the Printer MUST reject the
1137 operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as
1138 appropriate. This operation requires operator/administrator privileges, otherwise a rogue client could submit, then
1139 delete, at will using up valuable spooling space. Instead of using this operation, ~~U~~unprivileged users use Cancel-
1140 Document which goes through the normal accounting, if any.

1141 The Delete-Document request and Delete-Document response have the same attribute groups and attributes as the
1142 Cancel-Document operation (see section 3.9).

4   Semantic extensions to Job operations

1144 This section defines effects that Job operations have on the Document object. Printer and Subscription object (Event
1145 Notification [ntfy]) operations MUST have no effect on the Document object and the Document object has no effect
1146 on the semantics of the Printer and Subscription operations. The Job operations that MUST NOT have any effect on
1147 the Document object because they are defined to affect the Job object as a whole are: **Get-Job-Attributes**[8]
1148 ([RFC2911] section 3.3.4)**, Get-Jobs**[9] ([RFC2911] section 3.2.6)**, Hold-Job** ([RFC2911] section 3.3.5), **Promote-Job**
1149 ([adm-ops] section 4.4.1), **Release-Held-New-Jobs** ([adm-ops] section 3.3.2)**, Resume-Job** ([adm-ops] section
1150 4.3.2)**, Schedule-Job-After** ([adm-ops] section 4.4.2)**, Set-Job-Attributes** ([set-ops] section 4.2), and **Validate-Job**
1151 ([RFC2911] section 3.2.3).

1152 The Job operations that affect Document objects or that Document objects affect the semantics of the Job operations
1153 are, in alphabetical order:

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

1155 The Printer sets the "document-state" Document Description attribute to 'canceled' and the "document-state-reasons"
1156 Document Description attribute to 'canceled-by-xxx' for any documents in the current Job that have not yet reached a
1157 terminal state ('completed', 'canceled', or 'aborted'), where "xxx" is 'user' or 'operator'. See [adm-ops] section 4.2.

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[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.

4.2 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.

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. The values of the "document-state-reasons" attributes MUST NOT affect job scheduling (see Table 11), only the Job's "job-state-reasons" values. 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 (Group 4) 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 (Group 4) 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-state" and "document-state-reasons" Document Description attributes are unaffected (but the Documents are not processed any further, since the Job is stopped).

5 Attribute Precedence

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

The attribute precedence model has the following features:

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

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

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

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

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

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

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

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

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

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

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

~~3.~~4. **Document Level - Document object attributes -** The Document attributes supplied at the Document Level, i.e.that is, in a Create-Document, Send-Document, or Send-URI operation to apply to the Input Document. Supplied by the client when submitting a Document object, or set by the user or operator after the Document has been accepted either using the Set-Job-Attributes operation, or by the operator using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.

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

5. **Document Level - document override programming -** The special "document-overrides" collection operation attribute (see [override]) supplied by the client in the Send-Document or Send-URI request. The collection contains the member attributes that are to override attributes specified at lower precedence for the specified range of documents, including the current Document and subsequently created Documents. Clients that support the Document object SHOULD supply the attributes as

1271   Document Template attributes directly when creating the Document, instead of using the operation
1272   attribute mechanism. Example: "document-overrides" = {"input-documents" = '5:5'; "media" =
1273   'transparency'}

6. **Job Level - document override programming** - The special "document-overrides" collection Job
1275   Template attribute (see [override]) that contains the attributes that are to have the document override
1276   status for the specified Input-Documents or Output-Documents. Supplied by the client when submitting a
1277   job either in the protocol, or set by the user or operator after the job has been accepted either using the
1278   Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "document-
1279   overrides" = {"input-documents-number" = '5:5'; "media" = 'transparency'}

7. **Job Level - Job object and Document object attributes** - The Job attributes and Document attributes
1281   supplied at the Job Level, i.e., with a Create-Job, Print-Job, or Print-URI operation. Supplied by the
1282   client when submitting a Job in the protocol, or set by the user or operator after the job has been
1283   accepted either using the Set-Job-Attributes operation, or by the operator using means local to the
1284   Printer. Examples: "media" = 'na-letter' and "copies" = '2'.

8. **PDL document data** - an instruction in the PDL document data. Supplied by the application or print
1286   driver that created the PDL. Example: PostScript setPageDevice specifying na-letter media. Whether
1287   PDL document data is actually lower precedence than the preceding levels depends on the
1288   implementation as expressed in the "pdl-override-supported" Printer Description attribute (see
1289   [RFC2911] section 4.4.28 and [prod-print2] section 8.1).

1291   Job Template and Document Template attributes of the form "xxx-requested", such as "orientation-
1292   requested" (see [RFC2911] section 4.2.10) have a lower priority than the PDL. If the PDL contains a
1293   corresponding instruction, that PDL instruction will be used instead of the supplied "xxx-requested"
1294   attribute. For example, PostScript PDL data always has a well-defined orientation, so that "orientation-
1295   requested" never affects the result. On the other hand, PDLs such as text/plain never has orientation
1296   and PCL NEED NOT have orientation, in which case, "orientation-requested" takes affect.

9. **PDL Init File data** - a file that the Printer uses to initialize the PDL Interpreter before it starts interpreting
1298   each document in a Job. See description of "pdl-init-file" Job Template attribute in [prod-print2] Section
1299   5.8. It is immaterial how this file is specified, whether it be by a queue override, job object attribute or
1300   printer default – the precedence of the contents of this file is at this level.

10. **printer default** - a Printer "xxx-default" attribute that is applied by the Printer provided that none of the
1302   higher levels have supplied a value. The Printer implementation MUST supply values for all of the
1303   Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For example,
1304   if the output device will use media from the large-capacity input tray if not directed otherwise, the
1305   implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity' keyword
1306   value without requiring the administrator to configure that value. The implementation MUST allow the
1307   administrator to configure the Printer's "xxx-default" attributes to other values, if other value are
1308   supported by the implementation. Example: The administrator changes the Printer's "media-default"
1309   from 'large-capacity' to 'na-letter'.

Note: Because of the requirement that the implementation supply pre-configured values for the
1311   Printer's "xxx-default" attributes, there is no need for a lower "hardware default" precedence
1312   level.

6 Operation Attributes for the Job and Document Creation operations

1314 This section lists *all* the Operation attributes that have been defined in other IPP specifications that are used in Job
1315 Creation operations and extends their use to the Document Creation operations defined in the IPP specification.
1316 Operation attributes relate to the operation and do not depend on the printing capabilities of the Printer.

1317 ## 6.1   Operation Attributes supplied at the Job and Document Levels for Creation

1318 Table 6 lists the Operation attributes that clients supply at the Job Level and/or the Document Level. The value of
1319 the "ipp-attribute-fidelity" operation attribute (see section 6.2.1) does *not* affect the Printer's handling of the other
1320 operation attributes, only its handling of the Job Template and Document Template attributes (see section 7).

1321 The "Level Supplied" column indicates whether the Operation attribute can be supplied at the Job Level (Print-Job,
1322 Print-URI, and Create-Job) and at the Document Level (Create-Document, Send-Document, and Send-URI) . The
1323 Conformance column indicates the conformance requirements for what the client supplies in a request and the
1324 Printer supports in a request. The Reference and Section columns list the IETF or IEEE-ISTO specification which
1325 defines the semantics of the attribute.

1326 Legend:
1327 [job-]   indicates an attribute that shouldn't have had a "job-" prefix in its name in [RFC2911], so that the same
1328   attribute name could also be used for the Document object as a Document Description attribute. Note: For
1329   the PWG Semantic Model, the "job-" prefix is dropped.
1330 "-"   indicates that the Job or Document attribute is *not* defined.
1331 *   these operation attributes are defined for *all* operations, not just Job Creation and Document Creation
1332   operations
1333 **   the Printer MUST copy these operation attributes to the corresponding Job Description or Document
1334   Description attributes.   See Table 9 for the corresponding Job and Document Description attributes.

1335 **Table 6 - Operation Attributes supplied at the Job and Document Levels in Creation Requests**

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[11]	y	MAY	MUST	[RFC2911] §3.2.1.1
**document-mandatory-attributes **	1setOf type2 keyword	-	y	MAY	MAY	[this spec] §6.2.3
**document-message * **	text(127)	-	y	MAY	MAY	[this spec] §8.10
**document-name **	name(MAX)	y[12]	y	MAY	MUST	[RFC2911] §3.2.1.1
**document-natural-language **	naturalLanguage	y[13]	y	MAY	MAY	[RFC2911] §3.2.1.1

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[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. ISSUE 04: With the Document object, do we want to also defines Job Description attributes for: "compression", "document-format", "document-name", "document-natural-language", since they are really Document attributes?

[11] See long footnote for the "compression" operation attribute in this table.
[12] See long footnote for the "compression" operation attribute in this table.
[13] See long footnote for the "compression" operation attribute in this table.

Operation attribute name for Job and Document Creation *requests*	Attribute Syntax	Level Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
document-overrides[14]	1setOf collection	-	y	MAY	MAY	[override] §5.1, §9.2.2
See "document-overrides" in Table 8 for the list of member attributes						
document-uri **	uri	y	y	MAY[15]	MAY	[RFC2911] §3.2.2
input-document-number[16]	integer(1:MAX)	-	y	MAY	MAY	[override] §9.2, [this spec] §3.1.1.1
ipp-attribute-fidelity **	boolean	y	y	MAY	MUST	[RFC2911] §3.2.1.1, [this spec] §6.2.1
[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-mandatory-attributes **	1setOf type2 keyword	y	-y	MAY	MAY	[this spec] §6.2.2
[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
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
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[17]	1setOf collection	-	y	MAY	MAY	[override] §5.2, §9.2.3
See "page-overrides" in Table 8 for the list of member attributes						
printer-uri[18] *	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

1336 * and **. See Legend at the beginning of the Table. these attributes are defined for *all* operations, not just Job
1337 Creation and Document Creation operations

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[14] According to [override] section 9.2.2, Tthe "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. The Printer MUST merge this operation attribute into the "document-overrides" Document Template attribute, if any. See the "page-overrides" Job Template attribute in Table 8 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 8) for each Document Creation request (in a new Document Template attribute group) without needing a collection.

[15] The "document-uri" operation attribute MUST be supplied in the Print-URI Job Creation operation and the Send-URI Document Creation operation, MAY be supplied in a Validate-Document operation, and MUST NOT be supplied in other Job Creation operations.

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

[17] According to [override] section 9.2.3, Tthe "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. The Printer MUST merge this operation attribute into the "page-overrides" Document Template attribute, if any. See the "page-overrides" Job Template attribute in Table 8 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.

[18] The Printer copies the "printer-uri" operation attribute to the Job's "job-printer-uri" Job Description attribute.

6.2 Operation Attributes defined for use ~~with the~~ in Document ~~Object~~Creation operations

This section defines extensions to existing Operation attributes in Job and Document Creation operations and new Operation attributes ~~defined~~ for use ~~with the~~ in Document Creation operations~~object~~.

