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

9 ISSUES are highlighted like this, some are in footnotes.

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Version 0.6, January 13, 2003

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

Version 0.6, January 13, 2003

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 REQUIRED [RFC2911] Send-Document and OPTIONAL 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 REQUIRED 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 REQUIRED 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 five new operations for Document objects once they have been created:

3 REQUIRED: Cancel-Document, Get-Document-Attributes, Get-Documents

2 OPTIONAL: Delete-Document, Set-Document-Attributes.

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. A number of Job Description attributes, such as "time-at-completed" and "time-at-creation", have corresponding Document Description attributes defined. A number of Document Creation operation attributes, such as "attributes-charset" and "document-format", have corresponding Document Description attributes defined.

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

This version of the PWG Proposed Standard is available electronically at:

ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/pwg-ipp-document-object-v06-030113.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
112 standards.

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124 2) leave the subject line blank

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127 end

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129 discussions of clarifications or review of registration proposals for additional names. Requests for additional
130 extensions, for inclusion in this specification, should be sent to the IPP Mailing list for consideration. In order to
131 reduce spam the mailing list rejects mail from non-subscribers, so you must subscribe to the mailing list in order to
132 send a question or comment to the mailing list.

133

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315 1 Introduction and Summary

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

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

328 This specification also lists all of the attributes defined in other IPP specifications¹ to show their relationship to
329 corresponding attributes defined in this IPP specification for use with the Document object. The full semantics of the
330 "document-state", "document-state-reasons", and "document-state-message" Document Description attributes are
331 given along side of the corresponding [RFC2911] "job-state", "job-state-reasons", and "job-state-message" Job
332 Description attributes.

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

337 1.1 Scope

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

344 The Document object is a passive object² and is operated upon by the Job. The client uses the new Create-
345 Document operation or either of the existing Send-Document and Send-URI operations to create a Document object.
346 In addition there are 8 new operations that affect the Document object after it has been created as summarized in
347 Table 1.

¹ This specification lists all attributes defined in other IPP specifications at the time of publication of this specification. No attempt will be made to keep this specification up to date after publication.

² 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.

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Table 1 - List of Document operations

Operation Name	Printer support	Brief Description
Create-Document ³	REQUIRED	Creates a Document object with Document attributes, but no data.
Send-Data	REQUIRED	Sends data to the Document object created by Create-Document.
Send-Document *	REQUIRED	Creates a Document object with Document attributes and data.
Send-URI *	OPTIONAL	Creates a Document object with Document attributes and a URL reference to the data (print-by-reference).
Get-Document-Attributes	REQUIRED	Get requested attributes of specified Document in the specified Job.
Get-Documents	REQUIRED	Get requested attributes of all of the Documents in the specified Job.
Set-Document-Attributes	OPTIONAL	Set the supplied Document attributes on the specified Document.
Cancel-Document	REQUIRED	Cancel the specified Document in the specified Job, but don't remove it.
Delete-Document	OPTIONAL	Remove the specified Document object and its data from the Job.

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

354 2 Terminology

355 This section defines terminology used throughout this document.

356 2.1 Conformance Terminology

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

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

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

³ The Create-Document operation maps to the PWG PSI Send-Document-By-Post operation and the Send-Data maps to the HTTP Post operation.

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

375 2.2 Other Terminology

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

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

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

383 **Document Creation operation** - operations that create Document objects. Specifically: Create-Document, Print-
 384 Job, Print-URI, Send-Document and Send-URI. Note: the Print-Job and Print-URI are both **Job Creation** and
 385 **Document Creation** operations, since they create both Job and a **Document object** at the same time. Also this
 386 specification does not extend the Print-Job and Print-URI operations. However, this specification does extend the
 387 Send-Document and Send-URI operations to allow the client to supply **Document Template** attributes in each
 388 request.

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

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

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

402 **Job Attribute** - an **Operation attribute** or a **Job Template** attribute that applies to the Job (object) as a whole. For
 403 example, “job-name” is an **Operation attribute** and “job-priority” is a **Job Template attribute**.

404 **Document Template attribute** - an attribute that the client supplies in a Create-Document, Send-Document, or
 405 Send-URI operation request in the Document Attributes group. For example, “media”.

406 **Document attribute** - an **Operation attribute** or a **Document Template attribute** that applies to a **Document**
 407 **object** as a whole. For example, “document-format” is an **Operation attribute** and “media” is a **Document Template**
 408 attribute.

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

413 separate Document group in which the client can supply Document attributes. Note also that for the “Level” concept,
 414 no operation supplies attributes at more than one level.⁴

415 **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	

416

417 **Document Overrides** - a way for a client to specify attributes to apply to specified documents in a multi-document
 418 job. Specifically, as member attributes of the “document-overrides” **Job Template attribute** in a **Job Creation**
 419 operation or the “document-overrides” **operation attribute** in a **Document Creation operation** as defined in
 420 [override]. Note: The **Document Template attributes** supplied in a Create-Document, Send-Document, or Send-
 421 URI operation also “override” any Document Template attributes supplied in the Job Creation operation.

422 **3 Document Operations**

423 The Document object semantics are as parallel to the Job object semantics as possible. Therefore, most of the Job
 424 operations have analogous Document operations as shown in Table 15 in section “Appendix A: Document operations
 425 compared to Job operations”. Operations that can apply only to an entire job, have no analogous document
 426 operation as indicated. This extension adds 8 new Document operations that operate on the Document object once
 427 it is created by the new Create-Document operation or either of the existing two operations: Send-Document and
 428 Send-URI operations.

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

431 The signatures of the operation requests that create and/or validate Document objects are very similar as shown in
 432 Table 3 and defined in section 3.1 through section 3.4. The entries in the table show what a client MUST, MAY, or
 433 MUST NOT supply in the indicated operation requests.

⁴ 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).

434

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

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

435

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

438

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

	Create-Document	Send-Data	Send-Document	Send-URI	
Status code/message	MUST	MUST	MUST	MUST	
Unsupported Attributes	MUST, if any	MUST, if any	MUST, if any	MUST, if any	
Job status attributes	MUST	MUST	MUST	MUST	
Document status attributes:					
"document-number"	MUST	MUST	MUST	MUST	
"document-id-uri"	MUST	MUST	MUST	MUST	
"document-state"	MUST	MUST	MUST	MUST	
"document-state-reasons"	MUST	MUST	MUST	MUST	
"document-state-message"	MAY	MAY	MAY	MAY	

439

440 **3.1 Create-Document Operation**

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

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

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

- 452 1. MUST also support the Create-Document and Send-Data operations
- 453 2. MUST support the "multiple-operation-time-out" Printer Description attribute (see [RFC2911] section 4.4.31).
- 454 3. MUST support the "multiple-document-jobs-supported" Printer Description attribute (see [RFC2911] section
455 4.4.16) with a 'true' value, that is the Printer MUST support multiple document jobs.

456 4. MUST support the "multiple-document-handling" Job Template job attribute with at least one value (see
 457 [RFC2911] section 4.2.4) and the associated "multiple-document-handling-default" and "multiple-document-
 458 handling-supported" Job Template Printer attributes (see [RFC2911] section 4.2).

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

461 The Printer sets the value of the Document's "document-state" Document Description attribute to 'pending', if the
 462 Printer accepts the Create-Document request. A Printer MAY set the 'job-data-insufficient' value of the Document's
 463 "document-state-reason" Document Description attribute to indicate that processing cannot begin until sufficient data
 464 has arrived and set the "document-state" to 'pending'. A non-spooling printer that doesn't implement the 'pending'
 465 document state may even set the "document-state" to 'processing', even though there is not yet any data to process.
 466 See sections 8.2.16 and 8.2.18.

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

471 3.1.1 Create-Document Request

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

473 Group 1: Operation Attributes

474 Natural Language and Character Set:

475 First, the client MUST supply the "attributes-charset" and "attributes-natural-language" Operation attributes
 476 as described in [RFC2911] section 3.1.4.1. The Printer object MUST copy these values to the corresponding
 477 Job Description attributes described in [RFC2911] sections 4.3.19 and 4.3.20.

478 Target:

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

482 Requesting User Name:

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

485 3.1.1.1 input-document-number (integer(1:MAX)) DEPRECATED

486 3.1.1.2 The "input-document-number" operation attribute ([override] section 9.2.1) is DEPRECATED. A
 487 client MUST NOT supply the "input-document-number" operation attribute. Clients that want to
 488 submit multiple (large) document data in parallel MUST create each Document object separately
 489 in the order desired. Then the client MAY send the data in parallel with separate Send-
 490 Document operations (see section 3.2). If the client does supply the DEPRECATED "input-
 491 document-number" operation attribute, the Printer MUST ignore the value and assign the
 492 "document-number" Document Description attribute monotonically increasing starting with 1
 493 for each job (see below). last-document (boolean)

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

497 **3.1.1.3 document-message (text(MAX))**

498 The client MAY supply this operation attribute. If the Printer supports this attribute, the Printer MUST also
 499 support the corresponding "document-message" (text(MAX)) Document Description attribute (see section
 500 8.2.12) and copy this value to the "document-message" Document Description attribute. The end user can
 501 use this Document Description attribute as a message to the operator and the operator can use it as a
 502 message to the user. The Printer MAY print this message on a document start sheet for this document, if
 503 any.

504 **3.1.1.4 Additional Operation attributes:**

505 Any of the other Operation attributes indicated in the "Level Supplied" column labeled with a "y" in the "Doc"
 506 column in Table 6, such as "document-name" and "document-format". These operation attributes are said to
 507 be supplied at the Document Level and apply to the Document object, overriding any operation attributes
 508 supplied at the Job Level. For example, if "document-format" = 'application/postscript' at the Job Level and
 509 "document-format" = 'text/plain' in this Create-Document request, this Document will be 'text/plain'. If the
 510 next Create-Document request for this Job omits the "document-format" operation attribute, that Document
 511 will be 'application/postscript'.

512 **3.1.1.5 Ignoring unsupported or improper operation attributes:**

513 The Printer MUST ignore any operation attributes which are unsupported or are not defined for use with the
 514 Create-Document operation, such as "ipp-attribute-fidelity" (see section 4.3.1) and "job-mandatory-attributes"
 515 (see section 4.3.2) which are defined for use in Job Creation operations only.

516 **Group 2: Document Template Attributes**

517 **Any Document Template attributes in any order:**

518 The client OPTIONALLY supplies a set of Document Template attributes, that is any attributes indicated in
 519 Table 8 in the "Defined for use" column labeled with a "y" in the "D" column. These Document Template
 520 attributes are said to be supplied at the Document Level and apply to the Document object, overriding any
 521 Document Template attributes supplied at the Job Level. For example, if "media" = 'na-letter-white' at the
 522 Job Level and "media" = 'na-letter-transparency' in this Create-Document request, this Document will be 'na-
 523 letter-transparency'. If the next Create-Document operation for this Job omits the "media" operation attribute,
 524 that Document will be 'na-letter-white' which it inherits from the Job.

525 If the client is not supplying any Document Template attributes in the request, the client SHOULD omit Group
 526 2 rather than sending an empty group. However, a Printer object MUST be able to accept an empty group.

527 The client MUST NOT supply the document data in this operation request. See Send-Data operation
 528 (section 3.2).

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

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

- 535 - creates a new Document object and adds it to the specified Job object,
- 536 - assigns the lowest document number not yet used by this Job, starting a 1. Copy the document number
 537 assigned to the Document object's "document-number" Document Description attribute.

- 538 - stores a generated Document name in the "document-name" Document Description attribute in the natural
539 language and charset requested (see [RFC2911] section 3.1.4.1) (if those are supported, otherwise using
540 the Printer object's default natural language and charset), and
- 541 - at job processing time, uses its corresponding default value attributes for the supported Document Template
542 attributes that were (1) not supplied by the client as IPP attributes and (2) not embedded instructions in the
543 document data.

544 3.1.2 Create-Document Response

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

546 Group 1: Operation Attributes

547 Status Message:

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

551 The Printer MUST reject the operation if the client had supplied in the original Job Creation operation, either:

552 the "ipp-attribute-fidelity" operation attribute (see section 4.3.1) with a 'true' value and the client
553 supplies any unsupported and/or conflicting Job Template or Document Template attributes in this
554 Document Creation request OR

555 the "ipp-attribute-fidelity" operation attribute (section 4.3.1) with a 'false' value or had omitted it and
556 had supplied keyword values of the "job-mandatory-attributes" operation attribute (in the original Job
557 Creation operation) that identify attributes supplied in this request that are unsupported and/or
558 conflicting.

559 Otherwise, the Printer MUST accept the operation and ignore or substitute unsupported and/or conflicting
560 attribute values supplied by the client. See the Implementer's Guide [RFC3196] for a complete description of
561 the suggested steps for processing the attributes in a create request.

562 Natural Language and Character Set:

563 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
564 3.1.4.2.

565 Group 2: Unsupported Attributes

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

567 The value of the "ipp-attribute-fidelity" and the "job-mandatory-attributes" operation attributes supplied by the
568 client in the original Job Creation request does not affect what attributes the Printer object returns in this
569 group. The value of these two operation attributes in the original Job Creation request only affects whether
570 the Create-Document operation is accepted or rejected. If the request is accepted, the client may query the
571 Document object using the Get-Document-Attributes operation (see section 3.5) requesting the unsupported
572 attributes that were returned in the create response to see which attributes were ignored (not stored on the
573 Document object) and which attributes were stored with other (substituted) values.

574 **Group 3: Job Object Attributes**

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

578 "job-uri" (uri) - see [RFC2911] section 4.3.1
579 "job-id" (integer(1:MAX)) - see [RFC2911] section 4.3.2
580 "job-state" (type1 enum) - see [RFC2911] section 4.3.7
581 "job-state-reasons" (1setOf type2 keyword) - see [RFC2911] section 4.3.8

582
583 The Printer MAY return:

584 "job-state-message" (text(MAX)) - see [RFC2911] section 4.3.9
585 "number-of-intervening-jobs" (integer(0:MAX)) - see [RFC2911] section 4.3.15

586 **Group 4: Document Object Attributes**588 **3.1.2.1 document-number (integer(1:MAX))**

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

591 **3.1.2.2 document-id-uri (uri)**

592 The Printer MUST return the document id of this Document object as a URI as assigned by the Printer (see
593 section 8.2.11).

594 **3.1.2.3 document-state (type1 enum)**

595 The Printer MUST return the state of this Document object (see section 8.2.16).

596 **3.1.2.4 document-state-reasons (1setOf type2 keyword)**

597 The Printer MUST return the associated state reasons for this Document (see section 8.2.18).

598 **3.1.2.5 document-state-message (text(MAX))**

599 The Printer MAY return the localized description of the "document-state" and "document-state-reasons"
600 values for this Document (see section 8.2.17).

601 **3.2 Send-Data Operation**

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

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

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

616 3.2.1 Send-Data request

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

618 Group 1: Operation Attributes

619 Natural Language and Character Set:

620 The "attributes-charset" and "attributes-natural-language" attributes as described in section [RFC2911]
621 3.1.4.1.

622 Target:

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

628 Requesting User Name:

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

631 Group 2: Document Content

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

634 3.2.2 Send-Data Response

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

636 Group 1: Operation Attributes

637 Status Message:

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

641 Natural Language and Character Set:

642 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
643 3.1.4.2.

644 Group 2: Unsupported Attributes

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

646 Group 3: Job Object Attributes

647 The Printer MUST return the same set of Job status attributes as for the Print-Job, Send-Document, and
648 Create-Document responses (see section 3.1.2).

649 Group 4: Document Object Attributes

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

652 3.3 Send-Document Operation

653 This REQUIRED⁵ operation allows a client to submit multiple documents in a single Job by making a Send-Document
654 request for each Document. In this specification, the Send-Document creates a Document object ([RFC2911] did not
655 have a Document object). A Printer MUST support this operation with the semantics specified in [RFC2911] and with
656 the extension defined in this specification, since this specification REQUIRES the Printer to support multiple
657 document jobs.

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

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

663 3.3.1 Send-Document Request

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

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

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

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

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

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

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

⁵ 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.

684 3.3.2 Send-Document Response

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

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

687 Status Message:

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

691 Natural Language and Character Set:

692 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
693 3.1.4.2.

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

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

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

697 The Printer MUST return the same set of Job status attributes as for the Print-Job, Send-Document, and
698 Create-Document responses (see section 3.1.2).

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

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

702 3.4 Send-URI Operation

703 This OPTIONAL operation has the same request and response semantics as the Send-Document operation (see
704 section 3.3) except that a client MUST supply a URI reference ("document-uri" operation attribute) rather than the
705 document data itself. If a Printer object supports this operation, clients can use both Send-URI or Send-Document
706 operations to add new documents to an existing multi-document Job object. However, if a client needs to indicate
707 that the previous Send-URI or Send-Document was the last document, the client MUST use the Send-Document
708 operation with no document data and the "last-document" flag set to 'true' (rather than using a Send-URI operation
709 with no "document-uri" operation attribute).

710 If a Printer object supports this operation, it MUST also support the Print-URI operation (see [RFC2911] section
711 3.2.2).

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

715 3.5 Get-Document-Attributes Operation

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

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

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

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

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

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

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

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

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

746 3.5.1 Get-Document-Attributes Request

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

749 Group 1: Operation Attributes

750 Natural Language and Character Set:

751 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
 752 3.1.4.1.

753 Target:

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

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

762 **3.5.1.1 "requested-attributes" (1setOf keyword):**

763 The client OPTIONALLY supplies this attribute. The Printer MUST support this attribute. It is a set of
764 attribute names and/or attribute group names in whose values the requester is interested. If the client omits
765 this attribute, the Printer MUST respond as if this attribute had been supplied with a value of 'all'.

766 **3.5.2 Get-Document-Attributes Response**

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

768 **Group 1: Operation Attributes**

769 **Status Message:**

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

773 **Natural Language and Character Set:**

774 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
775 3.1.4.2. The "attributes-natural-language" MAY be the natural language of the Document object, rather than
776 the one requested.

777 **Group 2: Unsupported Attributes**

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

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

784 **Group 3: Document Object Attributes**

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

795 3.6 Get-Documents Operation

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

799 This operation is similar to the Get-Document-Attributes operation (see section 3.5), except that this Get-Documents
800 operation returns attributes from all Document objects contained in the Job object, instead of from a single selected
801 Document object in the Job object. As with the Get-Document-Attributes operation the Printer MUST only return
802 attributes that were submitted by a client when the Document object was created by the Create-Documents, Send-
803 Document, or Send-URI operations and possibly modified by the Set-Documents-Attributes operation (see section
804 3.7).

805 3.6.1 Get-Documents Request

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

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

810 Group 1: Operation Attributes

811 Natural Language and Character Set:

812 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
813 3.1.4.1.

814 Target:

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

817 Requesting User Name:

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

820 3.6.1.1 "limit" (integer(1:MAX)):

821 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute. It is an
822 integer value that determines the maximum number of Documents that a client will receive from the Printer.
823 The limit is a "stateless limit" in that if the value supplied by the client is 'N', then only the first 'N' Documents
824 are returned in the Get-Documents Response. There is no mechanism to allow for the next 'M' Documents
825 after the first 'N' Documents. If the client does not supply this attribute, the Printer object responds with all
826 Documents.

