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

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8 **Abstract:** This IPP specification extends the IPP Protocol, Model and Semantics [rfc2910], [rfc2911] object model by
9 defining a Document object. The [rfc2911] Job object is extended to contain one or more Document objects that are
10 passive objects operated on by the Job. Multi-Document Jobs exist in IPP [rfc2911] but are not objects in their own
11 right. This specification elevates the Document to an IPP object thus giving access to a document's metadata within
12 a Job. A Document object allows template attributes to be applied at both the Job and Document level. This enables
13 document overrides of Job Template attributes.

14 This specification defines new operations or extends [rfc2911] operations as follows:

- 15 1 [rfc 2911] operation that creates a Job object: Create-Job
- 16 2 [rfc 2911] operations that create a Job and Document object: Print-Job, Print-URI
- 17 2 [rfc 2911] operations that create Document objects: Send-Document, Send-URI
- 18 5 new operations: Get-Documents, Get-Documents-Attributes, Set-Documents-Attributes, Cancel-Document,
19 Delete-Document

20 This specification uses the new Operation attributes (defined in [jobx]) that describe the contents of the Document
21 and permit the Printer to reject requests that it cannot process correctly to define new Document Description
22 attributes. The Printer copies these Operation attributes to the corresponding Document Description attributes,
23 which clients may query.

24 This specification also uses existing Job Template attributes to define Document Template attributes ("xxx"
25 Document Template attribute, "xxx-actual" Document Description attribute, "xxx-default" Printer attribute, and "xxx-
26 supported" Printer attribute). In addition this specification lists all of the attributes defined in other IPP specifications
27 to show their relationship to corresponding attributes defined in this IPP specification for use with the Document
28 object.

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



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Working Draft, August 8, 2003

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

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

ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/wd-ippdoc10-20030808.pdf , .doc, .rtf

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110 2) leave the subject line blank

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112 subscribe ipp

113 end

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

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280

281 1 Introduction and Summary

282 This IPP specification extends the IPP Model and Semantics [rfc2911] object model by defining a Document object.
283 The [rfc2911] Job object is extended to contain one or more Document objects that are passive objects operated on
284 by the Job. The REQUIRED Print-Job and OPTIONAL Print-URI operations ([rfc2911] § 3.2.1 and 3.2.2) create a
285 Job object containing a single Document object. The REQUIRED Create-Job operation ([rfc2911] § 3.2.4) creates a
286 Job object. The REQUIRED Send-Document and OPTIONAL Send-URI operations ([rfc2911] § 3.3.1 and 3.3.2) add
287 a Document object to the specified Job object. This specification adds a Document Attributes group (and tag) to the
288 Send-Document and Send-URI requests and responses. The Document Attributes group contains any Document
289 Template attributes to be applied to this Document object being created, overriding any corresponding Job Template
290 attributes supplied at the job level (by Create-Job) and thereby allowing the client to vary the Document Template
291 attributes between Document objects in a single Job.

292 This specification defines one new operation for Job objects, four new operations for Document objects once they
293 have been created, and extends [rfc2911] operations as follows:

- 294 1 REQUIRED Job operation: Get-Documents
- 295 1 REQUIRED Job and Document Creation operation: PrintJob [rfc2911]
- 296 1 OPTIONAL Job and Document Creation operation: Print-URI [rfc2911]
- 297 1 REQUIRED Document Creation operation: Send-Document [rfc2911]
- 298 1 OPTIONAL Document Creation operation: Send-URI [rfc2911]
- 299 2 REQUIRED Document operations: Cancel-Document, Get-Document-Attributes
- 300 2 OPTIONAL Document operations: Delete-Document, Set-Document-Attributes.

301 This specification uses the new Operation attributes (defined in [jobx]) that describe the contents of the Document
302 and permit the Printer to reject requests that it cannot process correctly to define new Document Description
303 attributes. The Printer copies these Operation attributes to the corresponding Document Description attributes which
304 client may query.