6.2.1 ipp-attribute-fidelity (boolean) (RFC2911] sections 3.2.1 and 15)

This operation attribute indicates whether or not the Printer MUST honor all supplied Job Template and Document Template attributes in the Job Creation and Document Creation operation, respectively. The client ~~OPTIONALLY MAY~~ supply~~ies~~ this attribute in Job Creation and Document Creation operations. The Printer ~~object~~ MUST support this attribute in Job Creation and Document Creation operations. The value 'true' indicates that total fidelity to client supplied Job Template and Document Template attributes and values is required, else the Printer ~~object~~ MUST reject the ~~Print-Job~~ request. The value 'false' indicates that a reasonable attempt to print the Job or Document object is acceptable and the Printer object MUST accept the ~~Print-Job~~ request. If not supplied, the Printer ~~object~~ assumes the value is 'false'. All Printer ~~objects~~ implementations MUST support both types of job processing. See [RFC2911] section 15~~15~~ for a full description of "ipp-attribute-fidelity" and its relationship to other attributes, especially the Printer object's "pdl-override-supported" attribute.

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

This operation attribute identifies which Job Template ~~and Document Template~~ attributes the Printer MUST honor, in a Job Creation operation, otherwise, the Printer MUST reject the ~~Job Creation~~ operation~~for the Job or any subsequent Document Creation operations for this Job~~. The client MAY supply this attribute in Job Creation operations. The Printer MUST support this attribute in Job Creation operations. The Printer MUST ignore this attribute if the client supplies the "ipp-attribute-fidelity" operation attribute (see section 6.2.1) ~~is supplied~~ with a 'true' value, since ~~that~~ a 'true' value indicates that the Printer MUST honor all supplied Job Template and Document Template attributes.

The values of the "job-mandatory-attributes" attribute are the keyword attribute names that identify Job Template attributes, for example, 'job-hold-until', 'job-finishings' (see section 7.1.4), 'copies' and 'media'. In order to identify a member attribute of a collection attribute, the keyword names of both the collection attribute and the member attribute are given separated by a period (.) character. For example, to make the "media" attribute of the "cover-front" collection attribute mandatory, supply the keyword value: 'cover-front.media'.

6.2.3 document-mandatory-attributes (1setOf type2 keyword)

This operation attribute identifies which Document Template attributes the Printer MUST honor in a Document Creation operation, otherwise, the Printer MUST reject the operation. The client MAY supply this attribute in Document Creation operations. The Printer MUST support this attribute in Document Creation operations. The Printer MUST ignore this attribute if the client supplies the "ipp-attribute-fidelity" operation attribute (see section 6.2.1) with a 'true' value, since a 'true' value indicates that the Printer MUST honor all supplied Job Template attributes and Document Template attributes.

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

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

1380 ## 6.3 Operation Attributes returned in Job and Document Creation responses

1381 Table 7 lists the Operation attributes that Printers return in Job Creation operation *responses*: Print-Job, Print-URI,
1382 and Create-Job and in Document Creation operation *responses*: Send-Document and Send-URI. The column
1383 labeled "Conformance" indicates the conformance for what the Printer returns and what the Printer supports. The
1384 Reference and Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

1385 **Table 7 - 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] §8.2
document-number	integer(1:MAX)	MUST	MUST	[this spec] §8.1
job-id	integer(1:MAX)	MUST	MUST	[RFC2911] §4.3.2
job-uri	uri	MUST	MUST	[RFC2911] §4.3.1
redirect-uri (uri)19	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

1386 * - indicates attributes that are defined for *all* operations, not just Job Creation operations
1387

1388 # 7 Job Template and Document Template attributes

1389 Table 8 lists *all* of the Job Template attributes defined in other IPP specifications and lists their corresponding
1390 Document Template attributes defined in this IPP specification. The Job Template attributes can be supplied in the
1391 Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

1392 A subset of these Job Template attributes (e.g., "document-format" and "media", but not "job-priority") are also
1393 defined to apply to Documents and are called Document Template attributes when supplied at the Document Level.
1394 Document Template attribute can be supplied in the Create-Document, Send-Document, and Send-URI operations.

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[19] 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.

1395 These Document Template attributes can also be supplied as Document Overrides using the "document-overrides"
1396 Job Template attribute (see [overrides]).

1397 A subset of the Document Template attributes that apply to pages (e.g., "media", but not "document-format" or "job-
1398 priority") can also be supplied as Page Overrides using the "page-overrides" Job Template collection attribute (see
1399 [override]) or as a Document Template attribute.

1400 According to [override], the "document-overrides" (collection) attribute MAY be supplied by the client in a Send-
1401 Document or Send-URI request as an Operation attribute to apply document overrides to this and/or subsequent
1402 documents in the job. See the "document-overrides" Job Template attribute in Table 8 for the listing of the member
1403 attributes. However, with the introduction of the Document object, the "document-overrides" (collection) attribute
1404 SHOULD NOT be used (either as a Job Template attribute or an Operation attribute). Instead, the client simply
1405 supplies the Document Template attributes (see Table 8) for each Document Creation request (in a new Document
1406 Template attribute group) without needing a collection. A Printer MAY support "document-overrides" as specified in
1407 [override] for backward compatibility with clients that don't support the Document object.

1408 The "document-overrides" attribute is also useful in combination with the "pages-per-subset" attribute (see
1409 [overrides]) which divides up the Input Page stream concatenated across the Input Documents into separate Output
1410 Documents. For example, making every 10 Input Pages be a separate Output Document but the client only wants to
1411 staple the first Output Document.

1412 Similarly, according to [override], the "page-overrides" (collection) attribute MAY be supplied by the client in a Send-
1413 Document or Send-URI request as an Operation attribute to apply page overrides to this and/or subsequent
1414 documents in the job. See the "page-overrides" Job Template attribute in Table 8 for the listing of the member
1415 attributes. However, with the introduction of the Document object, the "page-overrides" (collection) attribute
1416 SHOULD be more simply supplied as one of the Document Template attributes for the document being created only.
1417 However, a Printer MAY also support the "page-overrides" attribute as an operation attribute for backward
1418 compatibility with clients that do not support the Document object.

1419 The "Defined for use" column indicates whether the client MAY supply and the Printer support the attribute at the
1420 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.

1421
1422 Job Template and Document Template attributes are OPTIONAL for a Printer to support and for a client to supply in
1423 a Job Creation or Document Creation request or a Document Overrides or Page Overrides. If a Printer supports a
1424 Job Template or Document Template attribute, then it MUST copy the supplied attribute to the Job or Document
1425 object, respectively so that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs and Get-
1426 Document-Attributes/Get-Documents operations, respectively. The effect of Job Template Attributes supplied in Job
1427 Creation requests are inherited by the Document objects, unless the Document Creation operation supplies the
1428 attribute with a different value.

1429 If a Job Template collection attribute is supported (see [coll]), then there are conformance requirements for which
1430 member attributes MUST be supported and which member attributes a client MUST supply as indicated in the
1431 Conformance column for each collection member attribute in Table 8.

1432 **Table 8 - 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[20]	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	y[21] ~~n~~	n	MAY	MAY	[override] §5.1
input-documents[22]	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

---

[20] 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.
[21] The client can supply the "document-overrides" operation attribute in the Send-Document or Send-URI operations (see [override]).
[22] The Printer MUST support "document-format", "document-name", "compression", "document-natural-language", and "page-ranges" with the "input-documents" member attribute, but not the "output-documents" member attribute.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use J	D	P	Conformance Client supply	Printer support	Reference
finishings	1setOf type2 enum	y[23]	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
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[24]	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[25]	n	MAY	MAY	[this spec] §7.1.1

[23] 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.

[24] 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.

[25] 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'.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
job-cover-back	collection	y	n[26]	n	MAY	MAY	[this spec] §7.1.2
same as **cover-back**	**see cover-back**						
job-cover-front	collection	y	n[27]	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
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[28]	n	MAY	MAY	[this spec] §7.1.4
job-finishings-col	collection	y	n[29]	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[30]	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

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[26] 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'.

[27] 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'.

[28] 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'.

[29] 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'.

[30] The "job-message-to-operator" Job Template attribute has no corresponding Document Template attribute. Instead, the user and operator communicate with each other using the same "document-message" operation attribute which the Printer copies to the "document-message" Document Description attribute.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
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
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

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
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	yn	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[31]	y	n	MAY	MAY	[override] §5.2
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[32]	y	ny	MAY	MAY	[RFC2911] §4.2.7
pages-per-subset	1setOf integer(1:MAX)	y[33]	n	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

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[31] The effect of the IPP "page-overrides" 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.

[32] 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.

[33] 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	
separator-sheets	collection	y	y	n~~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
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

1433

1434 7.1 Job Template attributes defined for use with the Document object

1435 This section defines additional Job Template attributes for use with the Document object.

1436 7.1.1 job-copies (integer(1:MAX)) Job Template attribute

1437 This attribute specifies the number of job copies, i.e., with all of the Document objects taken together. Its
1438 interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the
1439 "copies" Job Template attribute defined in [RFC2911] section 4.2.5 which switches between job copies and
1440 document copies depending on the value of the "multiple-document-handling" Job Template attribute.

1441 7.1.2 job-cover-back (collection) Job Template attribute

1442 This attribute specifies the cover for the back of the job, i.e., with all of the Document objects taken together and is
1443 independent of the value of the "multiple-document-handling" Job Template attribute. The member attributes are the
1444 same as "cover-back" (see [prod-print] section 3.1). However, the "cover-back" Job Template attribute switches
1445 between a job back cover and a document back cover depending on the value of the "multiple-document-handling"
1446 Job Template attribute.

1447 7.1.3 job-cover-front (collection) Job Template attribute

1448 This attribute specifies the cover for the front of the job, i.e., with all of the Document objects taken together and is
1449 independent of the value of the "multiple-document-handling" Job Template attribute. The member attributes are the
1450 same as the "cover-front" Job Template attribute (see [prod-print] section 3.2). However, the "cover-front" Job
1451 Template attribute switches between a job front cover and a document front cover depending on the value of the
1452 "multiple-document-handling" Job Template attribute.

1453 7.1.4 job-finishings (1setOf type2 enum) Job Template attribute

1454 This attribute specifies the job finishings, i.e., with all of the Document objects taken together. Its interpretation is
1455 independent of the value of the "multiple-document-handling" Job Template attribute. See the "finishings" Job

1456 Template attribute defined in [RFC2911] section 4.2.6 which switches between job finishings and document
1457 finishings depending on the value of the "multiple-document-handling" Job Template attribute.

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

1459 This attribute specifies the job finishings collection, i.e., with all of the Document objects taken together. Its
1460 interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the
1461 "finishings" Job Template attribute defined in [RFC2911] section 4.2.6 which switches between job finishings
1462 collection and document finishings collection depending on the value of the "multiple-document-handling" Job
1463 Template attribute.

8   Job Description and Document Description attributes

1465 Table 9 lists all the Job Description defined in other IPP specifications and the corresponding Document Description
1466 attributes defined in this IPP specification. Job Description and Document Description attributes are Job object and
1467 Document object attributes, respectively, that are filled in by the Printer. Some Job/Document Description attribute
1468 values are supplied by the client in the Job/Document Creation operation using corresponding Operation attributes
1469 as flagged with "**".

1470 The column labeled "attribute syntax" indicates the attribute syntax (see [RFC2911] section 4.1). The Printer
1471 conformance is indicated along with the reference to the specification in which the attribute is defined. The
1472 conformance for Document Description attributes (if the Printer supports the Document object) is the same as the
1473 corresponding Job Description attributes.

1474 Note: There are no corresponding Page Range (or Page Override) Description attributes. The Page Range is not an
1475 object with a state and it cannot be queried.