827 3.6.1.2 "requested-attributes" (1setOf type2 keyword):

828 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute. It is a set of
829 Document attribute names and/or attribute groups names in whose values the requester is interested. This
830 set of attributes is returned for each Document object that is returned. The allowed attribute group names
831 are the same as those defined in the Get-Documents-Attributes operation in section 3.5.1.

832 If the client does not supply this attribute, the Printer MUST respond as if the client had supplied this attribute
833 with the two values:

834 'document-number' (see section 8.2.15)
835 'document-id-uri' (see section 8.2.11).
836

837 3.6.2 Get-Documents Response

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

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

843 Group 1: Operation Attributes

844 Status Message:

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

848 Natural Language and Character Set:

849 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
850 3.1.4.2.

851 Group 2: Unsupported Attributes

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

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

858 Groups 3 to N: Document Object Attributes

859 The Printer object responds with one set of Document Object Attributes for each returned Document object.
860 The Printer object ignores (does not respond with) any requested attribute or value which is not supported or
861 which is restricted by the security policy in force, including whether the requesting user is the user that
862 submitted the job (job originating user) or not (see [RFC2911] section 8). However, the Printer object MUST
863 respond with the 'unknown' value for any supported attribute (including all REQUIRED attributes) for which
864 the Printer object does not know the value, unless it would violate the security policy. See the description of
865 the "out-of-band" values in the beginning of [RFC2911] section 4.1.

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

868 3.7 Set-Documents-Attributes Operation

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

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

880 If a client supplies a document attribute in a Set-Documents-Attributes request that the Printer supports, and the
 881 document was originally submitted without supplying that attribute, the Printer adds the attribute to the Document
 882 object.

883 If the client supplies a document attribute with the "out-of-band" value 'delete-attribute' (see [set-ops] section 8.2),
 884 then the Printer MUST remove the attribute and all of its values from the Document object, if present. The semantic
 885 effect of the client supplying the 'delete-attribute' value in a Set-Documents-Attributes operation MUST be the same as
 886 if the attribute had not been supplied with the Document object in the Document Creation operation, i.e., the Printer
 887 applies its default attribute or behavior with lower precedence than the PDL (see the beginning of [RFC2911] section
 888 4.2 and [RFC2911] 3.2.1.1). Any subsequent query of the Document object using Get-Documents-Attributes or Get-
 889 Documents MUST NOT return any attribute that has been deleted using the 'delete-attribute' out-of-band value.
 890 However, a client can re-establish such a deleted Document attribute with any supported value(s) using a
 891 subsequent Set-Documents-Attributes operation.

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

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

906 The Printer MUST accept or reject this operations when the Document's READ-ONLY "document-state" attribute has
 907 the values shown in Table 5. The document's current state MUST affect whether the Printer accepts or rejects the
 908 request. However, the Set-Documents-Attributes operation MUST NOT change the state of the Document object
 909 (since the Document is a passive object and the Document state is a subset of the Job State). For example, in the
 910 case where the operation creates a request for unavailable resources, the Job (but not the Document) transitions to a
 911 new state. Table 5 shows the allowed behaviors in each document state.

912 **Table 5 - Document State Table for the Set-Documents-Attributes operation**

Current "document-state"	New "document-state" (no change)	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).

Current "document-state"	New "document-state" (no change)	Printer's response status code and "action":
'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'

913

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

917 **3.7.1 Settable and READ-ONLY Document Description attributes**

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

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

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

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

931 **3.7.2 Set-Document-Attributes Request**

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

933 **Group 1: Operation Attributes**

934 **Natural Language and Character Set:**

935 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
 936 3.1.4.1.

937 **Target:**

938 The client MUST supply the "document-number" (integer(1:MAX)) operation attribute immediately after either
 939 (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation attribute(s) which
 940 define the target Document object for this operation as described in [RFC2911] section 3.1.5. If the client
 941 omits the "document-number" operation attribute, the Printer MUST reject the request and return the 'client-
 942 error-bad-request' status code.

943 Note: There is no way in a single operation for the client to set all of a Job's Document objects to the same
 944 attribute value. Either (1) the client sets the corresponding attribute in each Document object in the Job with

945 separate Set-Document-Attributes requests, or (2) the client sets the corresponding attribute at the Job Level
 946 using the Set-Job-Attributes operation. Setting the corresponding attribute at the Job Level (or supplying that
 947 attribute initially in the Job Creation operation) causes each Document object to inherit the Job Level
 948 attribute value, if the Document object doesn't have a corresponding explicit attribute supplied at the
 949 Document Level. In other words, supplying an attribute at the Job Levels will affect all the Job's Document
 950 objects that don't have that attribute also explicitly supplied at the Document Level.

951 **Requesting User Name:**

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

954 **Group 2: Document Attributes**

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

963 In order to set the Document's "document-message" Document Description attribute (see section 8.2.12), the
 964 client MUST supply the attribute in Group 2, rather than supplying a "document-message" operation attribute
 965 in Group 1.

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

968 **3.7.3 Set-Document-Attributes Response**

969 The Printer returns the following sets of attributes as part of the Set-Document-Attributes Response:

970 **Group 1: Operation Attributes**

971 **Status Message:**

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

975 **Natural Language and Character Set:**

976 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
 977 3.1.4.2.

978 **Group 2: Unsupported Attributes**

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

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

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1002
1. The number of attributes supplied by the client exceeds the maximum number that the Printer supports in a Set-Printer-Attributes request: return the 'client-error-request-entity-too-large' (see [RFC2911] section 13.1.4.9).
 2. The Printer doesn't support the attribute: return the attribute with the 'unsupported' out-of-band attribute value (see [RFC2911] section 3.1.7 and [RFC2910]) and the 'client-error-attributes-or-values-not-supported' (see [RFC2911] section 13.1.4.12).
 3. The attribute is READ-ONLY (in its definition) or is not-settable in this implementation: return the attribute with the 'not-settable' out-of-band attribute value (see [set-ops] section 8.1) and the 'client-error-attributes-not-settable' status code (see [set-ops] section 7.1).
 4. The Printer doesn't support the value: if the attribute in the operation has a single value return it. If the attribute in the operation is multi-valued, return only those values in a 1setOf that are not supported. Return the 'client-error-attributes-or-values-not-supported' status code (see [RFC2911] section 13.1.4.12).
 5. The values of some of the supplied attributes conflict with one another and/or other Document attribute values not being set: if the conflicting attribute in the operation has a single value return the attribute and the value. If the attribute in the operation is multi-valued, return only the attribute and those values in a 1setOf that are conflicting with other attributes. Return the 'client-error-conflicting-attributes' status code (see [RFC2911] section 13.1.4.15).

1003 3.8 Cancel-Document Operation

1004 This REQUIRED operation allows a client to cancel a specified Document in a specified Print Job from the time the
1005 Document is created up to, but not including, the time it is completed, canceled, or aborted. Since a Document might
1006 already be printing by the time a Cancel-Document is received, some media sheet pages might be printed before the
1007 document processing is actually terminated.

1008 The Cancel-Document operation does not remove the Document from the Job and Printer, but only sets the specified
1009 Document's "document-state" Document Description attribute to 'canceled' and the Document's "document-state-
1010 reasons" Document Description attribute to 'canceled-by-user' or 'cancel-by-operator'. If the Job object is printed
1011 again using operations such as the Reprocess-Job operation (see [adm-ops] section 4.1) or the Restart-Job
1012 operation (see [RFC2911] section 3.3.7), any canceled Documents are also printed again. Thus Cancel-Document
1013 has the same semantics as Cancel-Job (see [RFC2911] section 3.3.3), which only cancels the processing of the job,
1014 and doesn't delete the Job object itself. See the Delete-Document operation (section 3.9) to remove the Document
1015 object itself immediately from the Job and Printer.

1016 The Cancel-Document operation does not affect the states of any of the other Document objects in the job. If the Job
1017 was processing and there are more Documents to be processed, the Printer does so. If there are no further
1018 Documents to process, the Job moves to the 'completed' state as usual whenever there is no more processing to be
1019 done.

1020 The Printer MUST accept or reject the request based on the document's current state and transition the document to
1021 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'

1022 Rule 1: If the implementation requires some measurable time to cancel the document in the 'processing' document
 1023 states, the Printer object MUST add the 'processing-to-stop-point' value to the document's "document-state-reasons"
 1024 attribute and then transition the document to the 'canceled' state when the processing ceases (see [RFC2911]
 1025 section 4.3.8).

1026 Rule 2: If the Document object already has the 'processing-to-stop-point' value in its "document-state-reasons"
 1027 attribute, then the Printer object MUST reject a Cancel-Document operation.

1028 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job
 1029 owner or an operator or administrator of the Printer object (see [RFC2911] sections 1 and 8.5). Otherwise, the
 1030 Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-
 1031 not-authorized' as appropriate.

1032 **3.8.1 Cancel-Document Request**

1033 The following groups of attributes are part of the Cancel-Document Request:

1034 **Group 1: Operation Attributes**

1035 **Natural Language and Character Set:**

1036 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
 1037 3.1.4.1.

1038 **Target:**

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

1044 **Requesting User Name:**

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

1047 **3.8.1.1 document-message (text(MAX))**

operation attribute

1048 The client MAY supply this operation attribute. If the Printer supports this attribute, the Printer MUST also
 1049 support the corresponding "document-message" (text(MAX)) Document Description attribute (see section
 1050 8.2.12) and copy this value to the "document-message" Document Description attribute. The end user can
 1051 use this Document Description attribute as a message to the operator and the operator can use it as a
 1052 message to the user. The Printer MAY print this message on a document start sheet for this document, if
 1053 any.

1054 The Printer MUST ignore the new "job-message-from-operator" operation attribute (see [adm-ops] section 6)
1055 for this operation, since that is a job only attribute and Cancel-Document is a Document operation.

1056 3.8.2 Cancel-Document Response

1057 The following sets of attributes are part of the Cancel-Document Response:

1058 Group 1: Operation Attributes

1059 Status Message:

1060 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
1061 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation attribute as described
1062 in [RFC2911] sections 13 and 3.1.6.

1063 Natural Language and Character Set:

1064 The "attributes-charset" and "attributes-natural-language" attributes as described in [RFC2911] section
1065 3.1.4.2.

1066 Group 2: Unsupported Attributes

1067 See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

1068 Once a successful response has been sent, the implementation guarantees that the Document will eventually end up
1069 in the 'canceled' state. Between the time of the Cancel-Document operation is accepted and when the document
1070 enters the 'canceled' document-state (see section 8.2.16), the "document-state-reasons" attribute (see section
1071 8.2.18) SHOULD contain the 'processing-to-stop-point' value which indicates to later queries that although the
1072 Document might still be 'processing', it will eventually end up in the 'canceled' state, not the 'completed' state.

1073 3.9 Delete-Document Operation

1074 This OPTIONAL operation removes the specified Document object and its data immediately from the specified Job.
1075 The Printer MUST reject the request if the Document is in any state, but 'pending' (there is no 'pending-held' state for
1076 Documents). The Printer does not reassign the "document-number" Document Description attribute values of the
1077 remaining Document objects in the Job, so that the deleted Document object leaves a gap in the document
1078 numbering space for the Job. The Printer MUST return a 'client-error-not-found' status code, in a subsequent Get-
1079 Document-Attributes operation for this Document object specifying its former "document-number". This operation is
1080 similar to the Purge-Jobs operation which immediately deletes all jobs from the Printer. However, the Delete-
1081 Document operation only deletes a single Document from the specified Job.

1082 *Access Rights:* The authenticated user (see [RFC2911] section 8.3) performing this operation MUST be an operator
1083 or administrator of the Printer object (see [RFC2911] sections 1 and 8.5). Otherwise, the Printer MUST reject the
1084 operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as
1085 appropriate. This operation requires operator/administrator privileges, otherwise a rogue client could submit, then
1086 delete, at will using up valuable spooling space. Instead of using this operation, unprivileged users use Cancel-
1087 Document which goes through the normal accounting, if any.

1088 The Delete-Document request and Delete-Document response have the same attribute groups and attributes as the
1089 Cancel-Document operation (see section 3.8).

1090 4 Semantic extensions to Job operations

1091 This section defines effects that Job operations have on the Document object. Printer and Subscription object (Event
 1092 Notification [ntfy]) operations MUST have no effect on the Document object and the Document object has no effect
 1093 on the semantics of the Printer and Subscription operations. The Job operations that MUST NOT have any effect on
 1094 the Document object because they are defined to affect the Job object as a whole are: **Get-Job-Attributes**⁶
 1095 ([RFC2911] section 3.3.4), **Get-Jobs**⁷ ([RFC2911] section 3.2.6), **Hold-Job** ([RFC2911] section 3.3.5), **Promote-Job**
 1096 ([adm-ops] section 4.4.1), **Release-Held-New-Jobs** ([adm-ops] section 3.3.2), **Resume-Job** ([adm-ops] section
 1097 4.3.2), **Schedule-Job-After** ([adm-ops] section 4.4.2), **Set-Job-Attributes** ([set-ops] section 4.2), and **Validate-Job**
 1098 ([RFC2911] section 3.2.3).

1099 The Job operations that affect Document objects or that Document objects affect the semantics of the Job operations
 1100 are, in alphabetical order:

1101 4.1 Cancel-Current-Job ([adm-ops] section 4.2)

1102 The Printer sets the “document-state” Document Description attribute to ‘canceled’ and the “document-state-reasons”
 1103 Document Description attribute to ‘canceled-by-xxx’ for any documents in the current Job that have not yet reached a
 1104 terminal state (‘completed’, ‘canceled’, or ‘aborted’), where “xxx” is ‘user’ or ‘operator’. See [adm-ops] section 4.2.

1105 4.2 Cancel-Job ([RFC2911] section 3.3.3)

1106 The Printer sets “document-state” Document Description attribute to ‘canceled’ and the “document-state-reasons”
 1107 Document Description attribute to ‘canceled-by-user’ or ‘canceled-by-operator’ for *all* Document objects in the
 1108 identified Job that have not yet reached a terminal state (‘completed’, ‘canceled’, or ‘aborted’).

1109 4.3 Job Creation operations

1110 This section defines the extensions to Job Creation operations.

1111 The following operation attribute extensions are defined for use in all the Job Creation operations and Validate-Job:

1112 4.3.1 ipp-attribute-fidelity (boolean) ([RFC2911] section 3.2.1 and 15)

1113 This REQUIRED operation attribute specifies the policy for the Printer to use (see [RFC2911] §3.2.1.1)_when the
 1114 client supplies an unsupported attribute or value in a Job Creation operation or a subsequent Document Creation
 1115 operation for this job. The value ‘true’ indicates that total fidelity to client supplied Job Template and Document
 1116 Template attributes and values is required for this Job Creation operation and all subsequent Document Creation
 1117 operations for this job. If the client supplies the value ‘false’ or omits the attribute, then the Printer MUST accept the
 1118 Job Creation operation and all subsequent Document Creation operations even if the client supplies unsupported
 1119 attributes or values in them.

1120 The Printer MUST copy this attribute to the corresponding (new) Job Description attribute (see section 8.1.1) and use
 1121 its value for validating subsequent Document Creation operations for this job.

⁶ The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Documents, Send-Document, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

⁷ The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Documents, Send-Document, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

1122 Note: The inheritance of the effect of the “ipp-attribute-fidelity” operation attribute by subsequent Document Creation
1123 operations is like the inheritance of other operation attributes.

1124 4.3.2 job-mandatory-attributes (1setOf type2 keyword) operation attribute

1125 This OPTIONAL operation attribute identifies which Job Template and Document Template attributes the Printer
1126 MUST honor in this Job Creation request and all subsequent Document Creation requests for this job. The Printer
1127 MUST reject this Job Creation operation or any subsequent Document Creation operations for this job, if the client
1128 supplies an unsupported Job Template or Document Template attribute or value in the request that is also identified
1129 in this list. The client MAY supply this attribute in a Job Creation operation. If the Printer supports this operation
1130 attribute, the Printer MUST support this attribute in Job Creation operations and Validate-Job with any values and
1131 MUST NOT support this attribute in any other operations.

1132 The values of the “job-mandatory-attributes” attribute are the keyword attribute names that identify Job Template
1133 and/or Document Template attributes, for example, ‘job-hold-until’, ‘job-finishing’, (see section 7.1.4), ‘copies’ and
1134 ‘media’. In order to identify a member attribute of a collection attribute, the keyword names of both the collection
1135 attribute and the member attribute are given separated by a period (.) character. For example, to make the “media”
1136 attribute of the “cover-front” collection attribute mandatory, supply the keyword value: ‘cover-front.media’.

1137 The Printer MUST ignore this attribute if the client supplies the “ipp-attribute-fidelity” operation attribute (see section
1138 4.3.1) with a ‘true’ value in this operation, since a ‘true’ value indicates that the Printer MUST honor all supplied Job
1139 Template and Document Template attributes.

1140 The Printer MUST copy this attribute to the corresponding “job-mandatory-attributes” Job Description attribute (see
1141 section 4.3.2) for auditing and trouble shooting purposes and use its value for validating subsequent Document
1142 Creation operations for this job.

1143 Note: The inheritance of the effect of “job-mandatory-attributes” operation attribute by subsequent Document
1144 Creation operations is like the inheritance of other operation attributes.

1145 4.3.3 Create-Job ([RFC2911] section 3.2.4)

1146 The Printer creates the Job object with all of the mixture of Job and Document attributes supplied in the Create-Job
1147 operation. The Document objects that are subsequently created for the specified Job inherit the Document attributes
1148 from the Job object. However, the Printer MUST NOT copy down any Job Level attributes, including “document-
1149 overrides” ([override]) to the Document object as observable by a client in any Get-Documents or Get-Documents-
1150 Attributes operation responses. The only exceptions to this no copy down rule are the four “compression”,
1151 “document-format”, “document-name”, and “document-natural-language” operation attributes which do not have any
1152 corresponding Job Description attributes to hold them. Therefore, the Printer MUST copy down these attributes to
1153 the Document object which does have Document Description attributes defined (see section 8.2).

1154 ISSUE 01: It is the [override] specification the allowed these four “compression”, “document-format”, “document-
1155 name”, and “document-natural-language” operation attributes to be supplied in the Create-Job request. There needs
1156 to be a way for a client to query to see what was submitted. Possible solutions:

1157 a. OK to have the exception to the no copy down rule for these four which do not have any corresponding Job
1158 Description attributes to hold them? Otherwise, there would be no queriable record of what the client had supplied
1159 when the client only supplies them in the Create-Job operation.

1160 b. Or would it be better, simpler, and more consistent to define the four corresponding Job Description attributes and
1161 have the Printer just copy the operation attributes to them, like most other operation attributes?

1162 c. Or should we forget the [override] extension and go back to the RFC2911 Create-Job definition (see [RFC2911]
1163 section 3.2.4) which does not allow these four operation attributes to be submitted in the Create-Job, but requires

1164 that the client supply them each time in each Send-Document and Sent-URI operation, if the client wants to submit
 1165 them at all. Then the Printer just copies them to the corresponding Document Description attributes and there is no
 1166 inheritance problem between the Job and Document level for these four attributes.