305 This specification also uses existing Job Template attributes to define Document Template attributes (“xxx”
306 Document Template attribute, “xxx-actual” Document Description attribute [ippact], “xxx-default” Printer attribute, and
307 “xxx-supported” Printer attribute). In addition this specification lists all of the attributes defined in other IPP
308 specifications¹ to show their relationship to corresponding attributes defined in this IPP specification for use with the
309 Document object. The analogous Document Descriptions attributes that correspond to the Job Description attributes
310 are also defined.

311 The semantics of “document-state”, “document-state-reasons”, and “document-state-message” Document
312 Description attributes are based on the corresponding [rfc2911] “job-state”, “job-state-reasons”, and “job-state-
313 message” Job Description attributes. The state transitions for a Document are simpler than a Job’s. A Document is
314 either waiting for the Job to process it, being processed by the Job or has reached its terminating state. Only the
315 applicable state values are used. It is assumed that an implementation will only use values from “job-state-reasons”
316 that are applicable to a Document for “document-state-reasons”.

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

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.

321 **1.1 Scope**

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

328 The Document object is a passive object² and is operated upon by the Job. The client uses any of the existing Send-
 329 Document, Send-URI, Print-Job, or Print-URI operations to create a Document object. In addition there are 5 new
 330 operations that affect the Document object after it has been created as summarized in Table 1.

331 **Table 1 - Summary of operations**

Operation Name	Printer support	Brief Description
Print-Job [rfc2911]	REQUIRED	Creates a Job object as in [rfc2911] that contains a single Document object with pushed data in-line. Some additional Operation attributes are defined in [jobx] for use in creating the Document object with Document Description attributes.
Print-URI [rfc2911]	OPTIONAL	Creates a Job object as in [rfc2911] that contains a single Document object with a reference to the document data. Some additional Operation attributes are defined in [jobx] for use in creating the Document object with Document Description attributes.
Create-Job [rfc2911]	REQUIRED ³	Creates the Job object as defined in [rfc2911] with Job Attributes. Job Template attributes that affect individual documents, such as “media”, are inherited by the Document objects that are subsequently created for the Job using Send-Document and/or Send-URI.
Send-Document [rfc2911]	REQUIRED ³	Creates a Document object with Document attributes and data. Some additional Operation attributes are defined in [jobx] for use in creating the Document object with Document Description attributes, along with a new Document attributes group to pass Document Template attributes.
Send-URI [rfc2911]	OPTIONAL	Creates a Document object with Document attributes and a URL reference to the data (print-by-reference). Some additional Operation attributes are defined in [jobx] for use in creating the Document object with Document Description attributes, along with a new Document attributes group to pass Document Template attributes.
Get-Document-Attributes	REQUIRED	Get requested attributes of the 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.

332 This specification uses existing [rfc2911] and [jobx] Operation attributes summarized in Table 2 to define new
 333 Document Description attributes. The Printer copies these Operation attributes supplied by the client in the request
 334 to the corresponding Job or Document Description attributes.
 335

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.

³ In [rfc2911] the Create-Job and Send-Document operations are OPTIONAL for a Printer to support.

336

Table 2 - Summary of Operation and New Description attributes

Operation attribute	Creation operation	Printer support	Description
ipp-attribute-fidelity (boolean) * [rfc2911] §15.1	Job	MUST	Allows the client to indicate whether or not the Printer MUST support all Job Template and Document Template attributes.
job-mandatory-attributes (1setOf type2 keyword) [jobx] § 4.1.2	Job	MUST	Allows the client to list which Job Template and Document Template attributes that the Printer MUST support.
document-charset (charset) [jobx] § 4.2.1	Document	CMUST ⁴	The charset of the Document Object content.
document-digital-signature (type2 keyword) [jobx] § 4.2.2	Document	MAY	The type of digital signature, if any, used in the Document Object content.
document-format (mimeType) * [rfc2911] §3.2.1.1	Document	MUST	The document format of the Document Object content.
document-format-details (1setOf collection) [jobx] § 4.2.4	Document	CMUST ⁵	The details of the Document Object content, including when it's a package of files (e.g. zip, multipart/related). The details include information, such as the application and the operating system that created the document, the intended device type (when the format is device-dependent), and the natural languages of the document.
document-format-version (text(127)) [jobx] § 4.2.5	Document	MAY	The level or version of the document format.
document-natural-language (naturalLanguage) * [rfc2911] §3.2.1.1	Document	MAY	The primary language of the Document Object content.