1476 Legend:
1477 [job-]   indicates an attribute that shouldn't have had a "job-" prefix in its name in [RFC2911], so that the same
1478   attribute name could also apply to be used for the Document object as a Document Description attribute.
1479   Note: For the PWG Semantic Model, the "job-" prefix is proposed to be dropped.
1480 "-"   indicates that the Job or Document attribute is *not* defined.
1481 **   indicates a Job and/or Document Description attribute that the client MAY supply the values for in a
1482   corresponding Operation attribute. See Table 6 for the corresponding operation attribute.
1483 (r/w)   indicates that the Job Description or Document Description attribute is read/write, so that the client can
1484   changes its value using the Set-Job-Attributes or Set-Document-Attributes operation (see section 3.8).
1485   ISSUE 12: The "document-name" Document Description attribute is settable by Set-Document-Attributes
1486   (like "job-name")? But It's the only Document Description attribute that is marked (r/w)? Do we really need
1487   to be able to let a client change the "document-name" with the Set-Document-Attributes operation?

1488   **Table 9 - 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[34]	y	MAY	[prod-print] §4.1

---

[34] 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

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference
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
document-id-uri	uri	-	y	MUST? ISSUE 13	[this spec] §8.2
document-message (r/w)	text(127)	-35	y	MAY	[this spec] §8.10
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-printer-up-time	integer(1:MAX)	-	y	MUST	[this spec] §8.11
document-state	type1 enum	-	y	MUST	[this spec] §8.5.2
document-state-message	text(MAX)	-	y	MAY	[this spec] §8.9
document-state-reasons	1setOf type2 keyword	-	y	MUST	[this spec] §8.7
document-uri **	uri	-	y	MAY	[this spec] §8.3
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	-36	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	-37 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	-38	MUST	[RFC2911] §4.3.5
job-originating-user-name	name (MAX)	y	-	MUST	[RFC2911] §4.3.6

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.

35 The "document-message" (text(127)) Document Description attribute has a corresponding "job-message-from-operator" (text(127)) Job Description attribute (see [RFC2911] section 4.3.16) which handles operator to user communication only and a "job-message-to-operator (text(MAX)) Job Template attribute (see [prod-print] section 3.10) for user to operator communication.

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

37 The "job-message-from-operator" Job Description attribute has no corresponding "document-message-from-operator" (text(127)) Document Description attribute. Instead, both the user and the operator use the "document-message" (text(127)) operation/Document Description attribute (see section 8.10) to communicate with each other.

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

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference
job-printer-make-and-model	text(127)	y	-	CMUST 39	[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	- 40	MUST	[RFC2911] §4.3.7
job-state-message	text(MAX)	y	- 41	MAY	[RFC2911] §4.3.9
job-state-reasons	1setOf type2 keyword	y	- 42	MUST	[RFC2911] §4.3.8
job-uri	uri	y	- 43	MUST	[RFC2911] §4.3.1
[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

1489 "**"   See the description in the Legend before the table.
1490

1491 Most of the existing "job-state" and "job-state-reasons" Job Description attribute values apply equally well to
1492 individual documents in a multi-document job (with removal of the 'job-' prefix for those that apply to both Job and
1493 Document). Furthermore, the job states are completely service-type neutral, so they can apply to scanning. faxing,
1494 formatting processes as well. The job state reasons have a number of reasons that are print service specific, but
1495 most can apply to other types of service as well. The reason for separating state from reasons, is so that the states
1496 can be the fundamental states that most implementations have, while the state reasons can vary depending on the
1497 sophistication of the system. The states are the ones that clients are most likely to base actions upon, and the state
1498 reasons are more information, both for programs and people.

1499 The descriptions of the new "document-state" and "document-state-reasons" attributes are merged in with the
1500 existing "job-state" and "job-state-reasons". Such merging shows the parallelism in the description to aid
1501 understanding and implementation and so that future maintenance will continue this strong parallelism. The "/"
1502 character separates the words: Job from Document so that the same description can serve for both Job and
1503 Document objects.

---

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

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

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

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

43 The Document Description attribute that corresponds to the "job-uri" (uri) Job Description attribute is the (new) "document-id-uri" (uri) attribute. The "job-uri" Job Description attribute does not have a corresponding Document Description attribute. However, the value is only a unique ID. The client cannot use the "document-id-uri" attribute URI value as a target of a Document object operation; Tthe "job-uri" has proved problematic enough as a target.

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

1505 This REQUIRED Document Description attribute is the ordinal number of the document within the job which
1506 determines its order of being printed in a multi-document job. The Printer generates the values monotonically
1507 increasing from 1 for a job. However, the client MAY supply the value in the "input-document-number" operation
1508 attribute (see section 3.1.1.1).

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

1510 This REQUIRED Document Description attribute is generated by the Printer as a unique URI to identify a Document
1511 object, in the same way that the "job-uri" (uri) Job Description attribute uniquely identifies a Job object. Unlike the
1512 "job-uri" (uri) attribute, the client cannot supply this attribute as a target of an operation.

1513 ISSUE 16: Should the "document-id-uri" Document Description attribute be REQUIRED for the Printer to support in
1514 any Document Creation operation, as a way of uniquely identifying a Document object across all Printers?

1515 ISSUE 17: Should we REQUIRE the Printer to accept a "document-id-uri" as an alternative way for clients to specify
1516 the target of Document object operations? I know that implementers have grumbled about the "job-uri" being
1517 REQUIRED for the Printer to support and accept as the target.

8.3 document-uri (uri) Document Description attribute

1519 This Document Description attribute is the URI that the client supplied in a Send-URI operation. The Printer MUST
1520 support this attribute if the Printer supports the Send-URI operation (see section 3.4).

8.4 job-state (type1 enum) Job Description attribute

8.5 document-state (type1 enum) Document Description attribute

1523 The REQUIRED "job-state" and the REQUIRED "document-state" attribute identify the current state of the job and
1524 document, respectively. Even though IPP defines seven values for job/document states (plus the out-of-band
1525 'unknown' value - see [RFC2911] section 4.1), implementations only need to support those states which are
1526 appropriate for the particular implementation. In other words, an IPP Printer object implementation supports only
1527 those job/document states implemented by the output device and available to the IPP Printer object implementation.

1528 Table 10 lists the "job-state" and "document-state" attribute values.

1529 **Table 10 - "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

1530

1531 The (JD) and (J) notation below indicates whether the keyword is defined for the "job-state" and "document-state"
1532 attributes or just the "job-state" attribute as indicated in Table 10. 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.

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

Value	Symbolic Name and Description
	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.

1533 The final value for this attribute MUST be one of: 'completed', 'canceled', or 'aborted' before the Printer removes the
1534 job/document altogether. The length of time that jobs/document remain in the 'canceled', 'aborted', and 'completed'
1535 states depends on implementation.

1536 Jobs/documents reach one of the three terminal states: 'completed', 'canceled', or 'aborted', after the jobs/documents
1537 have completed all activity, including stacking output media, after the jobs/documents have completed all activity,
1538 and all job/document status attributes have reached their final values for the job/document.

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

1540 The "job-state" attribute is one of the most important Job Description attributes. Figure 1 shows the values of the
1541 "job-state" attribute and the Job object life cycle as affected by actions on the Job, Printer, and job processing.

*start = PrintJob, PrintUri, CreateJob

1542
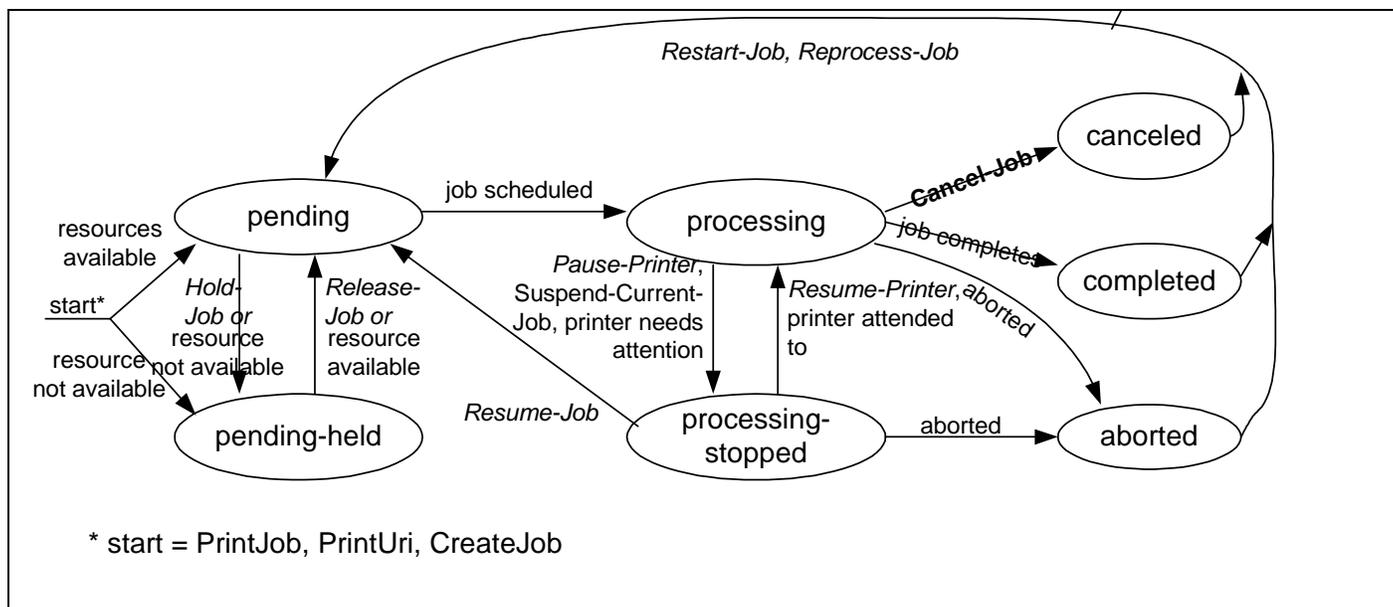
1543 **Figure 1 - The "job-state" Job Description attribute and the Job object life cycle**

1544 Normally a job progresses from left to right. Other state transitions are unlikely, but are not forbidden. Not shown
1545 are the transitions to the 'canceled' state from the 'pending', 'pending-held', and 'processing-stopped' states.

1546 ## 8.5.2 The "document-state" Document Description attribute and the Document object life
1547 Cycle

1548 The "document-state" attribute is one of the most important Document Description attributes. Figure 2 shows the
1549 values of the "document-state" attribute and the Document object life cycle as affected by actions on the Job,
1550 Document, Printer, and job processing. Documents are not active objects and their life cycle is closely tied to the
1551 lifecycle of a Job[44]. Documents basically have three states.   The first is waiting to be processed by a Job (i.e.
1552 pending). The second state is from the time the Job first starts processing the Document (i.e., processing) and until it
1553 reaches one of its terminal states. The third state for a Document is one of its terminal states (i.e., completed,
1554 canceled, or aborted).

1555
1556

---

[44] 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.