1167 A Printer that supports the Document object MUST support the Create-Job operation⁸ since the Create-Job operation
 1168 is the only operation that creates a Job object and allows subsequent Document objects to be created.

1169 **4.3.4 Print-Job ([RFC2911] section 3.2.1)**

1170 The Printer creates one Document object as a side effect of the Print-Job operation. All of the attributes supplied by
 1171 the client MUST remain at the Job Level as part of the Job object. Any Document attributes supplied have affect on
 1172 the Document object because the Document object inherits them from the Job object. The Printer MUST populate
 1173 the single Document object's "document-state", "document-state-reasons", and "document-number" Document
 1174 Description attributes with appropriate values. Thus a Get-Documents or Get-Documents-Attributes for a Job created
 1175 by Print-Job will return no attributes supplied by the client, but will return the populated Document Description
 1176 attributes.

1177 **4.3.5 Print-URI ([RFC2911] section 3.2.2)**

1178 The Printer creates one Document object as a side effect of the Print-URI operation. All of the attributes supplied by
 1179 the client MUST remain at the Job Level as part of the Job object. Any Document attributes supplied have affect on
 1180 the Document object because the Document object inherits them from the Job object. The Printer MUST populate
 1181 the Document object's "document-state", "document-state-reasons", and "document-number" Document Description
 1182 attributes with appropriate values. Thus a Get-Documents or Get-Documents-Attributes for a Job created by Print-Job
 1183 will return no attributes supplied by the client, but will return the populated Document Description attributes.

1184 **4.4 Purge-Jobs ([RFC2911] section 3.2.9)**

1185 The Printer removes all Job and all of their contained Document objects.

1186 **4.5 Release-Job ([RFC2911] section 3.3.6)**

1187 The Printer moves the job to the 'pending' state, if there are no other "job-state-reasons" to hold the job. The values
 1188 of the "document-state-reasons" attributes MUST NOT affect job scheduling (see Table 12), only the Job's "job-state-
 1189 reasons" values.

1190 **4.6 Reprocess-Job ([adm-ops] section 4.1)**

1191 The Printer processes the Job again by processing *all* Documents in the Job, including ones that have been
 1192 canceled by a previous Cancel-Document operation. Therefore, the Printer removes any 'canceled-by-xxx' values
 1193 from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attributes.

1194 **4.7 Restart-Job ([RFC2911] section 3.3.7)**

1195 The Printer starts the Job over again by processing *all* Documents in the Job, including ones that have been
 1196 canceled by a previous Cancel-Document operation. Therefore, the Printer removes any 'canceled-by-xxx' values
 1197 from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attributes and

⁸ In [RFC2911] the Create-Job operation is OPTIONAL for a Printer to support.

1198 4.8 Send-Document ([RFC2911] section 3.3.1)

1199 The Printer accepts a new Document Attributes group (Group 4) that the client can supply Document Template
1200 attribute and creates a Document object (see section 3.3).

1201 4.9 Send-URI ([RFC2911] section 3.3.2)

1202 The Printer accepts a new Document Attributes group (Group 4) that the client can supply Document Template
1203 attribute and creates a Document object (see section 3.4).

1204 4.10 Suspend-Current-Job ([adm-ops] section 4.3.1)

1205 The Printer suspends the current job and sets the Job's "job-state" Job Description attribute to 'processing-stopped'
1206 and "job-state-reasons" to 'job-suspended-by-xxx', where 'xxx' is 'user' or 'operator'. The Documents' "document-
1207 state" and "document-state-reasons" Document Description attributes are unaffected (but the Documents are not
1208 processed any further, since the Job is stopped).

1209 5 Attribute Precedence during job processing

1210 This section defines the Attribute Precedence rules that the Printer MUST follow when processing jobs, including
1211 instructions in the PDL data. These rules cover Queue Override attributes, Page Override attributes, Document
1212 Object attributes, Document Override attributes, Job Object attributes, PDL instructions, PDL Interpreter initialization
1213 files, and Printer object defaults. Since each attribute can be specified for all of these levels, it is important to define
1214 which level takes precedence when the same attribute occurs at different levels with differing values.

1215 The attribute precedence model has the following features:

- 1216 1) In principle, each defined attribute can occur at each of the precedence levels.
- 1217 2) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print
1218 driver, submission client, protocol, and Printer:
- 1219 • Attributes are supplied by different agents in the system: application, user, print driver, administrator,
1220 operator, Printer object, and the output device hardware.
 - 1221 • Attributes are supplied at different points in time: PDL generation, job submission, job acceptance, job
1222 pending, job processing.
- 1223 3) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print
1224 driver, submission client, protocol, and Printer.
- 1225 4) The later that an attribute is introduced into the work flow or the closer the specified scope of the attribute is to
1226 the affected object, the higher the precedence is assigned to that attribute, since precedence is intended to
1227 reflect the user's wishes.

1228 The following levels of Attribute Precedence are defined in order of decreasing priority:

- 1229 1. **queue override** - The value that the Printer enforces for any job submitted to it (see [prod-print2] section
1230 3.1). Set by the administrator when configuring the Printer by setting an "xxx-supported" Printer attribute
1231 to contain a single value, i.e., the override value. Example: the administrator sets the Printer's "sides" =

- 1232 'two-sided-long' so that all jobs submitted to that (logical) Printer are printed two-sided flipped along the
 1233 long edge.
- 1234 Note: The **queue override** level is only available for Printers that support the 'guaranteed' value for
 1235 its "pdl-override-supported" attribute (see [prod-print2] section 8.1). All other levels are available for
 1236 all Printers independent of the "pdl-override-supported" value.
- 1237 **2. Document Level - page override programming** - The special "page-overrides" collection Document
 1238 Template attribute (see [override]) supplied at the Document Level, that is, in a Create-Document, Send-
 1239 Document, or Send-URI operation, that contains the attributes that are to have the page override status
 1240 for the specified ranges of pages in the Input-Document or the Output-Document. Supplied by the client
 1241 when submitting a Document object, or set by the user or operator after the Document has been
 1242 accepted either using the Set-Document-Attributes operation, or by the operator using means local to the
 1243 Printer. Example: "page-overrides" = {"input-documents" = '1:1'; "pages" = '1:1'; "media" = 'letterhead'}
- 1244 **3. Job Level - page override programming** - The special "page-overrides" collection Job Template
 1245 attribute (see [override]) supplied at the Job Level, that is, in a Job Creation operation, that contains the
 1246 attributes that are to have the page override status for the specified ranges of pages in the Input-
 1247 Document or the Output-Document. Supplied by the client when submitting a job either in the protocol,
 1248 or set by the user or operator after the job has been accepted either using the Set-Job-Attributes
 1249 operation, or by the operator using means local to the Printer. Example: "page-overrides" = {"input-
 1250 documents" = '1:1'; "pages" = '1:1'; "media" = 'letterhead'}
- 1251 **4. Document Level - Document object attributes** - The Document attributes supplied at the Document
 1252 Level, that is, in a Create-Document, Send-Document, or Send-URI operation to apply to the Input
 1253 Document. Supplied by the client when submitting a Document object, or set by the user or operator
 1254 after the Document has been accepted either using the Set-Job-Attributes operation, or by the operator
 1255 using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
- 1256 **5. Document Level - document override programming** - The special "document-overrides" collection
 1257 operation attribute (see [override]) supplied by the client in the Send-Document or Send-URI request.
 1258 The collection contains the member attributes that are to override attributes specified at lower
 1259 precedence for the specified range of documents, including the current Document and subsequently
 1260 created Documents. Clients that support the Document object SHOULD supply the attributes as
 1261 Document Template attributes directly when creating the Document, instead of using the operation
 1262 attribute mechanism. Example: "document-overrides" = {"input-documents" = '5:5'; "media" =
 1263 'transparency'}
- 1264 **6. Job Level - document override programming** - The special "document-overrides" collection Job
 1265 Template attribute (see [override]) that contains the attributes that are to have the document override
 1266 status for the specified Input-Documents or Output-Documents. Supplied by the client when submitting a
 1267 job either in the protocol, or set by the user or operator after the job has been accepted either using the
 1268 Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "document-
 1269 overrides" = {"input-documents" = '5:5'; "media" = 'transparency'}
- 1270 **7. Job Level - Job object and Document object attributes** - The Job attributes and Document attributes
 1271 supplied at the Job Level, i.e., with a Create-Job, Print-Job, or Print-URI operation. Supplied by the
 1272 client when submitting a Job in the protocol, or set by the user or operator after the job has been
 1273 accepted either using the Set-Job-Attributes operation, or by the operator using means local to the
 1274 Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
- 1275 **8. PDL document data** - an instruction in the PDL document data. Supplied by the application or print
 1276 driver that created the PDL. Example: PostScript setPageDevice specifying na-letter media. Whether
 1277 PDL document data is actually lower precedence than the preceding levels depends on the
 1278 implementation as expressed in the "pdl-override-supported" Printer Description attribute (see

[RFC2911] section 4.4.28 and [prod-print2] section 8.1).

Job Template and Document Template attributes of the form "xxx-requested", such as "orientation-requested" (see [RFC2911] section 4.2.10) have a lower priority than the PDL. If the PDL contains a corresponding instruction, that PDL instruction will be used instead of the supplied "xxx-requested" attribute. For example, PostScript PDL data always has a well-defined orientation, so that "orientation-requested" never affects the result. On the other hand, PDLs such as text/plain never has orientation 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 each document in a Job. See description of "pdl-init-file" Job Template attribute in [prod-print2] Section 5.8. It is immaterial how this file is specified, whether it be by a queue override, job object attribute or 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 higher levels have supplied a value. The Printer implementation MUST supply values for all of the Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For example, if the output device will use media from the large-capacity input tray if not directed otherwise, the implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity' keyword value without requiring the administrator to configure that value. The implementation MUST allow the administrator to configure the Printer's "xxx-default" attributes to other values, if other value are supported by the implementation. Example: The administrator changes the Printer's "media-default" from 'large-capacity' to 'na-letter'.

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

6 Operation Attributes for the Job and Document Creation operations

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

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

Table 6 lists the Operation attributes that clients supply at the Job Level and/or the Document Level.

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

Legend:

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

"_" indicates that the Job or Document attribute is *not* defined.

* these operation attributes are defined for *all* operations, not just Job Creation and Document Creation operations

** For most of these operation attributes the Printer MUST copy these operation attributes to the corresponding Job Description or Document Description attributes. The ** in the Job and Doc column indicate that there is

1323
1324
1325

no corresponding Job Description or Document Description attribute, respectively. See Table 9 for the corresponding Job and Document Description attributes.

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 **	y	MAY	MUST	[RFC2911] §3.2.1.1
document-format	mimeMediaType	y **	y	MAY	MUST	[RFC2911] §3.2.1.1
document-message *	text(MAX)	-	y	MAY	MAY	§8.2.12
document-name	name(MAX)	y **	y	MAY	MUST	[RFC2911] §3.2.1.1
document-natural-language	naturalLanguage	y **	y	MAY	MAY	[RFC2911] §3.2.1.1
document-overrides	1setOf collection	-	y ⁹	MAY	MAY	[override] §5.1, §9.2.2
<i>See "document-overrides" in Table 8 for the list of member attributes</i>						
document-uri	uri	y **	y	CMUST ¹⁰	MAY	[RFC2911] §3.2.2
input-document-number DEPRECATED	integer(1:MAX)	-	y	MAY	MAY	§3.1.1.1, [override] §9.2
ipp-attribute-fidelity	boolean	y	-	MAY	MUST	§4.3.1, [RFC2911] §3.2.1.1
[job-]impressions	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
[job-]k-octets	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-mandatory-attributes	1setOf type2 keyword	y	-	MAY	MAY	§4.3.2
[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	1setOf collection	-	y ¹¹	MAY	MAY	[override] §5.2, §9.2.3
<i>See "page-overrides" in Table 8 for the list of member attributes</i>						
printer-uri *	uri	y ¹²	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

1326 * and . See Legend at the beginning of the Table.

⁹ See section 6.2 for an ISSUE about DEPRECATING "document-overrides" as an operation attribute.

¹⁰ The "document-uri" operation attribute MUST be supplied in the Print-URI Job Creation operation and the Send-URI Document Creation operation, and MUST NOT be supplied in other operations.

¹¹ See section 6.2 for an ISSUE about DEPRECATING "page-overrides" as an operation attribute.

¹² The Printer copies the "printer-uri" operation attribute to the Job's "job-printer-uri" Job Description attribute and Document's "job-printer-uri" Document Description attribute.

1327 **6.2 Override operation attributes in Send-Document and Send-URI**

1328 According to [override], the “document-overrides” (collection) attribute MAY be supplied by the client in a Send-
 1329 Document or Send-URI request as an Operation attribute to apply document overrides to this and/or subsequent
 1330 documents in the job. See the “document-overrides” Job Template attribute in Table 8 for the listing of the member
 1331 attributes. However, with the introduction of the Document object, the “document-overrides” (collection) attribute
 1332 SHOULD NOT be used (either as a Job Template attribute or an Operation attribute). Instead, the client simply
 1333 supplies the Document Template attributes (see Table 8) for each Document Creation request (in a new Document
 1334 Template attribute group) without needing a collection. A Printer MAY support “document-overrides” as specified in
 1335 [override] for backward compatibility with clients that don’t support the Document object.

1336 **ISSUE 02: Should we DEPRECATE the use of the “document-overrides” operation attribute in Send-Document and**
 1337 **Send-URI when supporting this specification? Or forbid?**

1338 The “document-overrides” attribute is also useful in combination with the “pages-per-subset” attribute (see
 1339 [overrides]) which divides up the Input Page stream concatenated across the Input Documents into separate Output
 1340 Documents. For example, making every 10 Input Pages be a separate Output Document but the client only wants to
 1341 staple the first Output Document.

1342 Similarly, according to [override], the “page-overrides” (collection) attribute MAY be supplied by the client in a Send-
 1343 Document or Send-URI request as an Operation attribute to apply page overrides to this and/or subsequent
 1344 documents in the job. See the “page-overrides” Job Template attribute in Table 8 for the listing of the member
 1345 attributes. However, with the introduction of the Document object, the “page-overrides” (collection) attribute
 1346 SHOULD be more simply supplied as one of the Document Template attributes for the document being created only.
 1347 However, a Printer MAY also support the “page-overrides” attribute as an operation attribute for backward
 1348 compatibility with clients that do not support the Document object.

1349 **ISSUE 03: Should we DEPRECATE the use of the “pages-overrides” operation attribute in Send-Document and**
 1350 **Send-URI when supporting this specification? Or forbid?**

1351 **6.3 Operation Attributes returned in Job and Document Creation responses**

1352 Table 7 lists the Operation attributes that Printers return in Job Creation operation *responses*: Print-Job, Print-URI,
 1353 and Create-Job and in Document Creation operation *responses*: Send-Document and Send-URI. The column
 1354 labeled “Conformance” indicates the conformance for what the Printer returns and what the Printer supports. The
 1355 Reference and Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

1356 **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

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
document-access-error	text	MAY	MAY	[RFC2911] §3.1.6.4
document-id-uri	uri	MUST	MUST	§8.2.11
document-number	integer(1:MAX)	MUST	MUST	§8.2.15
job-id	integer(1:MAX)	MUST	MUST	[RFC2911] §4.3.2
job-uri	uri	MUST	MUST	[RFC2911] §4.3.1
redirect-uri (uri) ¹³	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

1357 * - indicates attributes that are defined for *all* operations, not just Job Creation operations
 1358

1359 7 Job Template and Document Template attributes

1360 Table 8 lists *all* of the Job Template attributes defined in other IPP specifications and lists their corresponding
 1361 Document Template attributes defined in this IPP specification. The Job Template attributes can be supplied in the
 1362 Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

1363 A subset of these Job Template attributes (e.g., “document-format” and “media”, but not “job-priority”) are also
 1364 defined to apply to Documents and are called Document Template attributes when supplied at the Document Level.
 1365 Document Template attribute can be supplied in the Create-Document, Send-Document, and Send-URI operations.

1366 These Document Template attributes can also be supplied as Document Overrides using the “document-overrides”
 1367 Job Template attribute (see [overrides]).

1368 A subset of the Document Template attributes that apply to pages (e.g., “media”, but not “document-format” or “job-
 1369 priority”) can also be supplied as Page Overrides using the “page-overrides” Job Template collection attribute (see
 1370 [override]) or as a Document Template attribute.

1371 Most Job Template and Document Template attributes correspond to the PWG Semantic Model Job Processing and
 1372 Document Processing attributes, respectively. However, a few of the IPP Job Template attributes are represented in
 1373 the PWG Semantic Model as Job Description attributes, instead of Job Processing attributes. These are indicated in
 1374 the first column with (JD).

¹³ 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.

1375 The “Defined for use” column indicates whether the client MAY supply and the Printer support the attribute at the
 1376 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.

1377 Job Template and Document Template attributes are OPTIONAL for a Printer to support and for a client to supply in
 1378 a Job Creation or Document Creation request or a Document Overrides or Page Overrides. If a Printer supports a
 1379 Job Template or Document Template attribute, then it MUST copy the supplied attribute to the Job or Document
 1380 object, respectively so that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs and Get-
 1381 Document-Attributes/Get-Documents operations, respectively. The effect of Job Template Attributes supplied in Job
 1382 Creation requests are inherited by the Document objects, unless the Document Creation operation supplies the
 1383 attribute with a different value.
 1384

1385 If a Job Template collection attribute is supported (see [coll]), then there are conformance requirements for which
 1386 member attributes MUST be supported and which member attributes a client MUST supply as indicated in the
 1387 Conformance column for each collection member attribute in Table 8.

1388 **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 ¹⁴	y	n	MAY	MAY	[RFC2911] §4.2.5

¹⁴ 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.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
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 ¹⁵	n	MAY	MAY	[override] §5.1
input-documents ¹⁶	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
<i>any other Job Template attributes that affect documents, such as "media" or "media-col"</i>					MAY	MAY	
feed-orientation	type3 keyword	y	y	n	MAY	MAY	[prod-print2] §5.1
finishings	1setOf type2 enum	y ¹⁷	y	y	MAY be neither or one of, but NOT both	MAY, MUST if "finishing-col" is supported	[RFC2911] §4.2.6 [finish] §2
finishings-col	collection	y ¹⁸	y	y			MAY
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 ¹⁹	y	y	MAY	MAY	[prod-print] §3.3

¹⁵ See section 6.2 for an ISSUE about DEPRECATING "document-overrides" as an operation attribute.

¹⁶ The Printer MUST support "document-format", "document-name", "compression", "document-natural-language", and "page-ranges" with the "input-documents" member attribute, but not with the "output-documents" member attribute.

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

¹⁸ See the footnote on the "finishings" attribute.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
imposition-template	type2 keyword name(MAX)	y	y	y	MAY	MAY	[prod-print] §3.4
insert-sheet	1setOf collection	y ²⁰	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 (JD)	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 (JD)	name(MAX)	y	n	n	MAY	MAY	[prod-print] §3.7
job-copies	integer(1:MAX)	y	n ²¹	n	MAY	MAY	§7.1.1

¹⁹ 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.

²⁰ See the footnote on “force-front-side”.