337
338

* - indicates Operation attributes defined in [rfc2911] that are extended to apply to the Document Creation operations defined in this specification.

339 2 Terminology

340 This section defines terminology used throughout this document.

341 2.1 Conformance Terminology

342 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, and **OPTIONAL**, have
 343 special meaning relating to conformance as defined in RFC 2119 [rfc2119]. If an implementation supports the
 344 extension defined in this document, then these terms apply; otherwise, they do not. These terms define
 345 conformance to *this document (and [rfc2911]) only*; they do not affect conformance to other documents, unless
 346 explicitly stated otherwise. For example, the term **REQUIRED** in this document means “**REQUIRED** if this
 347 **OPTIONAL** Document Object specification is implemented”.

348 The term **CONDITIONALLY REQUIRED** means that the Printer **MUST** support the feature, if the specified condition
 349 is true. The term **CMUST** means **MUST** if the specified “condition” is true.

⁴ The Printer **MUST** support the “document-charset” operation/Document Description attributes if the Printer supports a document-format in which the charset may be ambiguous in the Document content, such as ‘application/vnd.hp-PCL’ where the charset escape sequence **MAY** be omitted from the data (see [jobx] §3.2.1).

⁵ The Printer **MUST** support the “document-format-details” operation/Document Description attributes if the Printer supports a packaging document format, such as ‘application/zip’ or ‘multipart/related’.

350 2.2 Other Terminology

351 This document uses the same terminology as [rfc2911], such as “**client**”, “**Printer**”⁶, “**attribute**”, “**attribute value**”,
352 “**keyword**”, “**Job Template attribute**”, “**Operation attribute**”, “**operation**”, “**request**”, “**response**”, and “**support**”
353 with the same meaning. In addition, the following terms are defined for use in this document:

354 **Attribute Precedence** - the precedence rules which dictate which attribute value takes precedence when the same
355 attribute is supplied at different points in the workflow with different values, such as at both the **Job Level** and the
356 **Document Level**. See section 6.

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

360 **Document Creation operation** - operations that create Document objects. Specifically: Print-Job, Print-URI, Send-
361 Document, and Send-URI. Note: Print-Job and Print-URI are both **Job Creation** and **Document Creation**
362 operations, since they create both a Job and a **Document object** at the same time. This specification does not
363 extend the Print-Job and Print-URI operations. However, this specification does extend the Send-Document and
364 Send-URI operations to allow the client to supply **Document Template** attributes in each request.

365 **Document Level** - Operation and Document Template attributes supplied in the Send-Document and Send-URI
366 operations are referred to as being supplied at the **Document Level**. Note: attributes supplied in the Print-Job and
367 Print-URI requests are considered as being supplied at the **Job Level** only, *not* also at the **Document Level**, even
368 though Print-Job and Print-URI also create **Document objects** (see Table 3).

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

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

373 **Honor** - a Printer is said to **Honor** an attribute supplied by the client, if the Printer **supports** that attribute and the
374 supplied value and performs the indicated semantics. If the client supplies the “ipp-attribute-fidelity” or “job-
375 mandatory-attributes” Operation attribute, the client is indicating which supplied Job Template and Document
376 Template attributes the Printer **MUST Honor**.

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

379 **Job Creation operation** - operations that create Job objects, specifically: Print-Job, Print-URI, and Create-Job as
380 defined in [rfc2911].