1557
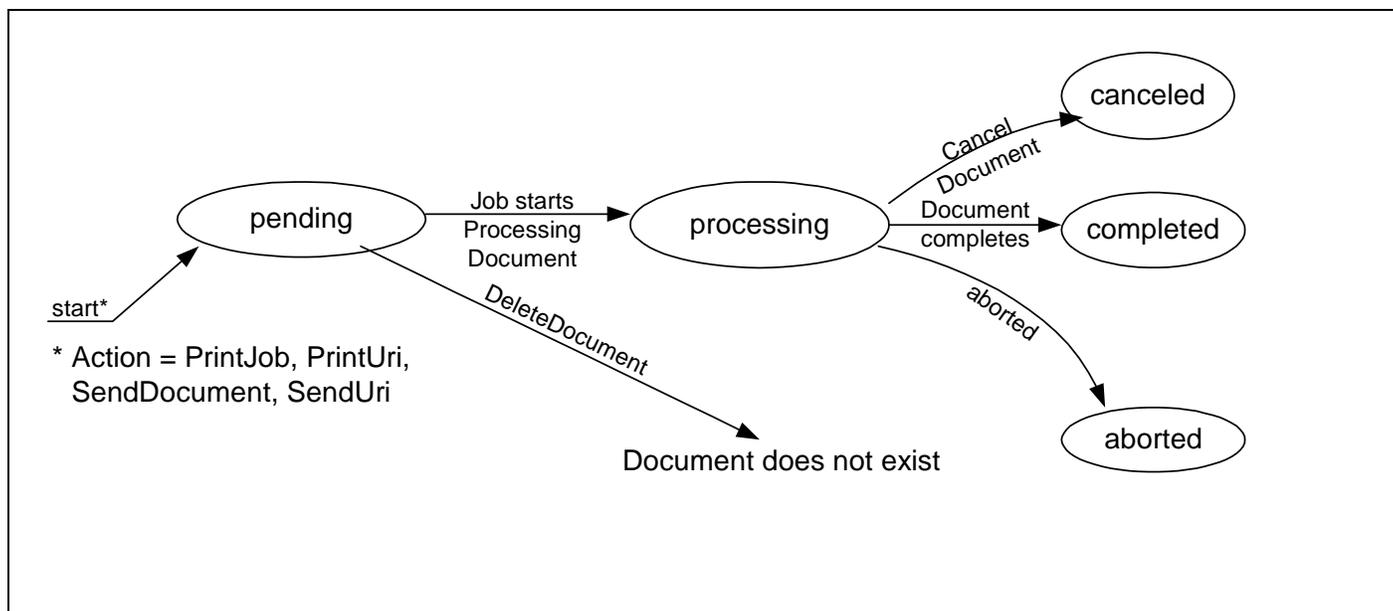
1558 **Figure 2 - The "document-state" Document Description attribute and the Document object life Cycle**

1559 A Document object has a much simpler life cycle than a Job object. A Document always progresses from left to right
1560 in the state diagram. No other state transitions are defined.

8.5.3 Forwarding Servers

1562 As with all other IPP attributes, if the implementation can not determine the correct value for this attribute, it SHOULD
1563 respond with the out-of-band value 'unknown' (see [RFC2911] Section 4.1) rather than try to guess at some possibly
1564 incorrect value and give the end user the wrong impression about the state of the Job/Document object. For
1565 example, if the implementation is just a gateway into some printing system from which it can normally get status, but
1566 temporarily is unable, then the implementation should return the 'unknown' value. However, if the implementation is
1567 a gateway to a printing system that never provides detailed status about the print job/document, the implementation
1568 MAY set the IPP Job/Document object's state to 'completed', provided that it also sets the 'queued-in-device' value in
1569 the job's/document's "job-state-reasons"/"document-state-reasons" attribute (see "job-state-reasons"/"document-
1570 state-reasons" attribute below).

8.5.4 Partitioning of Job/Document States

1572 This section partitions the job/document states into phases: Job/Document Not Completed, Job/Document
1573 Retention, Job/Document History, and Job/Document Removal. This section also explains the 'job-restartable' value
1574 of the "job-state-reasons" Job Description attribute for use with the Restart-Job operation.

1575 **Job**/Document **Not Completed**: When a job is in the 'pending', 'pending-held', 'processing', or 'processing-stopped'
1576 states, the job is not completed. When a Document is in the 'pending' or 'processing' state, it is not completed.

1577 **Job Retention**: When a job enters one of the three terminal job states: 'completed', 'canceled', or 'aborted', the IPP
1578 Printer object MAY "retain" the job in a restartable condition for an implementation-defined time period. This time
1579 period MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention. While
1580 in the Job Retention phase, the job's document data is retained and a client may restart the job using the Restart-Job
1581 operation. If the Printer supports the Restart-Job operation, then it SHOULD indicate that the job is restartable by
1582 adding the 'job-restartable' value to the job's "job-state-reasons" attribute (see Section 8.6) during the Job Retention
1583 phase. If the Printer supports the Document object, then the Get-Document-Attributes and Get-Documents
1584 operations MUST be supported while the job is in the Job Retention phase.

1585 **Job History**: After the Job Retention phase expires for a job, the Printer object deletes the document data for the
1586 job and the job becomes part of the Job History. The Printer object MAY also delete any number of the job and
1587 document attributes. Since the job is no longer restartable, the Printer object MUST remove the 'job-restartable'
1588 value from the job's "job-state-reasons" attribute, if present. If the implementation supports the Document object, it
1589 SHOULD retain at least the "document-state" and "document-state-reasons" attributes on the Document object
1590 during the Job History phase which can be queried using the Get-Document-Attributes and Get-Documents
1591 operations.

1592 **Job Removal**: After the job has remained in the Job History for an implementation-defined time, such as when the
1593 number of jobs exceeds a fixed number or after a fixed time period (which MAY be zero seconds), the IPP Printer
1594 removes the Job and Document objects from the system.

1595 Using the Get-Jobs/Get-Documents operation and supplying the 'not-completed' value for the "which-jobs" operation
1596 attribute, a client is requesting jobs/documents in the Job/Document Not Completed phase. Using the Get-Jobs/Get-
1597 Documents operation and supplying the 'completed' value for the "which-jobs" operation attribute, a client is
1598 requesting jobs/documents in the Job Retention and Job History phases. Using the Get-Job-Attributes/Get-
1599 Document-Attributes operation, a client is requesting a job/documents in any phase except Job Removal. After Job
1600 Removal, the Get-Job-Attributes/Get-Document-Attributes and Get-Jobs/Get-Documents operations no longer are
1601 capable of returning any information about a job/document.

1602 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

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

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

1605 The REQUIRED "job-state-reasons" and the REQUIRED "document-state-reasons" attributes provide additional
1606 information about the job's and each document's current state, i.e., information that augments the value of the job's
1607 "job-state" attribute and each Document's "document-state" attribute, respectively. The Printer SHOULD support the
1608 same values for both the "job-state-reasons" and the "document-state-reasons" attribute for those attributes that are
1609 defined for both as indicated in the "Job" and "Doc" columns in Table 11.

1610 These values MAY be used with any job or document state or states for which the reason makes sense. Some of
1611 these value definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when
1612 implemented, the Printer MUST return these values when the reason applies and MUST NOT return them when the
1613 reason no longer applies whether the value of the Job's "job-state" attribute or the Document's "document-state"
1614 attribute changed or not. When the Job or Document does not have any reasons for being in its current state, the
1615 value of the Job's "job-state-reasons" attribute or Document's "document-state-reasons" attribute MUST be 'none'.

1616 Some of the Job's "job-state-reasons" values affect job scheduling, such as 'resources-are-not-ready' and 'job-hold-
1617 until-specified'. However, "document-state-reasons" values MUST NOT affect job scheduling, since Document
1618 objects are passive objects operated on by the containing Job object.

1619 Note: While values cannot be added to the "job-state" or "document-state" attributes without impacting deployed
1620 clients that take actions upon receiving "job-state" or "document-state" values, it is the intent that additional "job-
1621 state-reasons" and "document-state-reasons' values can be defined and registered without impacting such deployed
1622 clients. In other words, the "job-state-reasons" and the "document-state-reasons" attributes are intended to be
1623 extensible.

1624 Table 11 lists the The following standard keyword values are defined for the "job-state-reasons" and/or "document-
1625 state-reasons" attributes defined in this and other IPP specifications as indicated in the References columnas shown
1626 in Table 9. In Table 11 the keywords are listed in alphabetic order (observing the "[job-]" prefix), while in their
1627 descriptions following Table 11, they are listed in the most likely order of occurrence to help understanding.

1628 When the Document object is supported, the Printer implementation SHOULD still support the corresponding Job
1629 level "job-state-reasons", so that clients that do not support the Document object will receive the same information.
1630 Also it is usually more convenient for the client to obtain just the Job level status. However, the client SHOULD
1631 query both Job and Document attributes and convert them to some canonical form for display to the user, so that all
1632 Jobs and their Documents are displayed in a uniform manner, no matter from which clients they were submitted.

1633 **Notation:**
1634 [job-] indicates a state reason keyword value that has the 'job-' prefix when it is a value of the "job-state-reasons"
1635 attribute, but does not have the 'job-' prefix when it is a value of the "document-state-reasons" attribute[45].
1636 For purposes of sorting in Table 11, the "[job-]" prefix is observed, since this is an IPP specification.
1637 "-" indicates that the Job or Document value is *not* defined.

1638 **Table 11 - "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	-[46]	MUST	[RFC2911] §4.3.8
document-state-reasons	1setOf type2 keyword	-	y	MUST	[this spec] §8.7
	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
	[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

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[45] 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.
[46] 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-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

1639

1640 For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely
1641 to occur (if implemented), starting with the 'none' value. Note: The order is improved over that in [RFC2911]. The
1642 (JD), (J), and (D) notation is identical to the "Job" and "Doc" columns in Table 11 indicating whether the keyword is
1643 defined for the "job-state-reasons" and/or "document-state-reasons" attributes:

1644 **'none' (JD):** There are no reasons for the job's or document's current state. This state reason is
1645 semantically equivalent to "job-state-reasons" or "document-state-reasons" attribute without any
1646 value and MUST be used when there is no other value, since the 1setOf attribute syntax requires at
1647 least one value.

1648 **'job-hold-until-specified' (J)**: The value of the job's "job-hold-until" attribute was specified with a time
1649 period that is still in the future. The job MUST NOT be a candidate for processing until this reason is
1650 removed and there are no other reasons to hold the job. This value SHOULD be supported if the
1651 "job-hold-until" Job Template attribute is supported.

1652 **'job-password-wait' (J)**: The Job is currently being held until the correct password is entered at the device.
1653 If the "job-password" (octetString(255)) Operation attribute (See [prod-print2] section 4.1) is
1654 supported, this value MUST be supported.

1655 **'proof-print-wait' (J)**: The job is currently being held until the operator verifies the output of the proof print
1656 and performs a Release-Job operation. If the "proof-print" (collection) Job Template attribute (See
1657 [prod-print2] section 5.9) is supported, this value MUST be supported.

1658 **'resources-are-not-supported' (JD)**: At least one of the resources needed by the job/document, such as
1659 media, fonts, resource objects, etc., is not supported on any of the physical printers for which the
1660 job/document is a candidate. This condition MAY be detected when the job/document is accepted,
1661 or subsequently while the job/document is pending or processing, depending on implementation.
1662 The job/document may (1) remain in its current state, (2) be moved to the 'pending-held' state,
1663 depending on implementation and/or job scheduling policy, or (3) scheduled normally, but the Printer
1664 is put into the 'stopped' state when the job/document is attempted to be processed on the Printer.
1665 This value is intended for use with an implementation that supports the "user-defined-values-

1666 supported" Printer attribute (see [prod-print] section 6.1) which allows a job to be accepted with an
1667 unsupported 'name' value.