²¹ 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 <i>same as cover-back</i>	collection see cover-back	y	n ²²	n	MAY	MAY	§7.1.2
job-cover-front <i>same as cover-front</i>	collection see cover-front	y	n ²³	n	MAY	MAY	§7.1.3
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 ²⁴	n	MAY	MAY	§7.1.4
job-finishings-col <i>same as finishings-col</i>	collection see finishings-col	y	n ²⁵	n	MAY	MAY	§7.1.5
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 ²⁶	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 (JD)	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

²² 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’.

²³ 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’.

²⁴ 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’.

²⁵ 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’.

²⁶ 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-size-name	type3 keyword name(MAX)				MAY	MAY	§7.1.6
media-thickness	integer(1:MAX)				MAY	MAY	[prod-print2] §8.4.4
media-tooth	type3 keyword name(MAX)				MAY	MAY	[prod-print2] §8.4.1
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
media-size-name ²⁷	type3 keyword name(MAX)	y	y	y	MAY	MAY	§7.1.6, [upnp]
media-type ²⁸	type3 keyword name(MAX)	y	y	y	MAY	MAY	[upnp], [prod-print] §3.13.2

²⁷ UPnPv1 and UPnPv2 define a separate MediaSizeName Job Template attribute with values from PWG 5101.1.

²⁸ UPnPv1 and UPnPv2 define a separate MediaType Job Template attribute with the same values as the "media-type" member attribute of "media-col".

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
multiple-document-handling	type2 keyword	y	n	n	MAY	MUST if multiple document jobs supported	[RFC2911] §4.2.4
number-up	integer(1:MAX)	y	y	y	MAY	MAY	[RFC2911] §4.2.9
orientation-requested	type2 enum	y	y	y	MAY	MAY	[RFC2911] §4.2.10
output-bin	type2 keyword name(MAX)	y	n	n	MAY	MAY	[output-bin] §2.1
page-delivery	type2 keyword	y	y	n	MAY	MAY	[prod-print] §3.15
page-order-received (JD)	type2 keyword	y	y	n	MAY	MAY	[prod-print] §3.16
page-overrides	1setOf collection	y ²⁹	y	n	MAY	MAY	[override] §5.2
input-documents	1setOf rangeOfInteger(1:MAX)				MUST be one or the other, but NOT both	MUST	[override] §5.2.1
output-documents	1setOf rangeOfInteger(1:MAX)					MUST	[override] §5.2.2
document-copies	1setOf rangeOfInteger(1:MAX)				MAY	MAY	[override] §5.2.3
pages	1setOf rangeOfInteger(1:MAX)				MUST	MUST	[override] §5.2.4
<i>any other Job Template attributes that affect pages, such as "media" or "media-col"</i>					MAY	MAY	
page-ranges	1setOf rangeOfInteger(1:MAX)	y ³⁰	y	n	MAY	MAY	[RFC2911] §4.2.7
pages-per-subset	1setOf integer(1:MAX)	y ³¹	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

²⁹ 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. ISSUE 06: This is a change from [override], OK?

³⁰ 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. ISSUE 07: This is a change from [override], OK?

³¹ 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-copies', 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	
proof-print	collection	y	n	n	MAY	MAY	[prod-print2] §5.9
proof-print-copies	integer (0:MAX)	y	n	n	MAY	MAY	[prod-print2] §5.9.1.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print2] §5.8.1.2
media-col	collection					MAY	[prod-print2] §5.8.1.2
separator-sheets	collection	y	y	n	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

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7.1 Job Template attributes defined for use with multi-document jobs

1390

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

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7.1.1 job-copies (integer(1:MAX))

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

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7.1.2 job-cover-back (collection)

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

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7.1.3 job-cover-front (collection)

1403

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

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1409 **7.1.4 job-finishings (1setOf type2 enum)**

1410 This attribute specifies the job finishings, i.e., with all of the Document objects taken together. Its interpretation is
 1411 independent of the value of the “multiple-document-handling” Job Template attribute. See the “finishings” Job
 1412 Template attribute defined in [RFC2911] section 4.2.6 which switches between job finishings and document
 1413 finishings depending on the value of the “multiple-document-handling” Job Template attribute.

1414 **7.1.5 job-finishings-col (1setOf collection)**

1415 This attribute specifies the job finishings collection, i.e., with all of the Document objects taken together. Its
 1416 interpretation is independent of the value of the “multiple-document-handling” Job Template attribute. See the
 1417 “finishings” Job Template attribute defined in [RFC2911] section 4.2.6 which switches between job finishings
 1418 collection and document finishings collection depending on the value of the “multiple-document-handling” Job
 1419 Template attribute.

1420 **7.1.6 media-size-name (type3 keyword | name(MAX))**

1421 This Job Template and Document Template attribute specifies the name of a size of media. The values are defined
 1422 in [pwg5101.1]. The attribute is used in [upnp] as a Job Template attribute. Examples:

1423 ‘na_letter_8.5x11in’ - The letter size (8.5 inches by 11 inches) used in North America.
 1424 ‘iso_a4_210x297mm’ - The iso A4 size (210 mm by 297 mm) used in metric countries.
 1425

1426 **7.2 Document Template attributes**

1427 Most Job Template attributes can be used as Document Template attributes for use in Document Creation
 1428 operations to apply to the Document object. However, the Job Template attributes that have the “job-“ prefix MUST
 1429 NOT be used as Document Template attributes, since they are defined to apply to the job as a whole. Table 8 shows
 1430 lists all of the Document Template attributes for use with the Document Creation operations and the Document
 1431 object. All of the definitions of the Document Template attributes are done by reference to the corresponding Job
 1432 Template attributes in other specifications. However, the semantics of each Document Template attribute only
 1433 applies to the Document object with which the attribute is associated either by being supplied by the client in the
 1434 Document Creation operation or supplied by the Printer as a default because the client did not (and the PDL did not
 1435 have any corresponding instruction). See section 5 for defaulting semantics.

1436 **8 Job Description and Document Description attributes**

1437 Table 9 lists all the Job Description defined in other IPP specifications and the corresponding Document Description
 1438 attributes defined in this IPP specification. Job Description and Document Description attributes are Job object and
 1439 Document object attributes, respectively, that are filled in by the Printer. Some Job/Document Description attribute
 1440 values are supplied by the client in the Job/Document Creation operation using corresponding Operation attributes
 1441 as flagged with “”. Unless specified otherwise herein, the Printer MUST NOT support modification of Job Description
 1442 and Document Descriptions attributes.

1443 The column labeled “attribute syntax” indicates the attribute syntax (see [RFC2911] section 4.1). The Printer
 1444 conformance is indicated along with the reference to the specification in which the attribute is defined. The
 1445 conformance for Document Description attributes (if the Printer supports the Document object) is the same as the
 1446 corresponding Job Description attributes.

1447 Each of the Document Description attributes have a sub-section in section 8.2. The column labeled References
 1448 column contains references to the sub-section in this document if there is significant information there. Those
 1449 subsections that are only references to other specifications contain only that reference in the Reference column.

1450 Note: There are no corresponding Page Range (or Page Override) Description attributes. The Page Range is not an
 1451 object with a state and it cannot be queried.

1452 Legend:

- 1453 **[job-]** indicates an attribute that shouldn't have had a "job-" prefix in its name in [RFC2911], so that the same
- 1454 attribute name could also be used for the Document object as a Document Description attribute. Note: For
- 1455 the PWG Semantic Model, the "job-" prefix is dropped.
- 1456 **“..”** indicates that the Job or Document attribute is *not* defined.
- 1457 indicates a Job and/or Document Description attribute that the client MAY supply the values for in a
- 1458 corresponding Operation attribute. See Table 6 for the corresponding operation attribute.
- 1459 (r/w) indicates that the Job Description or Document Description attribute is read/write, so that the client can
- 1460 changes its value using the Set-Job-Attributes or Set-Document-Attributes operation (see section 3.7).

1461 **Table 9 - Job and Document Description attributes**

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform-ance	Reference	
					Job Description Attr	Doc Desc.
attributes-charset	charset	y	y	MUST	[RFC2911] §4.3.19	§8.2.1
attributes-natural-language	naturalLanguage	y	y	MUST	[RFC2911] §4.3.20	§8.2.2
compression	type3 keyword	-	y	MUST	[RFC2911] §3.2.1.1	§8.2.3
current-page-order	type2 keyword	y	y	MAY	[prod-print] §4.1	§8.2.4
date-time-at-completed	dateTime	y	y	MAY	[RFC2911] §4.3.14.7	§8.2.5
date-time-at-creation	dateTime	y	y	MAY	[RFC2911] §4.3.14.5	§8.2.6
date-time-at-processing	dateTime	y	y	MAY	[RFC2911] §4.3.14.6	§8.2.7
document-format	mimeMediaType	-	y	MUST	[RFC2911] §3.2.1.1	§8.2.8
document-format-detail	collection	-	y	MAY		§8.2.9
document-format-detected	mimeMediaType	-	y	MAY		§8.2.10
document-id-uri	uri	-	y	MUST		§8.2.11
document-message (r/w)	text(MAX)	- ³²	y	MAY		§8.2.12
document-name (r/w)	name(MAX)	-	y	MUST	[RFC2911] §3.2.1.1	§8.2.13
document-natural-language	naturalLanguage	-	y	MAY	[RFC2911] §3.2.1.1	§8.2.14
document-number	integer(0:MAX)	-	y	MUST		§8.2.15
document-state	type1 enum	-	y	MUST		§8.2.16
document-state-message	text(MAX)	-	y	MAY		§8.2.17
document-state-reasons	1setOf type2 keyword	-	y	MUST		§8.2.18
document-uri	uri	-	y	MAY		§8.2.19
impressions-completed-current-copy	integer(0:MAX)	y	y	MAY	[job-prog] §4.4	§8.2.20
ipp-attribute-fidelity	boolean	y	-	MUST	[RFC2911] §3.2.1.1	§8.1.1
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	§8.2.21
[job-]document-access-errors	1setOf text(MAX)	y	y	MAY	[RFC2911] §4.3.11	§8.2.22
job-id	integer(1:MAX)	y	y	MUST	[RFC2911] §4.3.2	§8.2.23
[job-]impressions	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.2	§8.2.24
[job-]impressions-completed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.2	§8.2.25
[job-]k-octets	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.1	§8.2.26
[job-]k-octets-processed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.1	§8.2.27

³² 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.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform-ance	Reference	
					Job Description Attr	Doc Desc.
job-mandatory-attributes	1setOf type2 keyword	y	-	MAY		§8.1.2
[job-]media-sheets	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.3	§8.2.28
[job-]media-sheets-completed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.3	§8.2.29
job-message-from-operator	text(127)	y	- ³³	MAY	[RFC2911] §4.3.16	
[job-]more-info	uri	y	y	MAY	[RFC2911] §4.3.4	§8.2.30
job-name (r/w)	name(MAX)	y	- ³⁴	MUST	[RFC2911] §4.3.5	
job-originating-user-name	name (MAX)	y	-	MUST	[RFC2911] §4.3.6	
job-password	octetString(255)	y ³⁵	-	MAY	[prod-print2] §4.1	
job-password-encryption	type3 keyword name(MAX)	y ³⁶	-	MAY	[prod-print2] §4.2	
job-printer-make-and-model	text(127)	y	-	CMUST ₃₇	[RFC2911] §4.3.14.4	
[job-]printer-up-time	integer (1:MAX)	y	y	MUST	[RFC2911] §4.3.14.4	§8.2.31
job-printer-uri	uri	y	y	MUST	[RFC2911] §4.3.3	§8.2.32
job-state	type1 enum	y	- ³⁸	MUST	[RFC2911] §4.3.7	§8.2.16
job-state-message	text(MAX)	y	- ³⁹	MAY	[RFC2911] §4.3.9	§8.2.17
job-state-reasons	1setOf type2 keyword	y	- ⁴⁰	MUST	[RFC2911] §4.3.8	§8.2.18
job-uri	uri	y	y ⁴¹	MUST	[RFC2911] §4.3.1	§8.2.33
[job-]warnings-count	integer(0:MAX)	y	y	MAY	[override] §6.1	§8.2.34
last-document	boolean	-	y	MAY	[RFC2911] §4.3.12	§8.2.35
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	y	MAY	[RFC2911] §4.3.7.2	§8.2.36
sheet-completed-copy-number	integer(0:MAX)	y	y	MAY	[job-prog] §4.2	§8.2.37

³³ 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 **Error! Reference source not found.**) to communicate with each other.

³⁴ The Document Description attribute that corresponds to the “job-name” Job Description attribute is the (existing) “document-name” attribute defined in [RFC2911].

³⁵ ISSUE 08: Need to add “job-password” to [prod-print2] as a Job Description attribute to go along with the Operation attribute with suitable security in Get-Job-Attributes response in order to align with the PWG Semantic Model, OK?

³⁶ ISSUE 09: Need to add “job-password-encryption” to [prod-print2] as a Job Description attribute to go along with the Operation attribute with suitable security in Get-Job-Attributes response in order to align with the PWG Semantic Model, OK?

³⁷ The “job-printer-make-and-model” Job Description attribute MUST be supported if the “job-save-disposition” Job Template attribute is supported.

³⁸ The Document Description attribute that corresponds to the “job-state” Job Description attribute is the (new) “document-state” attribute.

³⁹ The Document Description attribute that corresponds to the “job-state-message” Job Description attribute is the (new) “document-state-message” attribute.

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

⁴¹ The “job-uri” Document Description attribute is a copy of the “job-uri” Job Description attribute of the job that contains this Document.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform-ance	Reference	
					Job Description Attr	Doc Desc.
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	§8.2.38
time-at-creation	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.1	§8.2.39
time-at-processing	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.2	§8.2.40

1462 "" See the description in the Legend before the table.

1463
 1464 Most of the existing "job-state" and "job-state-reasons" Job Description attribute values apply equally well to
 1465 individual documents in a multi-document job (with removal of the 'job-' prefix for those that apply to both Job and
 1466 Document). Furthermore, the job states are completely service-type neutral, so they can apply to scanning, faxing,
 1467 formatting processes as well. The job state reasons have a number of reasons that are print service specific, but
 1468 most can apply to other types of service as well. The reason for separating state from reasons, is so that the states
 1469 can be the fundamental states that most implementations have, while the state reasons can vary depending on the
 1470 sophistication of the system. The states are the ones that clients are most likely to base actions upon, and the state
 1471 reasons are more information, both for programs and people.

1472 The descriptions of the new "document-state" and "document-state-reasons" attributes are merged in with the
 1473 existing "job-state" and "job-state-reasons". Such merging shows the parallelism in the description to aid
 1474 understanding and implementation and so that future maintenance will continue this strong parallelism. The "/"
 1475 character separates the words: Job from Document so that the same description can serve for both Job and
 1476 Document objects.

1477 **8.1 Job Description attributes**

1478 This section contains *only* the Job Description attributes that are defined in this specification and are not defined in
 1479 any other specification.

1480 **8.1.1 ipp-attribute-fidelity (boolean)**

1481 This REQUIRED Job Description attribute indicates the value of the corresponding "ipp-attribute-fidelity" operation
 1482 attribute that the client supplied in the Job Creation operation. This Job Description attribute has no effect on the
 1483 processing of the job once the Job Creation and Document Creation operations have been accepted. However, this
 1484 attribute does provide an audit capability to the user and service desk for comparing unexpected printed results with
 1485 what was submitted.

1486 **8.1.2 job-mandatory-attributes (1setOf type2 keyword)**

1487 This OPTIONAL Job Description attribute indicates which Job Template and Document Template attributes the client
 1488 required that the Printer honor in order to accept the Job Creation and subsequent Document Creation requests.
 1489 The Printer populates this attribute with the value of the corresponding "job-mandatory-attributes" operation attribute
 1490 (see section 4.3.2) supplied by the client in the Job Creation operation. This Job Description attribute has no effect
 1491 on the processing of the job once the Job Creation and Document Creation operations have been accepted.
 1492 However, this attribute does provide an audit capability to the user and service desk for comparing unexpected
 1493 printed results with what was submitted.

1494 8.2 Document Description attributes

1495 This section contains *all* of the Document Description attributes for use with the Document object. Most of these
1496 definitions refer to the corresponding Job Template attribute semantics in other specifications. However, the
1497 semantics of each Document Description attribute only applies to the Document object containing the Document
1498 Description attribute.

Important Implementer's note: The brief descriptions in this section are not a substitute for the detailed specification in the referenced specifications. You need to read the referenced specifications when implementing!

1499 8.2.1 attributes-charset (charset)

1500 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1501 attribute (see [RFC2911] §4.3.19) applied to the Document object. The Printer sets this Document Description
1502 attribute from the corresponding operation attribute supplied by the client in the Document Creation operation (see
1503 section 3.1).

1504 8.2.2 attributes-natural-language (naturalLanguage)

1505 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1506 attribute (see [RFC2911] §4.3.20) applied to the Document object. The Printer sets this Document Description
1507 attribute from the corresponding operation attribute supplied by the client in the Document Creation operation (see
1508 section 3.1).

1509 8.2.3 compression (type3 keyword)

1510 This REQUIRED Document Description attribute specifies the compression used to represent this document (see
1511 [RFC2911] §3.2.1.1). The Printer sets this Document Description attribute from the corresponding operation attribute
1512 supplied by the client in the Document Creation operation (see section 3.1).

1513 8.2.4 current-page-order (type2 keyword)

1514 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1515 attribute (see [prod-print] §4.1) applied to the Document object.

1516 8.2.5 date-time-at-completed (dateTime)

1517 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1518 attribute (see [RFC2911] §4.3.14.7) applied to the Document object.

1519 8.2.6 date-time-at-creation (dateTime)

1520 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1521 attribute (see [RFC2911] §4.3.14.5) applied to the Document object.

1522 8.2.7 date-time-at-processing (dateTime)

1523 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1524 attribute (see [RFC2911] §4.3.14.6) applied to the Document object.

1525 8.2.8 document-format (mimeMediaType)

1526 This REQUIRED Document Description attribute specifies the document format (see [RFC2911] §3.2.1.1) for the
1527 Document object. The Printer sets this Document Description attribute from the corresponding operation attribute
1528 supplied by the client in the Document Creation operation (see section 3.1).

1529 8.2.9 document-format-detail (collection)

1530 **ISSUE 04: Is the definition of "document-format-detail" OK?**

1531 This OPTIONAL Document Description attribute provides additional information about the document format or
1532 document formats in the Document object. The member attributes of the "document-format-detail" attribute are:

1533 **Table 10 - "document-format-detail" member attributes**

Member Attribute Name	Attribute Syntax	Present	Printer Support
document-format	mimeMediaType	MUST	MUST
document-format-version	text(127)	MAY	MUST
document-format-natural-languages	1setOf naturalLanguage	MAY	MUST
platform	type3 keyword name(MAX)	MAY	MUST
device-id	text(127)	MAY	MUST
document-format-details	1setOf collection	MAY	MUST - If the Printer support a format that contains other document formats

1534

1535 8.2.9.1 document-format (mimeMediaType)

1536 This REQUIRED member attribute contains the MIME Media Type of the top level document content. The
1537 standard values for this attribute are Internet Media types (sometimes called MIME types). For further details
1538 see the description of the 'mimeMediaType' attribute syntax in [RFC2911] section 4.1.9.