381 **Job Level - Operation and Job Template** attributes supplied in the Print-Job, Print-URI, and Create-Job are
382 referred to as being supplied at the **Job Level** (see Table 3). Attributes supplied at the **Job Level** are a mixture of
383 **Job attributes** and **Document attributes**. **Job Template attributes** apply to the Job as a whole, while **Document**
384 **Template attributes** provide defaults for the **Document objects** in case the client does not supply a **Document**
385 **Template attribute** at the **Document Level** for a **Document object**. Put another way, **Document objects** *inherit*
386 **Document Template attributes** from the **Job object** which are used if the client didn’t supply a corresponding
387 **Document Template** attribute for the **Document object**.

⁶ [rfc2911] uses the terms “Printer object” and “Printer” interchangeably to mean the same thing. For simplicity, this document uses the term “Printer” exclusively, except for definitions copied directly from [rfc2911]. Nonetheless, the intent is as in [rfc2911]: a Printer is an object that MAY be hosted in the device or in a server.

388 **Operation attribute** - an attribute supplied by a client in the Operation Attribute group of a request in order to affect
 389 the behavior of the operation or an attribute returned by the Printer in the Operation Attributes group in an operation
 390 response in order to report the results of the operation. For some Operation attributes, the Printer copies the values
 391 supplied by the client to corresponding Job Description or Document Description attributes.

392 Table 3 shows this terminology as applied to the six operations. Note that Print-Job and Print-URI are both Job
 393 Creation operations and Document Creation operations, though they only create single Document jobs. In other
 394 words, for Print-Job and Print-URI, there is only one document per job, so whether the attributes are considered to be
 395 submitted at the Job Level and then inherited by the Document object is moot, since these operations do not have a
 396 separate Document group in which the client can supply Document attributes. Note also that for the "Level" concept,
 397 no operation supplies attributes at more than one level.⁷

398 **Table 3 - Job Creation and Document Creation operations**

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

399

400 **3 New Job operations and semantic extensions to Job operations**

401 This section defines the semantic extensions to Job operations that affect Document objects. Printer and
 402 Subscription object (Event Notification [ntfy]) operations MUST have no effect on the Document object and the
 403 Document object has no effect on the semantics of the Printer and Subscription operations. The Job operations that
 404 MUST NOT have any effect on the Document object because they are defined to affect the Job object as a whole

⁷ 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. In the [pwg-sm] the Printer copies all of these client's supplied attributes to the Job or Document object. [pwg-sm] Read-only Job and Document attributes that the Printer sets are called Job Status and Document Status attributes (instead of Description attributes).

405 are: **Get-Job-Attributes**⁸ ([rfc2911] § 3.3.4), **Get-Jobs**⁹ ([rfc2911] § 3.2.6), **Hold-Job** ([rfc2911] § 3.3.5), **Release-**
406 **Job** ([rfc2911] § 3.3.6), **Set-Job-Attributes** ([rfc3380] § 4.2), and **Validate-Job** ([rfc2911] § 3.2.3).

407 3.1 Job Creation operations

408 This section defines the extensions to the Job Creation operations.

409 3.1.1 Fidelity Attributes

410 The following Operation attributes have additional semantics when used with document objects. These attributes
411 apply for all the Job Creation operations.. The Fidelity Attributes must be retained when supplied by the Client on
412 Job Creation operations so that they are available when Documents are added to the Job. The semantic of Fidelity
413 on a Job are inherited by all the Documents within that Job.

414 3.1.1.1 ipp-attribute-fidelity (boolean) ([rfc2911] § 3.2.1 and 15)

415 This REQUIRED Operation attribute specifies the policy for the Printer to use (see [rfc2911] §3.2.1.1) when the client
416 supplies unsupported Job Template or Document Template attributes¹⁰ or value in a Job Creation operation or a
417 subsequent Document Creation operation for this job. The value 'true' indicates that total fidelity to client supplied
418 Job Template and Document Template attributes and values is required for this Job Creation operation and all
419 subsequent Document Creation operations for this job. If the client supplies the value 'false' or omits the attribute,
420 then the Printer MUST accept the Job Creation operation and all subsequent Document Creation operations even if
421 the client supplies unsupported attributes or values in them.