1668 **'resources-are-not-ready' (JD)**: At least one of the resources needed by the job/document, such as media,
1669 fonts, resource objects, etc., is not ready on any of the physical printer's for which the job/document
1670 is a candidate. This condition MAY be detected when the job/document is accepted, or
1671 subsequently while the job/document is pending or processing, depending on implementation. The
1672 job/document may remain in its current state or be moved to the 'pending-held' state, depending on
1673 implementation and/or job/document scheduling policy.

1674 **'[job-]incoming' (JD)**: Either (1) the Printer has accepted the Create-Job operation and is expecting
1675 additional Send-Document and/or Send-URI operations or (2) the Printer is retrieving/accepting
1676 document data as a result of a Print-Job, Print-URI, Send-Document or Send-URI operation.

1677 **'[job-]spooling' (JD)**: Same as 'job-incoming' with the specialization that the Printer is spooling the
1678 Job/Document data before processing it. This value corresponds to the 'spool' or 'automatic' value of
1679 the "job-spooling-supported" Printer Description attribute.

1680 **'[job-]streaming' (JD)**: Same as 'job-incoming' with the specialization that the Printer is processing the
1681 Job/Document data as it is being received (that is, the document is not being spooled, but rather is
1682 being processed in chunks by the output device and is being imaged during reception). This value
1683 corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer Description
1684 attribute.

1685 **'job-data-insufficient' (J)**: The Create-Job operation has been accepted by the Printer, but the Printer is
1686 expecting additional document data before it can move the job into the 'processing' state. If a Printer
1687 starts processing before it has received all data, the Printer removes the 'job-data-insufficient'
1688 reason, but the 'job-incoming' remains. If a Printer starts processing after it has received all data, the
1689 Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at the same time.

1690 **'unsupported-compression' (JD)**: The job/document was aborted by the system because the Printer
1691 determined while attempting to decompress the document-data's that the compression is actually not
1692 among those supported by the Printer. This value MUST be supported, since "compressions is a
1693 REQUIRED operation attribute.

1694 **'compression-error' (JD)**: The job/document was aborted by the system because the Printer encountered
1695 an error in the document-data while decompressing it. If the Printer posts this reason, the document-
1696 data has already passed any tests that would have led to the 'unsupported-compression' job-state-
1697 reason/document-state-reason.

1698 **'document-access-error' (JD)**: After accepting a Print-URI or Send-URI request, the Printer could not
1699 access one or more documents passed by reference. This reason is intended to cover any file
1700 access problem, including file does not exist and access denied because of an access control
1701 problem. The Printer MAY also indicate the document access error using the "job-document-access-
1702 errors" Job Description attribute (see the description of "job-document-access-errors" above).
1703 Whether the Printer aborts the job/document and moves the job/document to the 'aborted' job state
1704 or prints all documents that are accessible and moves the job/document to the 'completed'
1705 job/document state and adds the 'completed-with-errors' value in the job's "job-state-reasons" or
1706 document's "document-state-reasons" attribute depends on implementation and/or site policy. This
1707 value SHOULD be supported if the Print-URI or Send-URI operations are supported.

1708 **'unsupported-document-format' (JD)**: The job/document was aborted by the system because the
1709 document-data's document-format is not among those supported by the Printer. If the client
1710 specifies the document-format as 'application/octet-stream', the printer MAY abort the job/document
1711 and post this reason even though the format is a member of the "document-format-supported" printer
1712 attribute, but not among the auto-sensed document-formats. This value MUST be supported, since
1713 "document-format" is a REQUIRED operation attribute.

1714 **'document-format-error' (JD)**: The job/document was aborted by the system because the Printer
1715 encountered an error in the document-data while processing it. If the Printer posts this reason, the

1716 document-data has already passed any tests that would have led to the 'unsupported-document-
1717 format' job-state-reason/document-state-reason.

1718 **'submission-interrupted' (JD)**: The job or document was not completely submitted for some unforeseen
1719 reason, such as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or
1720 the document transfer method has crashed in some non-recoverable way before the document data
1721 was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-
1722 out period. See the description of the "multiple-operation-time-out" Printer attribute in [RFC2911]
1723 Section 4.4.31.

1724 **'[job-]outgoing' (JD)**: The Printer is transmitting the job/document to the output device.

1725 **'job-scheduling' (J)**: The printer is in the process of scheduling the processing for the Job.

1726 **'[job-]queued' (JD)**: Job is in the 'processing' state, but more specifically, the Printer has queued the
1727 Document data.

1728 **'[job-]transforming' (JD)**: Job/document is in the 'processing' state, but more specifically, the Printer is
1729 interpreting document data and producing another electronic representation.

1730 **'[job-]interpreting' (JD)**: Job/document is in the 'processing' state, but more specifically, the Printer is
1731 interpreting the document data.

1732 **'[job-]queued-for-marker' (JD)**: Job/document is in any of the 'pending-held', 'pending', or 'processing'
1733 states, but more specifically, the Printer has completed enough processing of the document to be
1734 able to start marking and the job/document is waiting for the marker. Systems that require human
1735 intervention to release jobs using the Release-Job operation, put the job into the 'pending-held' job
1736 state. Systems that automatically select a job to use the marker put the job into the 'pending' job
1737 state or keep the job in the 'processing' job state while waiting for the marker, depending on
1738 implementation. All implementations put the job/document into (or back into) the 'processing' state
1739 when marking does begin.

1740 **'[job-]printing' (JD)**: The output device is marking media. This value is useful for Printers which spend a
1741 great deal of time processing (1) when no marking is happening and then want to show that marking
1742 is now happening or (2) when the job/document is in the process of being canceled or aborted while
1743 the job/document remains in the 'processing' state, but the marking has not yet stopped so that
1744 impression or sheet counts are still increasing for the job/document.

1745 **'printer-stopped-partly' (J)**: The value of the Printer's "printer-state-reasons" attribute contains the value
1746 'stopped-partly'.

1747 **'printer-stopped'** (J): The value of the Printer's "printer-state" attribute is 'stopped'.

1748 **'job-suspending' (J)**: The printer is in the process of moving the Job from a processing condition to a
1749 suspended condition where other jobs can be processed.

1750 **'job-suspended' (J)**: The job has been suspended while processing using the Suspend-Current-Job
1751 operation and other jobs can be processed on the Printer. The Job can be resumed using the
1752 Resume-Job operation which removes this value. Note: Documents cannot be suspended and there
1753 is no Suspend-Current-Document operation.

1754 **'job-suspended-by-operator' (J)**: The Job has been indefinitely suspended by the printer operator.

1755 **'job-suspended-by-user' (J)**: The Job has been indefinitely suspended by the user.

1756 **'job-suspended-by-system' (J)**: The Job has been indefinitely suspended by the Printer's system software
1757 during normal processing of the job.

1758 **'job-resuming' (J)**: The printer is in the process of moving the Job from a suspended condition to become a
1759 candidate for processing.

1760 **'[job-]canceled-by-user' (JD)**: The job/document was canceled by the owner of the job using the Cancel-
1761 Job/Cancel-Document request, i.e., by a user whose authenticated identity is the same as the value

1762   of the originating user that created the Job object, or by some other authorized end-user, such as a
1763   member of the job owner's security group. This 'job-canceled' value SHOULD be supported. The
1764   'canceled-by-user' value SHOULD be supported for the "document-state-reasons" attributes ~~if the~~ for
1765   use with the Cancel-Document ~~operation is supported~~.

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

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

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

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

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

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

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

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

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

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

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

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

1810   **'job-restartable' (J)**: This job is retained (see the description of "job-state" above, specifically "Partitioning of
1811   Job States") and is currently able to be restarted using the Restart-Job operation (see [RFC2911]
1812   Section 3.3.7). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the Printer
1813   MUST accept a Restart-Job operation for that job. This value SHOULD be supported if the Restart-
1814   Job operation is supported.

1815   **'queued-in-device' (JD)**: The job/document has been forwarded to a device or print system that is unable to
1816   send back status. The Printer sets the job's/document's "job-state" / "document-state" attribute to
1817   'completed' and adds the 'queued-in-device' value to the job's/document's "job-state-reasons" /
1818   "document-state-reasons" attribute to indicate that the Printer has no additional information about the
1819   job/document and never will have any better information. See the description of the "job-state" /
1820   "document-state" attribute above, specifically the portion on "Forwarding Servers".

1821 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

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

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

1824 This OPTIONAL attribute specifies information about the "job-state"/"document-state" and "job-state-
1825 reasons"/"document-state-reasons" attributes in human readable text. If the Printer object supports this attribute, the
1826 Printer object MUST be able to generate this message in any of the natural languages identified by the Printer's
1827 "generated-natural-language-supported" attribute (see the "attributes-natural-language" operation attribute specified
1828 in [RFC2911] Section 3.1.4.1).

1829 The value SHOULD NOT contain additional information not contained in the values of the "job-state" and "job-states-
1830 reasons" attributes, such as interpreter error information. Otherwise, application programs might attempt to parse the
1831 (localized text). For such additional information such as interpreter errors for application program consumption or
1832 specific document access errors, new attributes with keyword values, needs to be developed and registered.

8.10 document-message (text(127))   Document Description

1834 ISSUE 02: Should the "document-message" Document Description attribute have a maximum of 127 octets, like the
1835 "job-message-from-operator" (text(127)) Job Description attribute in [RFC2911] section 4.3.16 or MAX (1023 octets)
1836 like "job-message-to-operator" (text(MAX)) Job Template attribute in IEEE-ISTO 5100.3 [prod-print] section 3.10?

1837 This OPTIONAL Document Description contains a message from the user to the operator or a message from the
1838 operator or administrator system administrator or "intelligent" process to indicate to the end user the reasons for
1839 modification or other management action taken on the Document. The Printer populates this Document Description
1840 attribute from the "document-message" (text(127) operation attribute value supplied by the client in any of the
1841 Document Creation operations (see section 3.1.1) or in a Cancel-Document or Cancel-Current-Document operations
1842 (see sections 3.9 or 3.10). In addition, the user and the operator can set the value of this Document Description
1843 attribute explicitly using the Set-Document-Attributes operation (see section 3.8).

8.11 document-printer-up-time (integer(1:MAX))   Document Description

1845 This REQUIRED Document Description attribute indicates the amount of time (in seconds) that the Printer
1846 implementation has been up and running. This attribute is an alias for the "printer-up-time" Printer Description
1847 attribute (see [RFC2911] section 4.4.29).

1848 A client MAY request this attribute in a Get-Document-Attributes or Get-Documents request and use the value
1849 returned in combination with other requested Event Time Job Description Attributes in order to display time attributes

1850 to a user. The difference between this attribute and the 'integer' value of a "time-at-xxx" attribute is the number of
1851 seconds ago that the "time-at-xxx" event occurred. A client can compute the wall-clock time at which the "time-at-
1852 xxx" event occurred by subtracting this difference from the client's wall-clock time.

1853 ISSUE 03: The following 4 Job Creation operation attributes have corresponding Job Description attributes, but
1854 there isn't a definition or an IANA Registration for any of these Job Description attributes: "ipp-attribute-fidelity", "job-
1855 mandatory-attributes", "job-password", and "job-password-encryption". OK to add Job Description attribute
1856 descriptions for each of them? That would correspond to the PWG Semantic Model where they are Job Description
1857 attributes.