1539 If it is a MIME Media Type, such as 'multipart/related' or 'application/zip', that is a container format that
1540 contains document parts, the "document-format-details" member attribute described each part.

1541 8.2.9.2 document-format-version (text(127))

1542 This REQUIRED member attribute contains the level or version of the document format. For example, the
1543 value for PostScript level 3 would be: "3" and for PCL 5e would be '5e'.

1544 8.2.9.3 document-format-natural-languages (1setOf naturalLanguage)

1545 This REQUIRED member attribute contains the natural language(s) of the document. The Printer MAY use
1546 this value to select fonts or other Globalization processing.

1547 8.2.9.4 platform (type3 keyword | name(MAX))

1548 **ISSUE 05: Should we call this member attribute "os-type", instead of "platform", in order to agree with the**
1549 **PWG Printer Installation Extension (see draft-ietf-ipp-install-04.txt)?**

1550 This REQUIRED member attribute identifies the operating system type the of platform on which the
1551 document was generated. Valid values are the operating system names defined in the IANA document [os-

1552 names] and the special keyword value: 'unknown'. Although the IANA registry requires that the names be all
 1553 upper-case, the values MUST be all lower case in this field since they are IPP keywords (plus hyphen-minus
 1554 (-), period (.), and slash (/)). Examples: 'linux', 'linux-2.2', 'os/2', 'mac', 'mac-x', 'sun-os-4.0', 'unix', 'unix-
 1555 bsd', 'win32', 'windows-95', 'windows-98', 'windows-ce', 'windows-nt', 'windows-nt-4', 'windows-nt-5',
 1556 'windows-2000', and 'unknown'.

1557 **8.2.9.5 device-id (text(127))**

1558 This REQUIRED member attribute identifies the type of device for which the document was formatted,
 1559 including manufacturer and model. The value of this variable MUST exactly match the IEEE 1284-2000
 1560 Device ID string, except the length field MUST not be specified. See the Microsoft Universal Plug and Play
 1561 [upnp] section 2.2.6 DeviceId parameter for details and examples.

1562 **8.2.9.6 document-format-details (1setOf collection)**

1563 This member attribute identifies the document format details of the body parts, if the top level document
 1564 format is a container types, such as 'multipart/related' or 'application/zip'. The Printer MUST support this
 1565 member attribute if it supports a container MIME type.

1566 The member attributes defined for this collection are the same as those defined for "document-format-detail"
 1567 itself, i.e., a recursive definition. But there MUST NOT be any duplicate collection values at the same level;
 1568 its a set, not a sequence. So 100 PostScript files with the same details in a .zip file would have
 1569 'application/zip' as the top level MIME type with its details and only one value of the "document-format-
 1570 details" member attribute with PostScript details.

1571 **8.2.10 document-format-detected (mimeMediaType)**

1572 This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format of
 1573 the Document object. This value will differ from the value submitted by the client or defaulted by the Printer, if the
 1574 Printer automatically senses the document format by examining the document content, such as when the "document-
 1575 format" attribute has the value: 'application/octet-stream' (see [RFC2911] section 4.1.9.1). Before the document
 1576 format is known, the Printer populates this attribute with a zero length string.

1577 **8.2.11 document-id-uri (uri)**

1578 This REQUIRED Document Description attribute is generated by the Printer as a unique URI to identify a Document
 1579 object, in the same way that the "job-uri" (uri) Job Description attribute uniquely identifies a Job object. Unlike the
 1580 "job-uri" (uri) attribute, the client cannot supply this attribute as a target of an operation.

1581 **8.2.12 document-message (text(MAX))**

1582 This OPTIONAL Document Description contains a message from the user to the operator or a message from the
 1583 operator or administrator system administrator or "intelligent" process to indicate to the end user the reasons for
 1584 modification or other management action taken on the Document. The Printer populates this Document Description
 1585 attribute from the "document-message" (text(MAX) operation attribute value supplied by the client in any of the
 1586 Document Creation operations (see section 3.1.1) or in a Cancel-Documents operation (see section 3.8).

1587 In addition, the user and the operator can set the value of this Document Description attribute explicitly using the Set-
 1588 Document-Attributes operation (see section 3.7).

1589 **8.2.13 document-name (name(MAX))**

1590 This REQUIRED Document Description attribute specifies the name of the document (see [RFC2911] §3.2.1.1).
 1591 The Printer sets this Document Description attribute from the corresponding operation attribute supplied by the client
 1592 in the Document Creation operation (see section 3.1).

1593 This attribute may be modified by a client using the Set-Documents-Attributes operation (see section 3.7).

1594 **8.2.14 document-natural-language (naturalLanguage)**

1595 This OPTIONAL Document Description attribute specified the natural language of the document (see [RFC2911]
 1596 §3.2.1.1). The Printer sets this Document Description attribute from the corresponding operation attribute supplied
 1597 by the client in the Document Creation operation (see section 3.1).

1598 **8.2.15 document-number (integer(1:MAX))**

1599 This REQUIRED Document Description attribute is the ordinal number of the document within the job which
 1600 determines its order of being printed in a multi-document job. The Printer MUST generate the values monotonically
 1601 increasing from 1 for each job.

1602 **8.2.16 document-state (type1 enum) and job-state (type1 enum)**

1603 The REQUIRED "job-state" and the REQUIRED "document-state" attribute identify the current state of the job and
 1604 document, respectively. Even though IPP defines seven values for job/document states (plus the out-of-band
 1605 'unknown' value - see [RFC2911] section 4.1), implementations only need to support those states which are
 1606 appropriate for the particular implementation. In other words, an IPP Printer object implementation supports only
 1607 those job/document states implemented by the output device and available to the IPP Printer object implementation.

1608 Table 11 lists the "job-state" and "document-state" attribute values.

1609 **Table 11 - "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

1610

1611 The (JD) and (J) notation below indicates whether the keyword is defined for the "job-state" and "document-state"
 1612 attributes or just the "job-state" attribute as indicated in Table 11. 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-

Value	Symbolic Name and Description
'5'	<p>state" attribute.</p> <p>'processing' (JD): One or more of:</p> <ol style="list-style-type: none"> 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. <p>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.</p> <p>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.</p> <p>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.</p>
'6'	<p>'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.</p> <p>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.</p> <p>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.</p> <p>The 'processing-stopped' state does not apply to the Document object's "document-state" attribute.</p>
'7'	<p>'canceled' (JD): The job/document has been canceled by a Cancel-Job/Cancel-Document operation and the Printer object has completed canceling the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is canceling the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' value and one of the 'canceled-by-user', 'canceled-by-operator', or 'canceled-at-device' value. When the job/document moves to the 'canceled' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'canceled-by-xxx', if present, MUST remain.</p>
'8'	<p>'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</p>

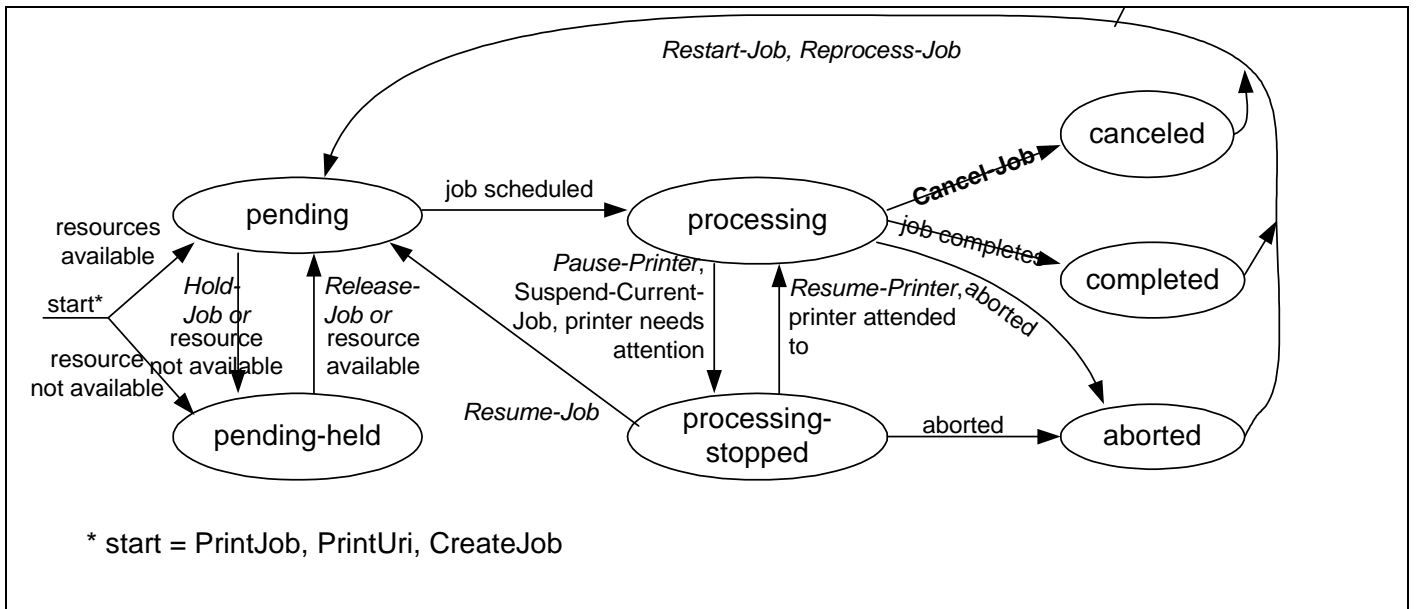
Value	Symbolic Name and Description
'g'	<p>completed aborting the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is aborting the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" 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.</p> <p>'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.</p>

1613 The final value for this attribute MUST be one of: 'completed', 'canceled', or 'aborted' before the Printer removes the
 1614 job/document altogether. The length of time that jobs/document remain in the 'canceled', 'aborted', and 'completed'
 1615 states depends on implementation.

1616 Jobs/documents reach one of the three terminal states: 'completed', 'canceled', or 'aborted', after the jobs/documents
 1617 have completed all activity, including stacking output media, after the jobs/documents have completed all activity,
 1618 and all job/document status attributes have reached their final values for the job/document.

1619 **8.2.16.1 The "job-state" Job Description attribute and the Job Life Cycle**

1620 The "job-state" attribute is one of the most important Job Description attributes. Figure 1 shows the values of the
 1621 "job-state" attribute and the Job object life cycle as affected by actions on the Job, Printer, and job processing.



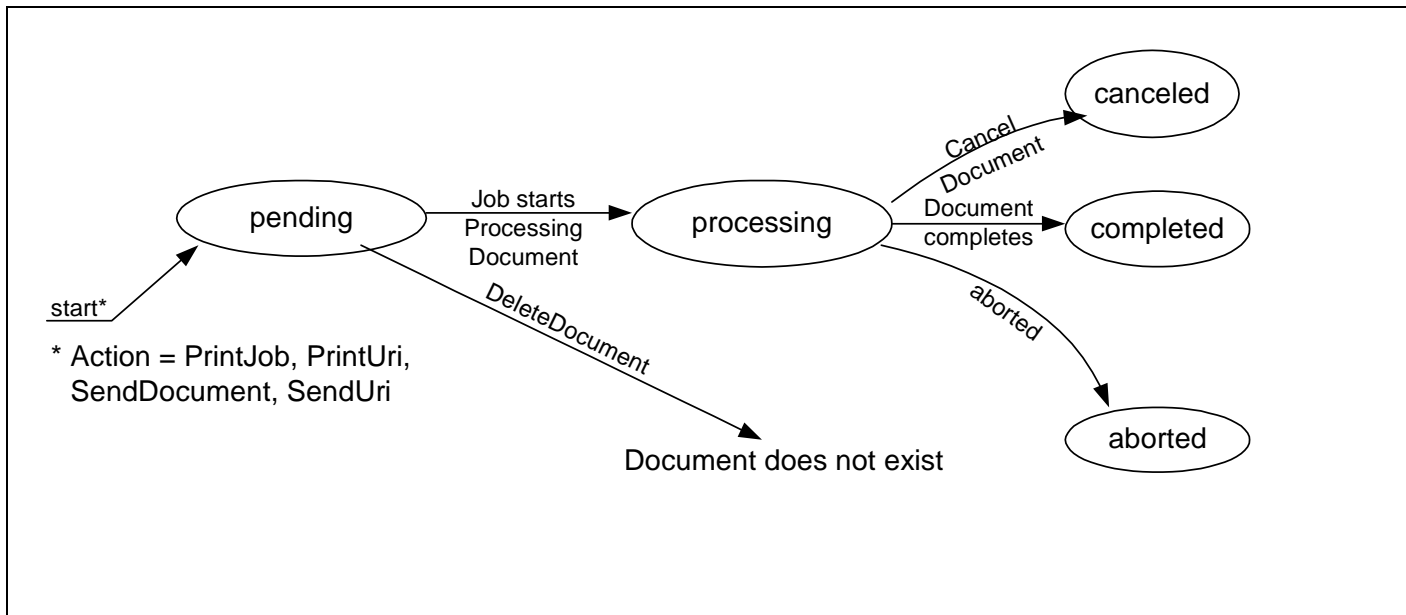
1622
 1623 **Figure 1 - The "job-state" Job Description attribute and the Job object life cycle**

1624 Normally a job progresses from left to right. Other state transitions are unlikely, but are not forbidden. Not shown
 1625 are the transitions to the 'canceled' state from the 'pending', 'pending-held', and 'processing-stopped' states.

1626 **8.2.16.2 The “document-state” Document Description attribute and the Document object life Cycle**

1627 The “document-state” attribute is one of the most important Document Description attributes. Figure 2 shows the
 1628 values of the “document-state” attribute and the Document object life cycle as affected by actions on the Job,
 1629 Document, Printer, and job processing. Documents are not active objects and their life cycle is closely tied to the
 1630 lifecycle of a Job⁴². Documents basically have three states. The first is waiting to be processed by a Job (i.e.
 1631 pending). The second state is from the time the Job first starts processing the Document (i.e., processing) and until it
 1632 reaches one of its terminal states. The third state for a Document is one of its terminal states (i.e., completed,
 1633 canceled, or aborted).

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1636

1637 **Figure 2 - The “document-state” Document Description attribute and the Document object life Cycle**

1638

1638 A Document object has a much simpler life cycle than a Job object. A Document always progresses from left to right
 1639 in the state diagram. No other state transitions are defined.

1639

1640 **8.2.16.3 Forwarding Servers**

1641 As with all other IPP attributes, if the implementation can not determine the correct value for this attribute, it SHOULD
 1642 respond with the out-of-band value 'unknown' (see [RFC2911] Section 4.1) rather than try to guess at some possibly
 1643 incorrect value and give the end user the wrong impression about the state of the Job/Document object. For
 1644 example, if the implementation is just a gateway into some printing system from which it can normally get status, but
 1645 temporarily is unable, then the implementation should return the 'unknown' value. However, if the implementation is
 1646 a gateway to a printing system that never provides detailed status about the print job/document, the implementation
 1647 MAY set the IPP Job/Document object's state to 'completed', provided that it also sets the 'queued-in-device' value in
 1648 the job's/document's "job-state-reasons"/"document-state-reasons" attribute (see "job-state-reasons"/"document-
 1649 state-reasons" attribute below).

⁴² 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.

1650 8.2.16.4 Partitioning of Job/Document States

1651 This section partitions the job/document states into phases: Job/Document Not Completed, Job/Document
1652 Retention, Job/Document History, and Job/Document Removal. This section also explains the 'job-restartable' value
1653 of the "job-state-reasons" Job Description attribute for use with the Restart-Job operation.

1654 **Job/Document Not Completed:** When a job is in the 'pending', 'pending-held', 'processing', or 'processing-stopped'
1655 states, the job is not completed. When a Document is in the 'pending' or 'processing' state, it is not completed.

1656 **Job Retention:** When a job enters one of the three terminal job states: 'completed', 'canceled', or 'aborted', the IPP
1657 Printer object MAY "retain" the job in a restartable condition for an implementation-defined time period. This time
1658 period MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention. While
1659 in the Job Retention phase, the job's document data is retained and a client may restart the job using the Restart-Job
1660 operation. If the Printer supports the Restart-Job operation, then it SHOULD indicate that the job is restartable by
1661 adding the 'job-restartable' value to the job's "job-state-reasons" attribute (see section 8.2.18) during the Job
1662 Retention phase. If the Printer supports the Document object, then the Get-Document-Attributes and Get-
1663 Documents operations MUST be supported while the job is in the Job Retention phase.

1664 **Job History:** After the Job Retention phase expires for a job, the Printer object deletes the document data for the
1665 job and the job becomes part of the Job History. The Printer object MAY also delete any number of the job and
1666 document attributes. Since the job is no longer restartable, the Printer object MUST remove the 'job-restartable'
1667 value from the job's "job-state-reasons" attribute, if present. If the implementation supports the Document object, it
1668 SHOULD retain at least the "document-state" and "document-state-reasons" attributes on the Document object
1669 during the Job History phase which can be queried using the Get-Document-Attributes and Get-Documents
1670 operations.

1671 **Job Removal:** After the job has remained in the Job History for an implementation-defined time, such as when the
1672 number of jobs exceeds a fixed number or after a fixed time period (which MAY be zero seconds), the IPP Printer
1673 removes the Job and Document objects from the system.

1674 Using the Get-Jobs/Get-Documents operation and supplying the 'not-completed' value for the "which-jobs" operation
1675 attribute, a client is requesting jobs/documents in the Job/Document Not Completed phase. Using the Get-Jobs/Get-
1676 Documents operation and supplying the 'completed' value for the "which-jobs" operation attribute, a client is
1677 requesting jobs/documents in the Job Retention and Job History phases. Using the Get-Job-Attributes/Get-
1678 Document-Attributes operation, a client is requesting a job/documents in any phase except Job Removal. After Job
1679 Removal, the Get-Job-Attributes/Get-Document-Attributes and Get-Jobs/Get-Documents operations no longer are
1680 capable of returning any information about a job/document.

1681 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

1682 8.2.17 document-state-message (text(MAX)) and job-state-message (text(MAX))

1683 This OPTIONAL attribute specifies information about the "job-state"/"document-state" and "job-state-
1684 reasons"/"document-state-reasons" attributes in human readable text. If the Printer object supports this attribute, the
1685 Printer object MUST be able to generate this message in any of the natural languages identified by the Printer's
1686 "generated-natural-language-supported" attribute (see the "attributes-natural-language" operation attribute specified
1687 in [RFC2911] Section 3.1.4.1).

1688 The value SHOULD NOT contain additional information not contained in the values of the "job-state" and "job-states-
1689 reasons" attributes, such as interpreter error information. Otherwise, application programs might attempt to parse the
1690 (localized text). For such additional information such as interpreter errors for application program consumption or
1691 specific document access errors, new attributes with keyword values, needs to be developed and registered.

1692 **8.2.18 document-state-reasons (1setOf type2 keyword) and job-state-reasons(1setOf type2**
 1693 **keyword)**

1694 The REQUIRED "job-state-reasons" and the REQUIRED "document-state-reasons" attributes provide additional
 1695 information about the job's and each document's current state, i.e., information that augments the value of the job's
 1696 "job-state" attribute and each Document's "document-state" attribute, respectively. The Printer SHOULD support the
 1697 same values for both the "job-state-reasons" and the "document-state-reasons" attribute for those attributes that are
 1698 defined for both as indicated in the "Job" and "Doc" columns in Table 12.

1699 These values MAY be used with any job or document state or states for which the reason makes sense. Some of
 1700 these value definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when
 1701 implemented, the Printer MUST return these values when the reason applies and MUST NOT return them when the
 1702 reason no longer applies whether the value of the Job's "job-state" attribute or the Document's "document-state"
 1703 attribute changed or not. When the Job or Document does not have any reasons for being in its current state, the
 1704 value of the Job's "job-state-reasons" attribute or Document's "document-state-reasons" attribute MUST be 'none'.

1705 Some of the Job's "job-state-reasons" values affect job scheduling, such as 'resources-are-not-ready' and 'job-hold-
 1706 until-specified'. However, "document-state-reasons" values MUST NOT affect job scheduling, since Document
 1707 objects are passive objects operated on by the containing Job object.

1708 Note: While values cannot be added to the "job-state" or "document-state" attributes without impacting deployed
 1709 clients that take actions upon receiving "job-state" or "document-state" values, it is the intent that additional "job-
 1710 state-reasons" and "document-state-reasons" values can be defined and registered without impacting such deployed
 1711 clients. In other words, the "job-state-reasons" and the "document-state-reasons" attributes are intended to be
 1712 extensible.

1713 Table 12 lists the standard keyword values for the "job-state-reasons" and/or "document-state-reasons" attributes
 1714 defined in this and other IPP specifications as indicated in the References column. In Table 12 the keywords are
 1715 listed in alphabetic order (observing the "[job-]" prefix), while in their descriptions following Table 12, they are listed in
 1716 the most likely order of occurrence to help understanding.

1717 When the Document object is supported, the Printer implementation SHOULD still support the corresponding Job
 1718 level "job-state-reasons", so that clients that do not support the Document object will receive the same information.
 1719 Also it is usually more convenient for the client to obtain just the Job level status. However, the client SHOULD
 1720 query both Job and Document attributes and convert them to some canonical form for display to the user, so that all
 1721 Jobs and their Documents are displayed in a uniform manner, no matter from which clients they were submitted.

1722 **Notation:**

- 1723 [job-] indicates a state reason keyword value that has the 'job-' prefix when it is a value of the "job-state-reasons"
 1724 attribute, but does not have the 'job-' prefix when it is a value of the "document-state-reasons" attribute⁴³.
- 1725 For purposes of sorting in Table 12, the "[job-]" prefix is observed, since this is an IPP specification.
- 1726 "-" indicates that the Job or Document value is *not* defined.

1727 **Table 12 - "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	- ⁴⁴	MUST	[RFC2911] §4.3.8
document-state-reasons	1setOf type2 keyword	-	y	MUST	8.2.18

⁴³ 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.

⁴⁴ 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
	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
	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	-	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

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For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely to occur (if implemented), starting with the 'none' value. Note: The order is improved over that in [RFC2911]. The

1731 (JD), (J), and (D) notation is identical to the "Job" and "Doc" columns in Table 12 indicating whether the keyword is
1732 defined for the "job-state-reasons" and/or "document-state-reasons" attributes:

- 1733 **'none' (JD):** There are no reasons for the job's or document's current state. This state reason is
1734 semantically equivalent to "job-state-reasons" or "document-state-reasons" attribute without any
1735 value and MUST be used when there is no other value, since the 1setOf attribute syntax requires at
1736 least one value.
- 1737 **'job-hold-until-specified' (J):** The value of the job's "job-hold-until" attribute was specified with a time
1738 period that is still in the future. The job MUST NOT be a candidate for processing until this reason is
1739 removed and there are no other reasons to hold the job. This value SHOULD be supported if the
1740 "job-hold-until" Job Template attribute is supported.
- 1741 **'job-password-wait' (J):** The Job is currently being held until the correct password is entered at the device.
1742 If the "job-password" (octetString(255)) Operation attribute (See [prod-print2] section 4.1) is
1743 supported, this value MUST be supported.
- 1744 **'proof-print-wait' (J):** The job is currently being held until the operator verifies the output of the proof print
1745 and performs a Release-Job operation. If the "proof-print" (collection) Job Template attribute (See
1746 [prod-print2] section 5.9) is supported, this value MUST be supported.
- 1747 **'resources-are-not-supported' (JD):** At least one of the resources needed by the job/document, such as
1748 media, fonts, resource objects, etc., is not supported on any of the physical printers for which the
1749 job/document is a candidate. This condition MAY be detected when the job/document is accepted,
1750 or subsequently while the job/document is pending or processing, depending on implementation.
1751 The job/document may (1) remain in its current state, (2) be moved to the 'pending-held' state,
1752 depending on implementation and/or job scheduling policy, or (3) scheduled normally, but the Printer
1753 is put into the 'stopped' state when the job/document is attempted to be processed on the Printer.
1754 This value is intended for use with an implementation that supports the "user-defined-values-
1755 supported" Printer attribute (see [prod-print] section 6.1) which allows a job to be accepted with an
1756 unsupported 'name' value.
- 1757 **'resources-are-not-ready' (JD):** At least one of the resources needed by the job/document, such as media,
1758 fonts, resource objects, etc., is not ready on any of the physical printer's for which the job/document
1759 is a candidate. This condition MAY be detected when the job/document is accepted, or
1760 subsequently while the job/document is pending or processing, depending on implementation. The
1761 job/document may remain in its current state or be moved to the 'pending-held' state, depending on
1762 implementation and/or job/document scheduling policy.
- 1763 **'[job-]incoming' (JD):** Either (1) the Printer has accepted the Create-Job operation and is expecting
1764 additional Send-Document and/or Send-URI operations or (2) the Printer is retrieving/accepting
1765 document data as a result of a Print-Job, Print-URI, Send-Document or Send-URI operation.
- 1766 **'[job-]spooling' (JD):** Same as 'job-incoming' with the specialization that the Printer is spooling the
1767 Job/Document data before processing it. This value corresponds to the 'spool' or 'automatic' value of
1768 the "job-spooling-supported" Printer Description attribute.
- 1769 **'[job-]streaming' (JD):** Same as 'job-incoming' with the specialization that the Printer is processing the
1770 Job/Document data as it is being received (that is, the document is not being spooled, but rather is
1771 being processed in chunks by the output device and is being imaged during reception). This value
1772 corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer Description
1773 attribute.
- 1774 **'job-data-insufficient' (J):** The Create-Job operation has been accepted by the Printer, but the Printer is
1775 expecting additional document data before it can move the job into the 'processing' state. If a Printer
1776 starts processing before it has received all data, the Printer removes the 'job-data-insufficient'
1777 reason, but the 'job-incoming' remains. If a Printer starts processing after it has received all data, the
1778 Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at the same time.

- 1779 **'unsupported-compression' (JD):** The job/document was aborted by the system because the Printer
 1780 determined while attempting to decompress the document-data's that the compression is actually not
 1781 among those supported by the Printer. This value MUST be supported, since "compressions is a
 1782 REQUIRED operation attribute.
- 1783 **'compression-error' (JD):** The job/document was aborted by the system because the Printer encountered
 1784 an error in the document-data while decompressing it. If the Printer posts this reason, the document-
 1785 data has already passed any tests that would have led to the 'unsupported-compression' job-state-
 1786 reason/document-state-reason.
- 1787 **'document-access-error' (JD):** After accepting a Print-URI or Send-URI request, the Printer could not
 1788 access one or more documents passed by reference. This reason is intended to cover any file
 1789 access problem, including file does not exist and access denied because of an access control
 1790 problem. The Printer MAY also indicate the document access error using the "job-document-access-
 1791 errors" Job Description attribute (see the description of "job-document-access-errors" above).
 1792 Whether the Printer aborts the job/document and moves the job/document to the 'aborted' job state
 1793 or prints all documents that are accessible and moves the job/document to the 'completed'
 1794 job/document state and adds the 'completed-with-errors' value in the job's "job-state-reasons" or
 1795 document's "document-state-reasons" attribute depends on implementation and/or site policy. This
 1796 value SHOULD be supported if the Print-URI or Send-URI operations are supported.
- 1797 **'unsupported-document-format' (JD):** The job/document was aborted by the system because the
 1798 document-data's document-format is not among those supported by the Printer. If the client
 1799 specifies the document-format as 'application/octet-stream', the printer MAY abort the job/document
 1800 and post this reason even though the format is a member of the "document-format-supported" printer
 1801 attribute, but not among the auto-sensed document-formats. This value MUST be supported, since
 1802 "document-format" is a REQUIRED operation attribute.
- 1803 **'document-format-error' (JD):** The job/document was aborted by the system because the Printer
 1804 encountered an error in the document-data while processing it. If the Printer posts this reason, the
 1805 document-data has already passed any tests that would have led to the 'unsupported-document-
 1806 format' job-state-reason/document-state-reason.
- 1807 **'submission-interrupted' (JD):** The job or document was not completely submitted for some unforeseen
 1808 reason, such as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or
 1809 the document transfer method has crashed in some non-recoverable way before the document data
 1810 was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-
 1811 out period. See the description of the "multiple-operation-time-out" Printer attribute in [RFC2911]
 1812 Section 4.4.31.
- 1813 **'[job-]outgoing' (JD):** The Printer is transmitting the job/document to the output device.
- 1814 **'job-scheduling' (J):** The printer is in the process of scheduling the processing for the Job.
- 1815 **'[job-]queued' (JD):** Job is in the 'processing' state, but more specifically, the Printer has queued the
 1816 Document data.
- 1817 **'[job-]transforming' (JD):** Job/document is in the 'processing' state, but more specifically, the Printer is
 1818 interpreting document data and producing another electronic representation.
- 1819 **'[job-]interpreting' (JD):** Job/document is in the 'processing' state, but more specifically, the Printer is
 1820 interpreting the document data.
- 1821 **'[job-]queued-for-marker' (JD):** Job/document is in any of the 'pending-held', 'pending', or 'processing'
 1822 states, but more specifically, the Printer has completed enough processing of the document to be
 1823 able to start marking and the job/document is waiting for the marker. Systems that require human
 1824 intervention to release jobs using the Release-Job operation, put the job into the 'pending-held' job
 1825 state. Systems that automatically select a job to use the marker put the job into the 'pending' job
 1826 state or keep the job in the 'processing' job state while waiting for the marker, depending on

- 1827 implementation. All implementations put the job/document into (or back into) the 'processing' state
1828 when marking does begin.
- 1829 **'[job-]printing' (JD):** The output device is marking media. This value is useful for Printers which spend a
1830 great deal of time processing (1) when no marking is happening and then want to show that marking
1831 is now happening or (2) when the job/document is in the process of being canceled or aborted while
1832 the job/document remains in the 'processing' state, but the marking has not yet stopped so that
1833 impression or sheet counts are still increasing for the job/document.
- 1834 **'printer-stopped-partly' (J):** The value of the Printer's "printer-state-reasons" attribute contains the value
1835 'stopped-partly'.
- 1836 **'printer-stopped' (J):** The value of the Printer's "printer-state" attribute is 'stopped'.
- 1837 **'job-suspending' (J):** The printer is in the process of moving the Job from a processing condition to a
1838 suspended condition where other jobs can be processed.
- 1839 **'job-suspended' (J):** The job has been suspended while processing using the Suspend-Current-Job
1840 operation and other jobs can be processed on the Printer. The Job can be resumed using the
1841 Resume-Job operation which removes this value. Note: Documents cannot be suspended and there
1842 is no Suspend-Current-Documents operation.
- 1843 **'job-suspended-by-operator' (J):** The Job has been indefinitely suspended by the printer operator.
- 1844 **'job-suspended-by-user' (J):** The Job has been indefinitely suspended by the user.
- 1845 **'job-suspended-by-system' (J):** The Job has been indefinitely suspended by the Printer's system software
1846 during normal processing of the job.
- 1847 **'job-resuming' (J):** The printer is in the process of moving the Job from a suspended condition to become a
1848 candidate for processing.
- 1849 **'[job-]canceled-by-user' (JD):** The job/document was canceled by the owner of the job using the Cancel-
1850 Job/Cancel-Documents request, i.e., by a user whose authenticated identity is the same as the value
1851 of the originating user that created the Job object, or by some other authorized end-user, such as a
1852 member of the job owner's security group. This 'job-canceled' value SHOULD be supported. The
1853 'canceled-by-user' value SHOULD be supported for the "document-state-reasons" attributes for use
1854 with the Cancel-Documents.
- 1855 **'[job-]canceled-by-operator' (JD):** The job/document was canceled by the operator using the Cancel-
1856 Job/Cancel-Documents request, i.e., by a user who has been authenticated as having operator
1857 privileges (whether local or remote). If the security policy is to allow anyone to cancel anyone's
1858 job/document, then these values may be used when the job/document is canceled by other than the
1859 owner of the job. For such a security policy, in effect, everyone is an operator as far as canceling
1860 jobs/documents is concerned. These values SHOULD be supported if the implementation permits
1861 canceling by other than the owner of the job.
- 1862 **'[job-]canceled-at-device' (JD):** The job/document was canceled by an unidentified local user, i.e., a user
1863 at a console at the device. This value SHOULD be supported if the implementation supports
1864 canceling jobs/documents at the console.
- 1865 **'aborted-by-system' (JD):** The job/document (1) is in the process of being aborted, (2) has been aborted by
1866 the system and placed in the 'aborted' state, or (3) has been aborted by the system and placed in the
1867 'pending-held' state, so that a user or operator can manually try the job/document again. This value
1868 SHOULD be supported.
- 1869 **'processing-to-stop-point' (J):** The requester has issued a Cancel-Job/Cancel-Documents operation or the
1870 Printer object has aborted the job/document, but is still performing some actions on the job/document
1871 until a specified stop point occurs or job/document termination/cleanup is completed.
1872 If the implementation requires some measurable time to cancel the job/document in the 'processing'
1873 or 'processing-stopped' job/document states, the Printer MUST use this value to indicate that the
1874 Printer object is still performing some actions on the job/document while the job/document remains in

- 1875 the 'processing' or 'processing-stopped' state. After all the job's/document's job/document
1876 description attributes have stopped incrementing, the Printer object moves the job/document from
1877 the 'processing' state to the 'canceled' or 'aborted' job/document states.
- 1878 **'service-off-line' (J):** The Printer is off-line and accepting no jobs. All 'pending' jobs are put into the
1879 'pending-held' state. This situation could be true if the service's or document transform's input is
1880 impaired or broken.
- 1881 **'[job-]warnings-detected' (JD):** If the Printer supports these values, the Printer MUST add the value to "job-
1882 state-reasons" / "document-state-reasons" when it generates the first warning message. That is, a
1883 single occurrence of this value is present in the "job-state-reasons" / "document-state-reasons" if the
1884 Printer has generated one or more warnings.
- 1885 **'[job-]completed-successfully' (JD):** The job/document completed successfully. There were no warnings
1886 or errors in printing. This value SHOULD be supported.
- 1887 **'[job-]completed-with-warnings' (JD):** The print part of the job/document completed with warnings
1888 (whether or not there were save errors). This value SHOULD be supported if the implementation
1889 detects warnings. [RFC2911]
- 1890 **'[job-]completed-with-errors' (JD):** The print part of the job/document completed with errors (and possibly
1891 warnings too) (whether or not there were save errors). This value SHOULD be supported if the
1892 implementation detects errors. [RFC2911]
- 1893 **'job-saving' (J):** The Printer is transmitting the Job to the save location. This is similar to the 'job-printing'
1894 value.
- 1895 **'job-saved-successfully' (J):** The Printer saved the Job successfully.
- 1896 **'job-save-error' (J):** The Printer did not save the Job successfully (whether or not it was printed successfully,
1897 printed with warnings, printed with errors, or not printed). The Printer MUST ensure that none of the
1898 saved job is accessible, if it was unable to successfully save all of the job.
- 1899 **'job-restartable' (J):** This job is retained (see the description of "job-state" above, specifically "Partitioning of
1900 Job States") and is currently able to be restarted using the Restart-Job operation (see [RFC2911]
1901 Section 3.3.7). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the Printer
1902 MUST accept a Restart-Job operation for that job. This value SHOULD be supported if the Restart-
1903 Job operation is supported.
- 1904 **'queued-in-device' (JD):** The job/document has been forwarded to a device or print system that is unable to
1905 send back status. The Printer sets the job's/document's "job-state" / "document-state" attribute to
1906 'completed' and adds the 'queued-in-device' value to the job's/document's "job-state-reasons" /
1907 "document-state-reasons" attribute to indicate that the Printer has no additional information about the
1908 job/document and never will have any better information. See the description of the "job-state" /
1909 "document-state" attribute above, specifically the portion on "Forwarding Servers".
- 1910 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

1911 8.2.19 document-uri (uri)

1912 This Document Description attribute is the URI that the client supplied in the corresponding operation attribute in a
1913 Send-URI operation (see [RFC2911] section 3.3.2). The Printer MUST support this attribute if the Printer supports
1914 the Send-URI operation (see section 3.4).

1915 8.2.20 impressions-completed-current-copy (integer(0:MAX))

1916 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1917 attribute (see [job-prog] §4.4) applied to the Document object.

1918 **8.2.21 [job-]detailed-status-message (1setOf text (MAX))**

1919 This OPTIONAL “detailed-status-message” Document Description attribute has the same semantics as the
1920 corresponding “job-detailed-status-message” Job Description attribute (see [RFC2911] §4.3.10) applied to the
1921 Document object.

1922 **8.2.22 [job-]document-access-errors (1setOf text(MAX))**

1923 This OPTIONAL “document-access-errors” Document Description attribute has the same semantics as the
1924 corresponding “job-detailed-status-message” Job Description attribute (see [RFC2911] §4.3.11) applied to the
1925 Document object.

1926 **8.2.23 job-id (integer(1:MAX))**

1927 This REQUIRED document description attribute is a *copy* of the “job-id” Job Description attribute (See [RFC2911]
1928 §4.3.2) of the job that contains this Document.

1929 **8.2.24 [job-]impressions (integer(0:MAX))**

1930 This OPTIONAL “impressions” Document Description attribute has the same semantics as the corresponding “job-
1931 impressions” Job Description attribute (see [RFC2911] §4.3.17.2) applied to the Document object. The Printer sets
1932 this Document Description attribute from the corresponding operation attribute supplied by the client in the Document
1933 Creation operation (see section 3.1).

1934 **8.2.25 [job-]impressions-completed (integer(0:MAX))**

1935 This OPTIONAL “impressions-completed” Document Description attribute has the same semantics as the
1936 corresponding “job-impressions-completed” Job Description attribute (see [RFC2911] §4.3.18.2) applied to the
1937 Document object.

1938 **8.2.26 [job-]k-octets (integer(0:MAX))**

1939 This OPTIONAL “k-octets” Document Description attribute has the same semantics as the corresponding “job-k-
1940 octets” Job Description attribute (see [RFC2911] §4.3.17.1) applied to the Document object. The Printer sets this
1941 Document Description attribute from the corresponding operation attribute supplied by the client in the Document
1942 Creation operation (see section 3.1).