1858 ISSUE 04 repeat: The following 4 Job Creation operation attributes have corresponding Job Description attributes,
1859 since they are really Document attributes: "compression", "document-format", "document-name", "document-natural-
1860 language"? OK to add Document Description attribute descriptions for each of them?   That would correspond to the
1861 PWG Semantic Model where they are Document Description attributes.

1862 ISSUE 05: The Printer copies the following 11 Document Creation operation attributes to corresponding Document
1863 Description attributes, but there isn't a definition or an IANA Registration for any of these Document Description
1864 attributes: "attributes-charset", "attributes-natural-language", "compression", "document-format", "document-name",
1865 "document-natural-language", "impressions", "k-octets", "media-sheets", "job-printer-uri", and "last-document". OK to
1866 add operation attribute and Document Description attribute descriptions for each of them?

1867 ISSUE 06: The definitions of the following 16 remaining Document Description attributes are derived from the
1868 corresponding Job Description attributes that are not set by the client: "current-page-order", "date-time-at-
1869 completed", "date-time-at-creation", "date-time-at-processing", "detailed-status-message", "document-access-errors",
1870 "impressions-completed", "impressions-completed-current-copy", "k-octets-processed", "media-sheets-completed",
1871 "more-info", "sheet-completed-copy-number", "time-at-completed", "time-at-creation", "time-at-processing", and
1872 "warnings-count", OK to add Document Description attribute descriptions for each of them?

1873 9 Printer attributes

1874 This section lists *all* of the Printer attributes defined in other IPP documents. Printer attributes are divided into three
1875 disjoint groups:
1876

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.

1877
1878 In a Get-Printer-Attributes request, a client can request all of the Printer attributes in the Job Template (JT) or Printer
1879 Description (PD) groups by supplying the 'job-template' or 'printer-description' group name, respectively. The client
1880 can also request "all". The column labels are:

1881 "**Attribute Syntax**" - indicates the attribute syntax (see [RFC2911] section 4.1). Many "xxx-default" and "xxx-
1882 supported" attributes have the 'collection' syntax which consists of a number of member attributes.

1883   These member attributes are not listed in this table when they are the same as the corresponding
1884   "xxx" attribute in Table 8. Only those few Printer attribute collection attributes that do not have a
1885   corresponding Job Template attributes show the member attributes in this table.

1886   "**Grp**" - indicates to which group the attribute belongs.

1887   "**Printer Conf.**" - indicates the IPP/1.1 Printer conformance requirements for supporting the attribute. Those
1888   attributes labeled as "MAY" may have conditional requirements that require their support, if the
1889   Printer supports a related attribute, operation, or feature. For example, all Job Template attributes
1890   are OPTIONAL for a Printer to support. However, if a Printer supports Job Template attribute "xxx",
1891   then it MUST also support the corresponding "xxx-default" and "xxx-supported" attributes. Similarly,
1892   if Event Notification is supported, then some of the attributes indicated as "MAY" in this table become
1893   MUST.

1894   "**Reference**" - lists the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

1895   **Table 12 - 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
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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
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 | name(MAX))	JT	MAY	[RFC2911] §4.2.2
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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
media-col-database	1setOf collection	-[47]	MAY	[prod-print2] §7.6
any "media-col" member attribute				
media-col-default	collection	JT	MAY	[prod-print] §3.13.12
any "media-col" member attribute				
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
any "media-col" member attribute				
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 | name(MAX))	-	MAY	[prod-print] §3.13.11.1
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

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[47] 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
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-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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
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
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

1896

1897 9.1 document-creation-attributes-supported (1setOf type2 keyword)

1898 This Printer Description attribute lists the keyword names of the Document Template and Operation attributes that
1899 the Printer will accept in the Create-Document, Send-Document, and Send-URI Document Creation operations.

1900 ## 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
	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[48]	[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[49]	[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

1901

1902 This description is taken from [RFC2911] with additions from other IPP extension documents:

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

[49] The 'paused' value MUST be supported if the Pause-Printer operation is supported.

1903   This REQUIRED Printer attribute supplies additional detail about the device's state. Some of the these value
1904   definitions indicate conformance requirements; the rest are OPTIONAL.

1905   Each keyword value MAY have a suffix to indicate its level of severity. The three levels are: report (least severe),
1906   warning, and error (most severe).

1907   **'-report'**: This suffix indicates that the reason is a "report". An implementation may choose to omit some or
1908   all reports. Some reports specify finer granularity about the printer state; others serve as a precursor
1909   to a warning. A report MUST contain nothing that could affect the printed output.

1910   **'-warning'**: This suffix indicates that the reason is a "warning". An implementation may choose to omit some
1911   or all warnings. Warnings serve as a precursor to an error. A warning MUST contain nothing that
1912   prevents a job from completing, though in some cases the output may be of lower quality.

1913   **'-error'**: This suffix indicates that the reason is an "error". An implementation MUST include all errors. If this
1914   attribute contains one or more errors, printer MUST be in the stopped state.

1915   If the implementation does not add any one of the three suffixes, all parties MUST assume that the reason is an
1916   "error".

1917   If a Printer object controls more than one output device, each value of this attribute MAY apply to one or more of the
1918   output devices. An error on one output device that does not stop the Printer object as a whole MAY appear as a
1919   warning in the Printer's "printer-state-reasons attribute". If the "printer-state" for such a Printer has a value of
1920   'stopped', then there MUST be an error reason among the values in the "printer-state-reasons" attribute.

1921   The following standard keyword values are defined (in alphabetical order):

1922   **'other'**: The device has detected an error other than one listed in this document.

1923   **'none'**: There are not reasons. This state reason is semantically equivalent to "printer-state-reasons" without
1924   any value and MUST be used, since the 1setOf attribute syntax requires at least one value.

1925   **'connecting-to-device'**: The Printer object has scheduled a job on the output device and is in the process of
1926   connecting to a shared network output device (and might not be able to actually start printing the job
1927   for an arbitrarily long time depending on the usage of the output device by other servers on the
1928   network).

1929   **'cover-open'**: One or more covers on the device are open.

1930   **'deactivated'**: A client has issued a Deactivate-Printer operation for the Printer object (see [adm-ops]
1931   section 3.4.1) and the Printer is in the process of becoming deactivated or has become deactivated.
1932   The Printer MUST reject all requests except Activate-Printer, queries (Get-Printer-Attributes, Get-
1933   Job-Attributes, Get-Jobs, etc.), Send-Document, and Send-URI (so that partial job submission can
1934   be completed - see [adm-ops] section 3.1.1) and return the 'server-error-service-unavailable' status
1935   code.

1936   **'developer-empty'**: The device is out of developer.

1937   **'developer-low'**: The device is low on developer.

1938   **'door-open'**: One or more doors on the device are open.

1939   **'fuser-over-temp'**: The fuser temperature is above normal.

1940   **'fuser-under-temp'**: The fuser temperature is below normal.

1941   **'hold-new-jobs'**: The operator has issued the Hold-New-Jobs operation (see [adm-ops] section 3.3.1) or
1942   other means, but the output-device(s) are taking an appreciable time to stop. Later, when all output
1943   has stopped, the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-
1944   paused' value in the "printer-state-reasons" attribute. This value MUST be supported, if the Hold-

1945   New-Jobs operation is supported and the implementation takes significant time to pause a device in
1946   certain circumstances.

1947   **'input-tray-missing'**: One or more input trays are not in the device.

1948   **'interlock-open'**: One or more interlock devices on the printer are unlocked.

1949   **'interpreter-resource-unavailable'**: An interpreter resource is unavailable (i.e. font, form)

1950   **'marker-supply-empty'**: The device is out of at least one marker supply. (e.g. toner, ink, ribbon)

1951   **'marker-supply-low'**: The device is low on at least one marker supply. (e.g. toner, ink, ribbon)

1952   **'marker-waste-almost-full'**: The device marker supply waste receptacle is almost full.

1953   **'marker-waste-full'**: The device marker supply waste receptacle is full.

1954   **'media-empty'**: At least one input tray is empty.

1955   **'media-jam'**: The device has a media jam.

1956   **'media-low'**: At least one input tray is low on media.

1957   **'media-needed'**: A tray has run out of media.

1958   **'moving-to-paused'**: Someone has paused the Printer object using the Pause-Printer operation (see
1959   [RFC2911] section 3.2.7) or other means, but the device(s) are taking an appreciable time to stop.
1960   Later, when all output has stopped, the "printer-state" becomes 'stopped', and the 'paused' value
1961   replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute. This value MUST be
1962   supported, if the Pause-Printer operation is supported and the implementation takes significant time
1963   to pause a device in certain circumstances.

1964   **'opc-life-over'**: The optical photo conductor is no longer functioning.

1965   **'opc-near-eol'**: The optical photo conductor is near end of life.

1966   **'output-area-almost-full'**: One or more output area is almost full (e.g. tray, stacker, collator).

1967   **'output-area-full'**: One or more output area is full. (e.g. tray, stacker, collator)

1968   **'output-tray-missing'**: One or more output trays are not in the device

1969   **'paused'**: Someone has paused the Printer object using the Pause-Printer operation (see [RFC2911] section
1970   3.2.7) or other means and the Printer object's "printer-state" is 'stopped'. In this state, a Printer
1971   MUST NOT produce printed output, but it MUST perform other operations requested by a client. If a
1972   Printer had been printing a job when the Printer was paused, the Printer MUST resume printing that
1973   job when the Printer is no longer paused and leave no evidence in the printed output of such a
1974   pause. This value MUST be supported, if the Pause-Printer operation is supported.

1975   **'shutdown'**: Someone has removed a Printer object from service, and the device may be powered down or
1976   physically removed. In this state, a Printer object MUST NOT produce printed output, and unless the
1977   Printer object is realized by a print server that is still active, the Printer object MUST perform no other
1978   operations requested by a client, including returning this value. If a Printer object had been printing a
1979   job when it was shutdown, the Printer NEED NOT resume printing that job when the Printer is no
1980   longer shutdown. If the Printer resumes printing such a job, it may leave evidence in the printed
1981   output of such a shutdown, e.g. the part printed before the shutdown may be printed a second time
1982   after the shutdown.

1983   **'spool-area-full'**: The limit of persistent storage allocated for spooling has been reached. The Printer is
1984   temporarily unable to accept more jobs. The Printer will remove this value when it is able to accept
1985   more jobs. This value SHOULD be used by a non-spooling Printer that only accepts one or a small
1986   number jobs at a time or a spooling Printer that has filled the spool space.

1987 **'stopped-partly'**: When a Printer object controls more than one output device, this reason indicates that one
1988 or more output devices are stopped. If the reason is a report, fewer than half of the output devices
1989 are stopped. If the reason is a warning, fewer than all of the output devices are stopped.

1990 **'stopping'**: The Printer object is in the process of stopping the device and will be stopped in a while. When
1991 the device is stopped, the Printer object will change the Printer object's state to 'stopped'. The
1992 'stopping-warning' reason is never an error, even for a Printer with a single output device. When an
1993 output-device ceases accepting jobs, the Printer will have this reason while the output device
1994 completes printing.

1995 **'timed-out'**: The server was able to connect to the output device (or is always connected), but was unable to
1996 get a response from the output device.

1997 **'toner-empty'**: The device is out of toner.

1998 **'toner-low'**: The device is low on toner.

1999 # 10 New Values for Existing Printer Description Attributes

2000 This section contains those attributes for which additional values are added.

2001 ## 10.1 operations-supported (1setOf type2 enum)

2002 The following "operation-id" values are added in order to support the new operations defined in this document:

2003 **Table 13 – Operation-id assignments**

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

2004 # 11 Conformance Requirements

2005 This section specifies the conformance requirements for Printers and clients.

2006 ## 11.1 Printer conformance requirements

2007 In order to conform to this specification, a Printer:

2008 1. MUST meet the conformance requirements for Printers specified in [RFC2911].

2009 2. MUST support the Document operations that section 3 REQUIRES a Printer to support.

2010 3. MUST support the operation attributes in the Send-Document operation and, if supported, the Send-URI
2011 operation that section 6 REQUIRES a Printer to support.

2012 4. MAY support any of the Document Template attributes in Document Creation operations as indicated in
2013 section 7 and MUST NOT support them for contexts for where they are not defined as indicated in the Table
2014 9 with an "n".

2015 5. MUST support the Document Description attributes that section 8 REQUIRES a Printer to support.

2016 6. MUST support the Printer attributes that section 8.11 REQUIRES a Printer to support.

2017 7. MUST support the values of Printer Descriptions attribute that section 10 REQUIRES a Printer to support.

11.2 Client conformance requirements

2019 In order to conform to this specification, a client:

2020 1. MUST meet the conformance requirements for clients specified in [RFC2911]

2021 2. MAY support any of the Document operations defined in section 3. ~~ISSUE 18: Or should the client be~~
2022 ~~REQUIRED to support some of the Document operations?~~

2023 3. MUST supply the operation attributes that section 6 REQUIRES a client to supply in operation requests.

2024 4. MUST supply any Document Template attributes in the format that section 7 REQUIRES a client to supply in
2025 Document Creation operations and MUST NOT support them for contexts for where they are not defined as
2026 indicated in the Table 9 with an "n".

2027 5. SHOULD support any of the Document Description attributes that section 8 REQUIRES a Printer to support.

2028 6. MAY support any of the Printer attributes listed in section 8.11.

2029 7. MAY support any of the values of the Printer Descriptions attributes in section 10.

12 Normative References

2031 Note: The references in the body of this IEEE-ISTO document use the more reader-friendly mnemonic symbols
2032 below, rather than the RFC number (except for [RFC2910] and [RFC2911]). IETF RFCs and IANA registrations
2033 require using the RFC numbers in the body of the document for references.

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2039 attribute syntax", <draft-ietf-ipp-collection-05.txt>, work in progress, July 17, 2001.

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2042 ISTO 5100.1-2001, February 5, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.1.pdf

2043 [get-method]
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2046 [job-prog]
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2054   Herriot, R., Hastings, T., Shepherd, M., deBry, R., Isaacson, S., Martin, J., and R. Bergman, "Internet
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2057 [output-bin]
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2059   5100.2-2001, February 7, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.2.pdf.

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2062   ISTO 5100.4-2001, February 7, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.4.pdf.

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2065   5100.3-2001, February 12, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf.

2066 [prod-print2] Hastings, T., and D. Fullman, "Internet Printing Protocol (IPP): Production Printing Attributes - Set 2", to
2067   become a PWG IEEE-ISTO standard, work in progress, August 21, 2002,
2068   ftp://ftp.pwg.org/pub/pwg/ipp/new_PPE/pwg-ipp-prod-print-set2-draft-v0_1-020821.pdf.

2069 [RFC2911]
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2071   Semantics", RFC 2911, September 2000.

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2075 # 13 Informative References

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2097 Herriot, R., Hastings, T., Jacobs, N., Martin, J., "Mapping between LPD and IPP Protocols", RFC 2569, April
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2104 Guide", RFC 3196, November 2001.

2105 [RFC3239]
2106 Kugler, C., Lewis, H. and T. Hastings, "Internet Printing Protocol (IPP): Requirements for Job, Printer, and
2107 Device Administrative Operations", RFC 3239, February 2002.

2108 14 IANA Considerations

2109 This section contains the registration information for IANA to add to the various IPP Registries according to the
2110 procedures defined in RFC 2911 [RFC2911] section 6 to cover the definitions in this document. The resulting
2111 registrations will be published in the http://www.iana.org/assignments/ipp-registrations registry.

2112 *Note to the RFC Editor: Replace the References below with the RFC number for the appropriate document,*
2113 *so that it accurately reflects the content of the information for the IANA Registry.*

2114 **14.1 Attribute Registrations**

2115 The following table lists all the attributes defined in this document. These are to be registered according to the
2116 procedures in RFC 2911 [RFC2911] section 6.2.
2117

2118	Attribute Name (attribute syntax):	Reference:	Section:
2119	~~Document Description attributes:~~		
2120	Document Description attributes:	Reference:	Section:
2121	attributes-charset (charset)	[RFC2911]	4.3.19
2122	attributes-natural-language (naturalLanguage)	[RFC2911]	4.3.20
2123	compression (type3 keyword)	[RFC2911]	3.2.1.1
2124	current-page-order (type2 keyword)	[prod-print]	4.1
2125	date-time-at-completed (dateTime)	[RFC2911]	4.3.14.7
2126	date-time-at-creation (dateTime)	[RFC2911]	4.3.14.5
2127	date-time-at-processing (dateTime)	[RFC2911]	4.3.14.6
2128	detailed-status-message (1setOf text (MAX))	[RFC2911]	4.3.10
2129	document-access-errors (1setOf text(MAX))	[RFC2911]	4.3.11
2130	document-format (documentFormat)	[RFC2911]	3.2.1.1
2131	document-id-uri (uri)	[this spec]	8.2
2132	document-message (text(127))	[this spec]	8.10
2133	document-name (name(MAX))	[RFC2911]	3.2.1.1
2134	document-natural-language (naturalLanguage)	[RFC2911]	3.2.1.1
2135	document-number (integer(0:MAX))	[this spec]	8.1
2136	document-state (type1 enum)	[this spec]	8.5
2137	document-state-message (text(MAX))	[this spec]	8.10
2138	document-state-reasons (1setOf type2 keyword)	[this spec]	8.7~~1~~
2139	document-uri (uri)	[this spec]	8.3
2140	impressions (integer(0:MAX))	[RFC2911]	4.3.17.2
2141	impressions-completed (integer(0:MAX))	[RFC2911]	4.3.18.2
2142	impressions-completed-current-copy	[job-prog]	4.4
2143	(integer(0:MAX))		
2144	k-octets (integer(0:MAX))	[RFC2911]	4.3.17.1
2145	k-octets-processed (integer(0:MAX))	[RFC2911]	4.3.18.1
2146	last-document (boolean)	[RFC2911]	4.3.12
2147	media-sheets (integer(0:MAX))	[RFC2911]	4.3.17.3
2148	media-sheets-completed (integer(0:MAX))	[RFC2911]	4.3.18.3
2149	more-info (uri)	[RFC2911]	4.3.4
2150	printer-up-time (integer (1:MAX))	[RFC2911]	4.3.14.4
2151	sheet-completed-copy-number (integer(0:MAX))	[job-prog]	4.2
2152	time-at-completed (integer (MIN:MAX))	[RFC2911]	4.3.14.3
2153	time-at-creation (integer (MIN:MAX))	[RFC2911]	4.3.14.1
2154	time-at-processing (integer (MIN:MAX))	[RFC2911]	4.3.14.2
2155	warnings-count (integer(0:MAX))	[override]	6.1
2156			
2157			
2158	Document Templates attributes:	Reference:	Section:
2159	copies (integer(1:MAX))	[RFC2911]	4.2.5

```
2160  cover-back (collection)                              [prod-print] 3.1
2161  media (type3 keyword | name(MAX))                    [prod-print] 3.1.1
2162  media-col (collection)                               [prod-print] 3.1.1
2163    cover-front (collection)                           [prod-print] 3.1
2164    cover-type (type2 keyword)                         [prod-print] 3.1.2
2165    media (type3 keyword | name(MAX))                  [prod-print] 3.1.1
2166    media-col (collection)                             [prod-print] 3.1.1
2167  cover-type (type2 keyword)                           [prod-print] 3.1.2
2168  finishings (1setOf type2 enum)                       [RFC2911]    4.2.6
2169                                                       [finish]     2
2170  finishings-col (collection)                          [prod-print] 3.2
2171    finishing-template (name(MAX))                     [prod-print] 3.2.1
2172    stitching (collection)                             [prod-print] 3.2.2
2173      stitching-locations (1setOf integer(0:MAX))      [prod-print] 3.2.2.3
2174      stitching-offset (integer (0:MAX))               [prod-print] 3.2.2.2
2175      stitching-reference-edge (type2 keyword)         [prod-print] 3.2.2.1
2176  force-front-side (1setOf integer(1:MAX))             [prod-print] 3.3
2177  imposition-template (type2 keyword | name(MAX))      [prod-print] 3.4
2178  insert-sheet (1setOf collection)                     [prod-print] 3.5
2179    insert-after-page-number (integer(0:MAX))          [prod-print] 3.5.1
2180    insert-count (integer(0:MAX))                      [prod-print] 3.5.2
2181    media (type3 keyword | name(MAX))                  [prod-print] 3.5.3
2182    media-col (collection)                             [prod-print] 3.5.3
2183  media (type3 keyword | name(MAX))                    [RFC2911]    4.2.11
2184  media-col (collection)                               [prod-print] 3.13
2185    media-back-coating (type3 keyword |                [prod-print] 3.13.10
2186       name(MAX))
2187    media-color (type3 keyword | name(MAX))            [prod-print] 3.13.4
2188    media-front-coating (type3 keyword |               [prod-print] 3.13.10
2189       name(MAX))
2190    media-hole-count (integer(0:MAX))                  [prod-print] 3.13.6
2191    media-info (text(255))                             [prod-print] 3.13.3
2192    media-key (type3 keyword | name(MAX))              [prod-print] 3.13.1
2193    media-order-count (integer(1:MAX))                 [prod-print] 3.13.7
2194    media-preprinted (type3 keyword | name(MAX))       [prod-print] 3.13.5
2195    media-recycled (type3 keyword | name(MAX))         [prod-print] 3.13.11
2196    media-size (collection)                            [prod-print] 3.13.8
2197      x-dimension (integer(0:MAX))                     [prod-print] 3.13.8.1
2198      y-dimension (integer(0:MAX))                     [prod-print] 3.13.8.2
2199    media-type (type3 keyword | name(MAX)              [prod-print] 3.13.2
2200    media-weight-metric (integer(0:MAX))               [prod-print] 3.13.9
2201  media-input-tray-check (type3 keyword |              [prod-print] 3.14
2202       name(MAX))
2203  number-up (integer(1:MAX))                           [RFC2911]    4.2.9
2204  orientation-requested (type2 enum)                   [RFC2911]    4.2.10
2205  output-bin (type2 keyword | name(MAX))               [output-bin] 2.1
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2206  page-delivery (type2 keyword)                        [prod-print]  3.15
2207  page-order-received (type2 keyword)                   [prod-print]  3.16
2208  page-overrides (1setOf collection)                    [override]    5.2
2209    document-copies (1setOf rangeOfInteger(MAX))        [override]    5.2.3
2210    input-documents (1setOf rangeOfInteger(MAX))        [override]    5.2.1
2211    output-documents (1setOf rangeOfInteger(MAX))       [override]    5.2.2
2212    pages (1setOf rangeOfInteger(MAX))                  [override]    5.2.4
2213    <any other Job Template attributes that
2214  affect pages, such as media or media-col (
2215  page-ranges (1setOf rangeOfInteger(1:MAX))            [RFC2911]     4.2.7
2216  pages-per-subset (1setOf integer(1:MAX))              [prod-print]  5.3
2217  presentation-direction-number-up (type2              [prod-print]  3.17
2218  keyword)
2219  print-quality (type2 enum)                            [RFC2911]     4.2.13
2220  printer-resolution (resolution)                       [RFC2911]     4.2.12
2221  separator-sheets (collection)                         [prod-print]  3.18
2222    media (type3 keyword | name(MAX))                   [prod-print]  3.18.2
2223    media-col (collection)                              [prod-print]  3.18.2
2224    separator-sheets-type (type3 keyword |              [prod-print]  3.18.1
2225       name(MAX))
2226  sheet-collate (type2 keyword)                         [job-prog]    3.1
2227  sides (type2 keyword)                                 [RFC2911]     4.2.8
2228  x-image-position (type2 keyword)                      [prod-print]  3.19.2
2229  x-image-shift (integer(MIN:MAX))                      [prod-print]  3.19.3
2230  x-side1-image-shift (integer(MIN:MAX))                [prod-print]  3.19.4
2231  x-side2-image-shift (integer(MIN:MAX))                [prod-print]  3.19.5
2232  y-image-position (type2 keyword)                      [prod-print]  3.19.6
2233  y-image-shift (integer(MIN:MAX))                      [prod-print]  3.19.7
2234  y-side1-image-shift (integer(MIN:MAX))                [prod-print]  3.19.8
2235  y-side2-image-shift (integer(MIN:MAX))                [prod-print]  3.19.9
2236
2237  Job Template attributes:                      Reference:    Section:
2238  job-copies (integer(1:MAX))                   [this spec]   7.1.1
2239  job-cover-back (collection)                   [this spec]   7.1.2
2240    <member attributes are the same as "cover-back">
2241  job-cover-front (collection)                  [this spec]   7.1.3
2242    <member attributes are the same as "cover-front">
2243  job-finishings (1setOf type2 enum)            [this spec]   7.1.4
2244  job-finishings-col (1setOf collection)        [this spec]   7.1.5
2245    <member attributes are the same as "finishings-col">
2246
2247  Printer Descriptions:                         Reference:    Section:
2248  document-creation-attributes-supported (1setOf type2 keyword)
2249                                                [this spec]   9.1
2250
2251  Operation attributes:                         Reference:    Section:
```

```
2252   document-mandatory-attributes (1setOf type2 keyword)
2253                                           [this spec]   6.2.3
2254   document-message (text(127))             [this spec]   3.9.1.1
2255   input-document-number (integer(1:MAX))   [this spec]   3.1.1.13
2256   job-mandatory-attributes (1setOf type2 keyword) [this spec]  6.2.2
2257   last-document (boolean)                   [this spec]   3.1.1.2
2258
```