1943 **8.2.27 [job-]k-octets-processed (integer(0:MAX))**

1944 This OPTIONAL “k-octets-processed” Document Description attribute has the same semantics as the corresponding
1945 “job-k-octets-processed” Job Description attribute (see [RFC2911] §4.3.18.1) applied to the Document object.

1946 **8.2.28 [job-]media-sheets (integer(0:MAX))**

1947 This OPTIONAL “media-sheets” Document Description attribute has the same semantics as the corresponding “job-
1948 media-sheets” Job Description attribute (see [RFC2911] §4.3.17.3) applied to the Document object. The Printer sets
1949 this Document Description attribute from the corresponding operation attribute supplied by the client in the Document
1950 Creation operation (see section 3.1).

1951 **8.2.29 [job-]media-sheets-completed (integer(0:MAX))**

1952 This OPTIONAL “media-sheets” Document Description attribute has the same semantics as the corresponding “job-
1953 media-sheets-completed” Job Description attribute (see [RFC2911] 4.3.18.3) applied to the Document object.

1954 **8.2.30 [job-]more-info (uri)**

1955 This OPTIONAL "more-info" Document Description attribute has the same semantics as the corresponding "job-
1956 more-info" Job Description attribute (see [RFC2911] §4.3.4) applied to the Document object.

1957 **8.2.31 [job-]printer-up-time (integer (1:MAX))**

1958 This REQUIRED "printer-up-time" Document Description attribute indicates the amount of time (in seconds) that the
1959 Printer implementation has been up and running. This attribute is an alias for the "printer-up-time" Printer Description
1960 attribute (see [RFC2911] section 4.4.29).

1961 A client MAY request this attribute in a Get-Document-Attributes or Get-Documents request and use the value
1962 returned in combination with other requested Event Time Job Description Attributes in order to display time attributes
1963 to a user. The difference between this attribute and the 'integer' value of a "time-at-xxx" attribute is the number of
1964 seconds ago that the "time-at-xxx" event occurred. A client can compute the wall-clock time at which the "time-at-
1965 xxx" event occurred by subtracting this difference from the client's wall-clock time.

1966 **8.2.32 job-printer-uri (uri)**

1967 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1968 attribute (see [RFC2911] §4.3.3) applied to the Document object.

1969 **8.2.33 job-uri (uri)**

1970 This REQUIRED document description attribute is a copy of the "job-uri" Job Description attribute (see [RFC2911]
1971 §4.3.1.) of the job that contains this Document.

1972 **8.2.34 [job-]warnings-count (integer(0:MAX))**

1973 This OPTIONAL "warnings-count" Document Description attribute has the same semantics as the corresponding
1974 "job-warnings-count" Job Description attribute (see [override] §6.1.) applied to the Document object. See [override]
1975 §6.1.

1976 **8.2.35 last-document (boolean)**

1977 This OPTIONAL Document Description attribute indicates whether or not this Document is the last Document in the
1978 Job. See [RFC2911] §4.3.12. The Printer sets this Document Description attribute from the corresponding
1979 operation attribute supplied by the client in the Document Creation operation (see section 3.1).

1980 **8.2.36 output-device-assigned (name(127))**

1981 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1982 attribute (see [RFC2911] §4.3.7.2) applied to the Document object.

1983 **8.2.37 sheet-completed-copy-number (integer(0:MAX))**

1984 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1985 attribute (see [job-prog] §4.2) applied to the Document object.

1986 **8.2.38 time-at-completed (integer (MIN:MAX))**

1987 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1988 attribute (see [RFC2911] §4.3.14.3) applied to the Document object.

1989 **8.2.39 time-at-creation (integer (MIN:MAX))**

1990 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
 1991 attribute (see [RFC2911] §4.3.14.1) applied to the Document object.

1992 **8.2.40 time-at-processing (integer (MIN:MAX))**

1993 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
 1994 attribute (see [RFC2911] §4.3.14.2) applied to the Document object.

1995 **9 Printer attributes**

1996 This section lists *all* of the Printer attributes defined in other IPP documents. Printer attributes are divided into three
 1997 disjoint groups:
 1998

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.

1999 In a Get-Printer-Attributes request, a client can request all of the Printer attributes in the Job Template (JT) or Printer
 2000 Description (PD) groups by supplying the ‘job-template’ or ‘printer-description’ group name, respectively. The client
 2001 can also request “all”. The column labels are:
 2002

2003 **“Attribute Syntax”** - indicates the attribute syntax (see [RFC2911] section 4.1). Many “xxx-default” and “xxx-
 2004 supported” attributes have the ‘collection’ syntax which consists of a number of member attributes.
 2005 These member attributes are not listed in this table when they are the same as the corresponding
 2006 “xxx” attribute in Table 8. Only those few Printer attribute collection attributes that do not have a
 2007 corresponding Job Template attributes show the member attributes in this table.

2008 **“Grp”** - indicates to which group the attribute belongs.

2009 **“Printer Conf.”** - indicates the IPP/1.1 Printer conformance requirements for supporting the attribute. Those
 2010 attributes labeled as “MAY” may have conditional requirements that require their support, if the
 2011 Printer supports a related attribute, operation, or feature. For example, all Job Template attributes
 2012 are OPTIONAL for a Printer to support. However, if a Printer supports Job Template attribute “xxx”,
 2013 then it MUST also support the corresponding “xxx-default” and “xxx-supported” attributes. Similarly,
 2014 if Event Notification is supported, then some of the attributes indicated as “MAY” in this table become
 2015 MUST.

2016 **“Reference”** - lists the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

2017

Table 13 - 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
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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
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
media-col-database	1setOf collection	- ⁴⁵	MAY	[prod-print2] §7.6
<i>any "media-col" member attribute</i>				
media-col-default	collection	JT	MAY	[prod-print] §3.13.12
<i>any "media-col" member attribute</i>				
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
<i>any "media-col" member attribute</i>				
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

⁴⁵ 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
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
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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
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 [prod-print2] §8.1
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
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

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

2018

2019 **9.1 document-creation-attributes-supported (1setOf type2 keyword)**

2020 This Printer Description attribute lists the keyword names of the Document Template and Operation attributes that
 2021 the Printer will accept in the Create-Document, Send-Document, and Send-URI Document Creation operations.

2022 **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

IPP Printer Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
	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 ⁴⁶	[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 ⁴⁷	[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

2023

2024 This description is taken from [RFC2911] with additions from other IPP extension documents:

2025 This REQUIRED Printer attribute supplies additional detail about the device's state. Some of these value
 2026 definitions indicate conformance requirements; the rest are OPTIONAL.

2027 Each keyword value MAY have a suffix to indicate its level of severity. The three levels are: report (least severe),
 2028 warning, and error (most severe).

2029 **'-report'**: This suffix indicates that the reason is a "report". An implementation may choose to omit some or
 2030 all reports. Some reports specify finer granularity about the printer state; others serve as a precursor
 2031 to a warning. A report MUST contain nothing that could affect the printed output.

2032 **'-warning'**: This suffix indicates that the reason is a "warning". An implementation may choose to omit some
 2033 or all warnings. Warnings serve as a precursor to an error. A warning MUST contain nothing that
 2034 prevents a job from completing, though in some cases the output may be of lower quality.

⁴⁶ The 'moving-to-paused' value MUST be supported if the Pause-Printer operation is supported and it takes significant time to move to paused.

⁴⁷ The 'paused' value MUST be supported if the Pause-Printer operation is supported.

2035 **'-error'**: This suffix indicates that the reason is an "error". An implementation MUST include all errors. If this
 2036 attribute contains one or more errors, printer MUST be in the stopped state.

2037 If the implementation does not add any one of the three suffixes, all parties MUST assume that the reason is an
 2038 "error".

2039 If a Printer object controls more than one output device, each value of this attribute MAY apply to one or more of the
 2040 output devices. An error on one output device that does not stop the Printer object as a whole MAY appear as a
 2041 warning in the Printer's "printer-state-reasons attribute". If the "printer-state" for such a Printer has a value of
 2042 'stopped', then there MUST be an error reason among the values in the "printer-state-reasons" attribute.

2043 The following standard keyword values are defined (in alphabetical order):

2044 **'other'**: The device has detected an error other than one listed in this document.

2045 **'none'**: There are not reasons. This state reason is semantically equivalent to "printer-state-reasons" without
 2046 any value and MUST be used, since the 1setOf attribute syntax requires at least one value.

2047 **'connecting-to-device'**: The Printer object has scheduled a job on the output device and is in the process of
 2048 connecting to a shared network output device (and might not be able to actually start printing the job
 2049 for an arbitrarily long time depending on the usage of the output device by other servers on the
 2050 network).

2051 **'cover-open'**: One or more covers on the device are open.

2052 **'deactivated'**: A client has issued a Deactivate-Printer operation for the Printer object (see [adm-ops]
 2053 section 3.4.1) and the Printer is in the process of becoming deactivated or has become deactivated.
 2054 The Printer MUST reject all requests except Activate-Printer, queries (Get-Printer-Attributes, Get-
 2055 Job-Attributes, Get-Jobs, etc.), Send-Document, and Send-URI (so that partial job submission can
 2056 be completed - see [adm-ops] section 3.1.1) and return the 'server-error-service-unavailable' status
 2057 code.

2058 **'developer-empty'**: The device is out of developer.

2059 **'developer-low'**: The device is low on developer.

2060 **'door-open'**: One or more doors on the device are open.

2061 **'fuser-over-temp'**: The fuser temperature is above normal.

2062 **'fuser-under-temp'**: The fuser temperature is below normal.

2063 **'hold-new-jobs'**: The operator has issued the Hold-New-Jobs operation (see [adm-ops] section 3.3.1) or
 2064 other means, but the output-device(s) are taking an appreciable time to stop. Later, when all output
 2065 has stopped, the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-
 2066 paused' value in the "printer-state-reasons" attribute. This value MUST be supported, if the Hold-
 2067 New-Jobs operation is supported and the implementation takes significant time to pause a device in
 2068 certain circumstances.

2069 **'input-tray-missing'**: One or more input trays are not in the device.

2070 **'interlock-open'**: One or more interlock devices on the printer are unlocked.

2071 **'interpreter-resource-unavailable'**: An interpreter resource is unavailable (i.e. font, form)

2072 **'marker-supply-empty'**: The device is out of at least one marker supply. (e.g. toner, ink, ribbon)

2073 **'marker-supply-low'**: The device is low on at least one marker supply. (e.g. toner, ink, ribbon)

2074 **'marker-waste-almost-full'**: The device marker supply waste receptacle is almost full.

2075 **'marker-waste-full'**: The device marker supply waste receptacle is full.

2076 **'media-empty'**: At least one input tray is empty.

- 2077 **'media-jam'**: The device has a media jam.
- 2078 **'media-low'**: At least one input tray is low on media.
- 2079 **'media-needed'**: A tray has run out of media.
- 2080 **'moving-to-paused'**: Someone has paused the Printer object using the Pause-Printer operation (see
2081 [RFC2911] section 3.2.7) or other means, but the device(s) are taking an appreciable time to stop.
2082 Later, when all output has stopped, the "printer-state" becomes 'stopped', and the 'paused' value
2083 replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute. This value MUST be
2084 supported, if the Pause-Printer operation is supported and the implementation takes significant time
2085 to pause a device in certain circumstances.
- 2086 **'opc-life-over'**: The optical photo conductor is no longer functioning.
- 2087 **'opc-near-eol'**: The optical photo conductor is near end of life.
- 2088 **'output-area-almost-full'**: One or more output area is almost full (e.g. tray, stacker, collator).
- 2089 **'output-area-full'**: One or more output area is full. (e.g. tray, stacker, collator)
- 2090 **'output-tray-missing'**: One or more output trays are not in the device
- 2091 **'paused'**: Someone has paused the Printer object using the Pause-Printer operation (see [RFC2911] section
2092 3.2.7) or other means and the Printer object's "printer-state" is 'stopped'. In this state, a Printer
2093 MUST NOT produce printed output, but it MUST perform other operations requested by a client. If a
2094 Printer had been printing a job when the Printer was paused, the Printer MUST resume printing that
2095 job when the Printer is no longer paused and leave no evidence in the printed output of such a
2096 pause. This value MUST be supported, if the Pause-Printer operation is supported.
- 2097 **'shutdown'**: Someone has removed a Printer object from service, and the device may be powered down or
2098 physically removed. In this state, a Printer object MUST NOT produce printed output, and unless the
2099 Printer object is realized by a print server that is still active, the Printer object MUST perform no other
2100 operations requested by a client, including returning this value. If a Printer object had been printing a
2101 job when it was shutdown, the Printer NEED NOT resume printing that job when the Printer is no
2102 longer shutdown. If the Printer resumes printing such a job, it may leave evidence in the printed
2103 output of such a shutdown, e.g. the part printed before the shutdown may be printed a second time
2104 after the shutdown.
- 2105 **'spool-area-full'**: The limit of persistent storage allocated for spooling has been reached. The Printer is
2106 temporarily unable to accept more jobs. The Printer will remove this value when it is able to accept
2107 more jobs. This value SHOULD be used by a non-spooling Printer that only accepts one or a small
2108 number jobs at a time or a spooling Printer that has filled the spool space.
- 2109 **'stopped-partly'**: When a Printer object controls more than one output device, this reason indicates that one
2110 or more output devices are stopped. If the reason is a report, fewer than half of the output devices
2111 are stopped. If the reason is a warning, fewer than all of the output devices are stopped.
- 2112 **'stopping'**: The Printer object is in the process of stopping the device and will be stopped in a while. When
2113 the device is stopped, the Printer object will change the Printer object's state to 'stopped'. The
2114 'stopping-warning' reason is never an error, even for a Printer with a single output device. When an
2115 output-device ceases accepting jobs, the Printer will have this reason while the output device
2116 completes printing.
- 2117 **'timed-out'**: The server was able to connect to the output device (or is always connected), but was unable to
2118 get a response from the output device.
- 2119 **'toner-empty'**: The device is out of toner.
- 2120 **'toner-low'**: The device is low on toner.

2121 **10 New Values for Existing Printer Description Attributes**

2122 This section contains those attributes for which additional values are added.

2123 **10.1 operations-supported (1setOf type2 enum)**

2124 The following “operation-id” values are added in order to support the new operations defined in this document:

2125 **Table 14 – Operation-id assignments**

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

2126 **11 Conformance Requirements**

2127 This section specifies the conformance requirements for Printers and clients.

2128 **11.1 Printer conformance requirements**

2129 In order to conform to this specification, a Printer:

- 2130 1. MUST meet the conformance requirements for Printers specified in [RFC2911].
- 2131 2. MUST support the Create-Job operation as specified in [RFC2911], even though a Printer NEED NOT
- 2132 support the Create-Job operation in order to conform to [RFC2911].
- 2133 3. MUST support the Document operations that section 3 REQUIRES a Printer to support.
- 2134 4. MUST support the operation attributes in the Send-Document operation and, if supported, the Send-URI
- 2135 operation that section 6 REQUIRES a Printer to support.
- 2136 5. MAY support any of the Document Template attributes in Document Creation operations as indicated in
- 2137 section 7 and MUST NOT support them for contexts for where they are not defined as indicated in the Table
- 2138 9 with an “n”.
- 2139 6. MUST support the Document Description attributes that section 8 REQUIRES a Printer to support.
- 2140 7. MUST support the Printer attributes that section 8.2.1 REQUIRES a Printer to support.
- 2141 8. MUST support the values of Printer Descriptions attribute that section 10 REQUIRES a Printer to support.

2142 11.2 Client conformance requirements

2143 In order to conform to this specification, a client:

- 2144 1. MUST meet the conformance requirements for clients specified in [RFC2911]
- 2145 2. MAY support any of the Document operations defined in section 3.
- 2146 3. MUST supply the operation attributes that section 6 REQUIRES a client to supply in operation requests.
- 2147 4. MUST supply any Document Template attributes in the format that section 7 REQUIRES a client to supply in
2148 Document Creation operations and MUST NOT support them for contexts for where they are not defined as
2149 indicated in the Table 9 with an "n".
- 2150 5. SHOULD support any of the Document Description attributes that section 8 REQUIRES a Printer to support.
- 2151 6. MAY support any of the Printer attributes listed in section 8.2.1.
- 2152 7. MAY support any of the values of the Printer Descriptions attributes in section 10.

2153 12 Normative References

2154 Note: The references in the body of this IEEE-ISTO document use the more reader-friendly mnemonic symbols
2155 below, rather than the RFC number (except for [RFC2910] and [RFC2911]). IETF RFCs and IANA registrations
2156 require using the RFC numbers in the body of the document for references.

2157 [adm-ops]

2158 Kugler, C, Hastings, T., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Administrative
2159 Operations", <draft-ietf-ipp-ops-set2-03.txt>, July 17, 2001.

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2234 **14 IANA Considerations**

2235 This section contains the registration information for IANA to add to the various IPP Registries according to the
 2236 procedures defined in RFC 2911 [RFC2911] section 6 to cover the definitions in this document. The resulting
 2237 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations-registry>.

2238 *Note to the RFC Editor: Replace the References below with the RFC number for the appropriate document,
 2239 so that it accurately reflects the content of the information for the IANA Registry.*

2240 **14.1 Attribute Registrations**

2241 The following table lists all the attributes defined in this document. These are to be registered according to the
 2242 procedures in RFC 2911 [RFC2911] section 6.2.