2259 14.2 Additional Enum Attribute Value Registrations for the "operations-supported"
2260   Printer Attribute

2261   The following table lists all the new enum attribute values defined in this document as additional type2 enum values
2262   for use with the "operations-supported" Printer Description attribute. These are to be registered according to the
2263   procedures in RFC 2911 [RFC2911] section 6.1.
2264

```
2265     Value       Name                          Reference   Section:
2266     --------    ----------------------        ---------   -------
2267   document-state (type1 enum)                  [this spec]   §8.5
2268     3    pending                              [this spec]   §8.5
2269     5    processing                           [this spec]   §8.5
2270     7    canceled                             [this spec]   §8.5
2271     8    aborted                              [this spec]   §8.5
2272     9    completed                            [this spec]   §8.5
2273
2274   job-finishings (1setOf type2 enum)           [this spec]   §7.1.4
2275     <enum values are the same as "finishings">
2276
2277   operations-supported (type2 enum):
2278     0x0032     Cancel-Current-Document        [this-spec]   §3.10
2279     0x0033     Cancel-Document                [this-spec]   §3.9
2280     0x0034     Get-Document-Attributes        [this-spec]   §3.5
2281     0x0035     Get-Documents                  [this-spec]   §3.7
2282     0x0036     Delete-Document                [this-spec]   §3.11
2283     0x0037     Set-Document-Attributes        [this-spec]   §3.8
2284     0x0038     Validate-Document              [this-spec]   §3.5
2285     0x0039     Create-Document                [this-spec]   §3.1
2286     0x003A     Send-Data                      [this-spec]   §3.2
```
2287   §The resulting enum attribute value registrations will be published in the
2288   http://www.iana.org/assignments/ipp-registrations registry.
2289

2290 14.3 Operation Registrations

2291   The following table lists all of the operations defined in this document. These are to be registered according to the
2292   procedures in RFC 2911 [RFC2911] section 6.4.
2293

```
2294   Operations:                                   Reference:   Section:
2295   Cancel-Current-Document                       [this-spec]   §33.10
```

2296	Cancel-Document	[this-spec]	§33.9
2297	Get-Document-Attributes	[this-spec]	§33.5
2298	Get-Documents	[this-spec]	§33.7
2299	Delete-Document	[this-spec]	§33.11
2300	Set-Document-Attributes	[this-spec]	§33.8
2301	Validate-Document	[this-spec]	§33.5
2302	Create-Document	[this-spec]	§3.1
2303	Send-Data	[this-spec]	§3.2
2304			

2305 15 Internationalization Considerations

2306 The internationalization considerations for this extension for handling the Document object are the same as for
2307 handling the Job object in [RFC2911].

2308 16 Security Considerations

2309 The Document object should provide no more increased security considerations than the Job object. The Printer
2310 MUST provide the same access control for Document objects as for Job objects.

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2312 18 Acknowledgments

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20 Appendix A: Document operations compared to Job operations

2338   This appendix compares the Document operations with the existing Job operations to show the parallelism.

2339   Table 14 compares the Job and Document operations. The two Conf. columns indicate the conformance
2340   requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ"
2341   in the Document Conformance column means if the Document object is supported. Whether a Document operation
2342   is a method on the Job object or the Document object depends on the modeling regime and is not an essential part
2343   of the semantics described here, since these semantics are intended to apply to both to object-oriented and object-
2344   based protocols, APIs, and implementations.

2345   **Table 14 - 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~~REQ
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[50]
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

2346
2347

---

[50] 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.

2348 # 21 Annex B: Change Log (informative)

2349 Version 0.5, 25 October 2002, as a result of the PWG Semantic Model telecon, October 24, 2002:

2350 1. Fixed the title to say "Proposed Standard" and removed the 5100.n number until the document is approved
2351 by the PWG Last Call to progress as a Draft Standard.
2352 2. Changed Cancel-Document from OPTIONAL to REQUIRED.
2353 3. Added Table 3 and Table 4 to show the request and response signatures of the Document Creation and
2354 Validation operations.
2355 4. Renamed the "document-number" operation attribute to "input-document-number", to agree with [override]
2356 and because the Document object is really the Input Document (as opposed to the Output Document). The
2357 Printer copies this value to the Document's "document-number" Document Description attribute.
2358 5. Clarified that the Printer MUST reject a Create-Document request if the "document-number" already exists.
2359 6. Clarified that the client cannot supply Subscription attributes in any Document Creation requests.
2360 7. Added "document-message" (text(127)) operation attribute to the Document Creation requests to go with the
2361 "document-message" agreement (see point #15).
2362 8. Fixed Create-Document response to return Job status attributes in Group 3 and Document status attributes
2363 in Group 4.
2364 9. Required the Printer to return just the "document-number" and "document-id-uri" (uri) Document Description
2365 attribute in a Document Creation response.
2366 10. Added the "document-mandatory-attributes" operation attribute.
2367 11. Separated the returned Job status attributes and the Document status attributes into two groups, one Job
2368 Attributes and the other Document attributes.
2369 12. Allowed the client to supply or omit the "document-uri" operation attribute in a Validate-Job request.
2370 13. Clarified that the "document-number" operation attribute MUST follow the Printer and Job Target in Group 1.
2371 14. Changed the Get-Documents response when there is no "requested-attributes" to simply "document-number"
2372 and "document-id-uri" to be parallel with the Get-Jobs operation.
2373 15. Changed the "message" operation attribute in Cancel-Document and Cancel-Current-Document to
2374 "document-message" operation attribute which the Printer copies to the "document-message" Document
2375 Description attribute for use both by the user and the operator.
2376 16. Clarified that the "document-state-reasons" values never affect Job scheduling.
2377 17. Made Job Level - page override programming higher precedence than Document level Document object
2378 attributes.
2379 18. Clarified PDL document data precedence and its relationship to Job Template attributes ending with "-
2380 requested".
2381 19. In Table 6, flagged the operation attributes that the Printer copies to the corresponding Job and Document
2382 Description attributes in Document Creations operations.
2383 20. Fixed "job-mandatory-attributes" operation attribute so its only supplied at Job level, now that we have
2384 "document-mandatory-attributes" operation attribute.
2385 21. Clarified that "ipp-attribute-fidelity" can be supplied at both the Job and Document Levels and how it interacts
2386 with "job-mandatory-attributes" and "document-mandatory-attributes" operation attributes.
2387 22. Disallowed "output-bin" at the Document Level (and Page Level). It subsets the single stream of Input-Pages
2388 across Input-Documents.
2389 23. Disallowed "page-ranges" at the Page Level.
2390 24. Disallowed "pages-per-subset" at the Document level (and Page Level).
2391 25. Disallowed "separator-sheets" at the Page Level.
2392 26. Added "document-printer-up-time" Document Description attribute for Get-Documents and Get-Document-
2393 Attributes responses that the Printer MUST support, just like "job-printer-up-time" operation attribute for Get-
2394 Jobs and Get-Job-Attributes.

2395

2396 Version 0.4, 14 September October 2002:
2397 1. Added the operation specifications.
2398 2. Added the Create-Document and Send-Data to be more parallel with Jobs and support PWG PSI.
2399 3. Resolved the 15 issues in version 0.3 as discussed on the mailing list.
2400 4. Added the Attribute Precedence section 5.
2401 5. Added [prod-print2] attributes.

2402   6.   Added job-mandatory-attributes, job-cover-back, job-cover-front, job-copies, job-finishings, job-finishings-col.
2403   document-id-uri, and redirect-uri.
2404
2405 Version 0.3, 9 September 2002:
2406   1.   Reformatted as an IEEE-ISTO standard and added the usual sections for a standard.
2407   2.   Added "original-requesting-user-name" Operation attribute to Table 6.
2408   3.   Added "y" to "output-bin" in Table 8 so it MAY be a Document Template attribute.
2409   4.   Clarified the * and ** in Table 9 - Job and Document Description attributes.
2410   5.   Added section 8.11 all of the Printer attributes defined In any IPP standard.
2411   6.   Allocated operation-id enums in section 10 to the 7 Document operations.
2412   7.   Added the conformance section 11
2413   8.   Completed the IANA Considerations section 14.
2414
2415