2243	Attribute Name (attribute syntax):	Reference:	Section:
2244	Document Description attributes:	Reference:	Section:
2245	attributes-charset (charset)	[this spec]	8.2.1

2247	attributes-natural-language (naturalLanguage)	[this spec]	8.2.2
2248	compression (type3 keyword)	[this spec]	8.2.3
2249	current-page-order (type2 keyword)	[this spec]	8.2.4
2250	date-time-at-completed (dateTime)	[this spec]	8.2.5
2251	date-time-at-creation (dateTime)	[this spec]	8.2.6
2252	date-time-at-processing (dateTime)	[this spec]	8.2.7
2253	detailed-status-message (1setOf text (MAX))	[this spec]	4.3.10
2254	document-access-errors (1setOf text(MAX))	[this spec]	4.3.11
2255	document-format (mimeMediaType)	[this spec]	8.2.8
2256	document-format-detail (collection)		8.2.9
2257	document-format (mimeMediaType	[this spec]	8.2.9.1
2258	document-format-version (text(127))	[this spec]	8.2.9.2
2259	document-format-natural-languages	[this spec]	8.2.9.3
2260	(1setOf naturalLanguage)		
2261	platform (type3 keyword name(MAX))	[this spec]	8.2.9.4
2262	device-id (text(127))	[this spec]	8.2.9.5
2263	document-format-details (1setOf collection)	[this spec]	8.2.9.6
2264	document-format-detected (mimeMediaType)		8.2.10
2265	document-id-uri (uri)	[this spec]	8.2.11
2266	document-message (text(MAX))	[this spec]	8.2.12
2267	document-name (name(MAX))	[this spec]	8.2.13
2268	document-natural-language (naturalLanguage)	[this spec]	8.2.14
2269	document-number (integer(0:MAX))	[this spec]	8.2.15
2270	document-state (type1 enum)	[this spec]	8.2.16
2271	document-state-message (text(MAX))	[this spec]	8.2.17
2272	document-state-reasons (1setOf type2 keyword)	[this spec]	8.2.18
2273	document-uri (uri)	[this spec]	8.2.19
2274	impressions (integer(0:MAX))	[this spec]	8.2.24
2275	impressions-completed (integer(0:MAX))	[this spec]	8.2.25
2276	impressions-completed-current-copy	[this spec]	8.2.20
2277	(integer(0:MAX))		
2278	job-printer-uri (uri)	[this spec]	8.2.32
2279	k-octets (integer(0:MAX))	[this spec]	8.2.26
2280	k-octets-processed (integer(0:MAX))	[this spec]	8.2.27
2281	last-document (boolean)	[this spec]	8.2.35
2282	media-sheets (integer(0:MAX))	[this spec]	8.2.28
2283	media-sheets-completed (integer(0:MAX))	[this spec]	8.2.29
2284	more-info (uri)	[this spec]	8.2.30
2285	printer-up-time (integer (1:MAX))	[this spec]	8.2.31
2286	sheet-completed-copy-number (integer(0:MAX))	[this spec]	8.2.37
2287	time-at-completed (integer (MIN:MAX))	[this spec]	8.2.38
2288	time-at-creation (integer (MIN:MAX))	[this spec]	8.2.39
2289	time-at-processing (integer (MIN:MAX))	[this spec]	8.2.40
2290	warnings-count (integer(0:MAX))	[this spec]	8.2.34
2291			
2292			

	Document Templates attributes:	Reference:	Section:
2293	Document Templates attributes:		
2294	copies (integer(1:MAX))	[RFC2911]	4.2.5
2295	cover-back (collection)	[prod-print]	3.1
2296	media (type3 keyword name(MAX))	[prod-print]	3.1.1
2297	media-col (collection)	[prod-print]	3.1.1
2298	cover-front (collection)	[prod-print]	3.1
2299	cover-type (type2 keyword)	[prod-print]	3.1.2
2300	media (type3 keyword name(MAX))	[prod-print]	3.1.1
2301	media-col (collection)	[prod-print]	3.1.1
2302	cover-type (type2 keyword)	[prod-print]	3.1.2
2303	finishings (lsetOf type2 enum)	[RFC2911]	4.2.6
2304		[finish]	2
2305	finishings-col (collection)	[prod-print]	3.2
2306	finishing-template (name(MAX))	[prod-print]	3.2.1
2307	stitching (collection)	[prod-print]	3.2.2
2308	stitching-locations (lsetOf integer(0:MAX))	[prod-print]	3.2.2.3
2309	stitching-offset (integer (0:MAX))	[prod-print]	3.2.2.2
2310	stitching-reference-edge (type2 keyword)	[prod-print]	3.2.2.1
2311	force-front-side (lsetOf integer(1:MAX))	[prod-print]	3.3
2312	imposition-template (type2 keyword name(MAX))	[prod-print]	3.4
2313	insert-sheet (lsetOf collection)	[prod-print]	3.5
2314	insert-after-page-number (integer(0:MAX))	[prod-print]	3.5.1
2315	insert-count (integer(0:MAX))	[prod-print]	3.5.2
2316	media (type3 keyword name(MAX))	[prod-print]	3.5.3
2317	media-col (collection)	[prod-print]	3.5.3
2318	media (type3 keyword name(MAX))	[RFC2911]	4.2.11
2319	media-col (collection)	[prod-print]	3.13
2320	media-back-coating (type3 keyword	[prod-print]	3.13.10
2321	name(MAX))		
2322	media-color (type3 keyword name(MAX))	[prod-print]	3.13.4
2323	media-front-coating (type3 keyword	[prod-print]	3.13.10
2324	name(MAX))		
2325	media-hole-count (integer(0:MAX))	[prod-print]	3.13.6
2326	media-info (text(255))	[prod-print]	3.13.3
2327	media-key (type3 keyword name(MAX))	[prod-print]	3.13.1
2328	media-order-count (integer(1:MAX))	[prod-print]	3.13.7
2329	media-preprinted (type3 keyword name(MAX))	[prod-print]	3.13.5
2330	media-recycled (type3 keyword name(MAX))	[prod-print]	3.13.11
2331	media-size (collection)	[prod-print]	3.13.8
2332	x-dimension (integer(0:MAX))	[prod-print]	3.13.8.1
2333	y-dimension (integer(0:MAX))	[prod-print]	3.13.8.2
2334	media-type (type3 keyword name(MAX))	[prod-print]	3.13.2
2335	media-weight-metric (integer(0:MAX))	[prod-print]	3.13.9
2336	media-input-tray-check (type3 keyword	[prod-print]	3.14
2337	name(MAX))		
2338	number-up (integer(1:MAX))	[RFC2911]	4.2.9

2339	orientation-requested (type2 enum)	[RFC2911]	4.2.10
2340	output-bin (type2 keyword name(MAX))	[output-bin]	2.1
2341	page-delivery (type2 keyword)	[prod-print]	3.15
2342	page-order-received (type2 keyword)	[prod-print]	3.16
2343	page-overrides (lsetOf collection)	[override]	5.2
2344	document-copies (lsetOf rangeOfInteger(MAX))	[override]	5.2.3
2345	input-documents (lsetOf rangeOfInteger(MAX))	[override]	5.2.1
2346	output-documents (lsetOf rangeOfInteger(MAX))	[override]	5.2.2
2347	pages (lsetOf rangeOfInteger(MAX))	[override]	5.2.4
2348	<any other Job Template attributes that		
2349	affect pages, such as media or media-col (
2350	page-ranges (lsetOf rangeOfInteger(1:MAX))	[RFC2911]	4.2.7
2351	pages-per-subset (lsetOf integer(1:MAX))	[prod-print]	5.3
2352	presentation-direction-number-up (type2	[prod-print]	3.17
2353	keyword)		
2354	print-quality (type2 enum)	[RFC2911]	4.2.13
2355	printer-resolution (resolution)	[RFC2911]	4.2.12
2356	separator-sheets (collection)	[prod-print]	3.18
2357	media (type3 keyword name(MAX))	[prod-print]	3.18.2
2358	media-col (collection)	[prod-print]	3.18.2
2359	separator-sheets-type (type3 keyword	[prod-print]	3.18.1
2360	name(MAX))		
2361	sheet-collate (type2 keyword)	[job-prog]	3.1
2362	sides (type2 keyword)	[RFC2911]	4.2.8
2363	x-image-position (type2 keyword)	[prod-print]	3.19.2
2364	x-image-shift (integer(MIN:MAX))	[prod-print]	3.19.3
2365	x-side1-image-shift (integer(MIN:MAX))	[prod-print]	3.19.4
2366	x-side2-image-shift (integer(MIN:MAX))	[prod-print]	3.19.5
2367	y-image-position (type2 keyword)	[prod-print]	3.19.6
2368	y-image-shift (integer(MIN:MAX))	[prod-print]	3.19.7
2369	y-side1-image-shift (integer(MIN:MAX))	[prod-print]	3.19.8
2370	y-side2-image-shift (integer(MIN:MAX))	[prod-print]	3.19.9
2371			
2372	Job Template attributes:	Reference:	Section:
2373	job-copies (integer(1:MAX))	[this spec]	7.1.1
2374	job-cover-back (collection)	[this spec]	7.1.2
2375	<member attributes are the same as "cover-back">		
2376	job-cover-front (collection)	[this spec]	7.1.3
2377	<member attributes are the same as "cover-front">		
2378	job-finishings (lsetOf type2 enum)	[this spec]	7.1.4
2379	job-finishings-col (lsetOf collection)	[this spec]	7.1.5
2380	<member attributes are the same as "finishings-col">		
2381			
2382	Printer Descriptions:	Reference:	Section:
2383	document-creation-attributes-supported (lsetOf type2 keyword)	[this spec]	9.1
2384			

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2386
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2389
2390

Operation attributes:	Reference:	Section:
document-message (text(MAX))	[this spec]	3.8.1.1
job-mandatory-attributes (1setOf type2 keyword)	[this spec]	4.3.2
last-document (boolean)	[this spec]	3.1.1.2

2391 **14.2 Additional Enum Attribute Value Registrations**

2392 The following table lists all the new enum attribute values defined in this document as additional type2 enum values.
2393 These are to be registered according to the procedures in RFC 2911 [RFC2911] section 6.1.
2394

Value	Name	Reference	Section:
-----	-----	-----	-----
document-state (type1 enum)		[this spec]	§8.2.16
3 pending		[this spec]	§8.2.16
5 processing		[this spec]	§8.2.16
7 canceled		[this spec]	§8.2.16
8 aborted		[this spec]	§8.2.16
9 completed		[this spec]	§8.2.16
job-finishings (1setOf type2 enum)		[this spec]	§7.1.4
<enum values are the same as "finishings">			
operations-supported (type2 enum):			
0x0033 Cancel-Document		[this-spec]	§3.8
0x0034 Get-Document-Attributes		[this-spec]	§3.5
0x0035 Get-Documents		[this-spec]	§3.6
0x0036 Delete-Document		[this-spec]	§3.9
0x0037 Set-Document-Attributes		[this-spec]	§3.7
0x0039 Create-Document		[this-spec]	§3.1
0x003A Send-Data		[this-spec]	§3.2

2415 **14.3 Operation Registrations**

2416 The following table lists all of the operations defined in this document. These are to be registered according to the
2417 procedures in RFC 2911 [RFC2911] section 6.4.
2418

Operations:	Reference:	Section:
Cancel-Document	[this-spec]	§3.8
Get-Document-Attributes	[this-spec]	§3.5
Get-Documents	[this-spec]	§3.6
Delete-Document	[this-spec]	§3.9
Set-Document-Attributes	[this-spec]	§3.7
Create-Document	[this-spec]	§3.1
Send-Data	[this-spec]	§3.2

2427

2428 **15 Internationalization Considerations**

2429 The internationalization considerations for this extension for handling the Document object are the same as for
2430 handling the Job object in [RFC2911].

2431 **16 Security Considerations**

2432 The Document object should provide no more increased security considerations than the Job object. The Printer
2433 MUST provide the same access control for Document objects as for Job objects.

2434 **17 Contributors**

2435 Don Fullman, Xerox
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2437 **18 Acknowledgments**

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2457 **20 Appendix A: Document operations compared to Job operations**

2458 This appendix compares the Document operations with the existing Job operations to show the parallelism.

2459 Table 15 compares the Job and Document operations. The two Conf. columns indicate the conformance
2460 requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ"
2461 in the Document Conformance column means if the Document object is supported. Whether a Document operation
2462 is a method on the Job object or the Document object depends on the modeling regime and is not an essential part

2463 of the semantics described here, since these semantics are intended to apply to both to object-oriented and object-
 2464 based protocols, APIs, and implementations.

2465 **Table 15 - Document operations compared to Job operations**

Job operations	Job Conf.	Document operations	Doc Conf
Cancel-Current-Job	OPT	<i>N/A, can only cancel a document explicitly by document number and explicit job id.</i>	OPT
Cancel-Job	REQ	Cancel-Document	REQ
Create-Job	OPT	Create-Document	REQ
Get-Job-Attributes	REQ	Get-Document-Attributes	REQ
Get-Jobs	REQ	Get-Documents	REQ
Hold-Job		<i>N/A, can only hold an entire job.</i>	
Print-Job	REQ	Send-Document (existing operation - see [RFC2911] with an additional Document attributes group defined in section 3.3)	REQ ⁴⁸
Print-URI	OPT	Send-URI (existing operation - see [RFC2911] with an additional Document attributes group defined in section 3.4)	OPT
<i>N/A</i>		Send-Data	REQ
Promote-Job	OPT	<i>N/A, can only promote an entire job</i>	
Purge-Jobs	OPT	Delete-Document	OPT
Release-Held-New-Jobs	OPT	<i>N/A, can only release entire jobs</i>	
Release-Job	OPT	<i>N/A, can only release an entire job</i>	
Reprocess-Job	OPT	<i>N/A, can only reprocess an entire job</i>	
Restart-Job	OPT	<i>N/A, can only restart an entire job</i>	
Resume-Job	OPT	<i>N/A, can only resume an entire job</i>	
Schedule-Job-After	OPT	<i>N/A, can only schedule an entire job</i>	
Set-Job-Attributes	OPT	Set-Document-Attributes	OPT
Suspend-Current-Job	OPT	<i>N/A, can only suspend an entire job in order to run another one</i>	
Validate-Job	REQ	<i>N/A, use Validate-Job to validate a single document or use Create-Job with "ipp-attribute-fidelity" = 'true' and Create-Document request to validate a multi-document job.</i>	REQ

2466
 2467

2468 **21 Annex B: Change Log (informative)**

- 2469 Version 0.6, 13 January 2003, agreements from New Orleans October PWG meeting and subsequent telecons:
 2470 1. Deleted the Cancel-Current-Documents and Validate-Document operations.
 2471 2. Deprecated the "input-document-number" operation attribute from the Document Creation operations.
 2472 3. Deleted the "document-mandatory-attributes" operation attribute to align with the PWG Semantic model. So
 2473 both specifications have only the "job-mandatory-attributes" operation attribute. The client can only supply at
 2474 the Job Level. The Document Level inherits from the Job Level.
 2475 4. Increased "document-message" operation attribute length from 127 to MAX (1023) octets.
 2476 5. Clarified that "ipp-attribute-fidelity" and "job-mandatory-attributes" can only be supplied at the Job Level; the
 2477 Document level inherits their values.
 2478 6. Added "ipp-attribute-fidelity" and "job-mandatory-attributes" Job Description attributes.

⁴⁸ 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.

- 2479 7. Added the "media-size-name" as a member attribute of "media-col" and as a separate Job Template attribute
2480 as used by UPnPv1 and UPnPv2.
- 2481 8. Added the "media-type" as a Job and Document Template attribute on its own as used by UPnPv1 and
2482 UPnPv2 (as well as leaving it as a member attribute of the "media-col" Job and Document Template
2483 attributes).
- 2484 9. Renamed "document-printer-up-time" Document Description attribute to simply "printer-up-time".
- 2485 10. Added the following Job Description attributes: "ipp-attribute-fidelity", and "job-mandatory-attributes".
- 2486 11. Removed the following Document Description attributes: "ipp-attribute-fidelity".
- 2487 12. Added the following Document Description attributes: "document-format-detail", "document-format-detected",
2488 "job-id", "job-printer-uri", "job-uri", "output-device-assigned".
- 2489 13. Defined all of the Document Description attributes, often with references to other specifications, so that they
2490 appear in the table of contents.

2491
2492 Version 0.5, 25 October 2002, as a result of the PWG Semantic Model telecon, October 24, 2002:

- 2493 1. Fixed the title to say "Proposed Standard" and removed the 5100.n number until the document is approved by
2494 the PWG Last Call to progress as a Draft Standard.
- 2495 2. Changed Cancel-Document from OPTIONAL to REQUIRED.
- 2496 3. Added Table 3 and Table 4 to show the request and response signatures of the Document Creation and
2497 Validation operations.
- 2498 4. Renamed the "document-number" operation attribute to "input-document-number", to agree with [override]
2499 and because the Document object is really the Input Document (as opposed to the Output Document). The
2500 Printer copies this value to the Document's "document-number" Document Description attribute.
- 2501 5. Clarified that the Printer MUST reject a Create-Document request if the "document-number" already exists.
- 2502 6. Clarified that the client cannot supply Subscription attributes in any Document Creation requests.
- 2503 7. Added "document-message" (text(127)) operation attribute to the Document Creation requests to go with the
2504 "document-message" agreement (see point #15).
- 2505 8. Fixed Create-Document response to return Job status attributes in Group 3 and Document status attributes in
2506 Group 4.
- 2507 9. Required the Printer to return just the "document-number" and "document-id-uri" (uri) Document Description
2508 attribute in a Document Creation response.
- 2509 10. Added the "document-mandatory-attributes" operation attribute.
- 2510 11. Separated the returned Job status attributes and the Document status attributes into two groups, one Job
2511 Attributes and the other Document attributes.
- 2512 12. Allowed the client to supply or omit the "document-uri" operation attribute in a Validate-Job request.
- 2513 13. Clarified that the "document-number" operation attribute MUST follow the Printer and Job Target in Group 1.
- 2514 14. Changed the Get-Documents response when there is no "requested-attributes" to simply "document-number"
2515 and "document-id-uri" to be parallel with the Get-Jobs operation.
- 2516 15. Changed the "message" operation attribute in Cancel-Document and Cancel-Current-Document to
2517 "document-message" operation attribute which the Printer copies to the "document-message" Document
2518 Description attribute for use both by the user and the operator.
- 2519 16. Clarified that the "document-state-reasons" values never affect Job scheduling.
- 2520 17. Made Job Level - page override programming higher precedence than Document level Document object
2521 attributes.
- 2522 18. Clarified PDL document data precedence and its relationship to Job Template attributes ending with "-
2523 requested".
- 2524 19. In Table 6, flagged the operation attributes that the Printer copies to the corresponding Job and Document
2525 Description attributes in Document Creations operations.
- 2526 20. Fixed "job-mandatory-attributes" operation attribute so its only supplied at Job level, now that we have
2527 "document-mandatory-attributes" operation attribute.
- 2528 21. Clarified that "ipp-attribute-fidelity" can be supplied at both the Job and Document Levels and how it interacts
2529 with "job-mandatory-attributes" and "document-mandatory-attributes" operation attributes.
- 2530 22. Disallowed "output-bin" at the Document Level (and Page Level). It subsets the single stream of Input-Pages
2531 across Input-Documents.
- 2532 23. Disallowed "page-ranges" at the Page Level.
- 2533 24. Disallowed "pages-per-subset" at the Document level (and Page Level).

- 2534 25. Disallowed "separator-sheets" at the Page Level.
- 2535 26. Added "document-printer-up-time" Document Description attribute for Get-Documents and Get-Document-
- 2536 Attributes responses that the Printer MUST support, just like "job-printer-up-time" operation attribute for Get-
- 2537 Jobs and Get-Job-Attributes.

Version 0.4, 14 October 2002:

- 2539 1. Added the operation specifications.
- 2540 2. Added the Create-Document and Send-Data to be more parallel with Jobs and support PWG PSI.
- 2541 3. Resolved the 15 issues in version 0.3 as discussed on the mailing list.
- 2542 4. Added the Attribute Precedence section 5.
- 2543 5. Added [prod-print2] attributes.
- 2544 6. Added job-mandatory-attributes, job-cover-back, job-cover-front, job-copies, job-finishings, job-finishings-col.
- 2545 document-id-uri, and redirect-uri.
- 2546
- 2547

Version 0.3, 9 September 2002:

- 2548 1. Reformatted as an IEEE-ISTO standard and added the usual sections for a standard.
- 2549 2. Added "original-requesting-user-name" Operation attribute to Table 6.
- 2550 3. Added "y" to "output-bin" in Table 8 so it MAY be a Document Template attribute.
- 2551 4. Clarified the * and in Table 9 - Job and Document Description attributes.
- 2552 5. Added section 8.2.1 all of the Printer attributes defined In any IPP standard.
- 2553 6. Allocated operation-id enums in section 10 to the 7 Document operations.
- 2554 7. Added the conformance section 11
- 2555 8. Completed the IANA Considerations section 14.
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- 2557
- 2558