422 The Printer MUST copy this attribute to the corresponding Job Description attribute (see [jobx] § 6.1) and use its
423 value for validating subsequent Document Creation operations for this job.

424 Note: The inheritance of the effect of the "ipp-attribute-fidelity" Operation attribute by subsequent Document Creation
425 operations is like the inheritance of Document Template attributes supplied at the Job Level but affecting the
426 behavior of the Document Level (see Table 3).

427 3.1.1.2 job-mandatory-attributes (1setOf type2 keyword) Operation attribute

428 This REQUIRED Operation attribute identifies which Job Template and Document Template attributes the Printer
429 MUST Honor in this Job Creation request and all subsequent Document Creation requests for this Job.

430 A client MUST NOT supply this "job-mandatory-attributes" Operation attribute in a Document Creation operation. If a
431 client does supply this attribute in a Document Creation operation, the Printer MUST ignore and otherwise accept the
432 request and return this attribute without any values in the Unsupported Attributes Group in the response (see
433 [rfc2911] § 3.1.7). Thus the Printer only supports the "job-mandatory-attributes" Operation attribute supplied at the
434 Job level. Thus the "job-mandatory-attributes" Operation attribute controls all other Job Template and Document
435 Template attributes supplied at the Job Level and Document Level uniformly.

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

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

¹⁰ The value of the "ipp-attribute-fidelity" Operation attribute has no effect on other *Operation* attributes supplied by the client, only on Job Template and Document Template attributes supplied by the client.

436 The Printer MUST copy this attribute to the corresponding “job-mandatory-attributes” Job Description attribute (see
437 [jobx] § 6.3) for auditing and trouble-shooting purposes and use its value for validating subsequent Document
438 Creation operations for this job.

439 Note: The inheritance of the effect of the “job-mandatory-attributes” Operation attribute by subsequent Document
440 Creation operations is like the inheritance of Document Template attributes supplied at the Job Level but affecting
441 the behavior of the Document Level (see Table 3).

442 **3.1.2 Create-Job ([rfc2911] § 3.2.4)**

443 This REQUIRED¹¹ operation creates the Job object with all of the mixture of Job and Document attributes supplied in
444 the Create-Job operation. All Operation attributes supplied affect the Job as a whole. The client supplies Job
445 Template attributes [rfc2911] that are a mixture of Job and Document attributes supplied together in the Job attribute
446 group in the request¹². For example, such Job Template attributes as “job-priority” and “job-hold-until” are Job
447 attributes that affect the Job as a whole. On the other hand, such Job Template attributes as “media” and “number-
448 up” are Document attributes that the client is supplying as defaults for the Document objects. The Document objects
449 that are subsequently created for the specified Job are said to inherit the Document attributes from the Job object,
450 unless the Document Creation operation supplies a corresponding Document Template attribute. However, the
451 Printer MUST NOT copy down any Job Level attributes to the Document object as observable by a client in any Get-
452 Documents or Get-Documents-Attributes operation responses.

453 **3.1.3 Print-Job ([rfc2911] § 3.2.1)**

454 This REQUIRED operation creates one Document object as a side effect of the Print-Job operation in addition to
455 creating the Job object. The Printer MUST copy all of the supported Operation attributes supplied by the client to the
456 corresponding Job Description or Document Description attributes as indicated in Table 8. For example, the Printer
457 copies the “job-name” and “attributes-charset” operation attributes to the corresponding Job Description attributes,
458 while copying the “document-format” and “document-charset” Operation attributes to the corresponding Document
459 Description attributes. The Printer MUST copy the supported Job Template attributes supplied by the client to the
460 Job object and MUST NOT copy them down to the Document object. In other words, the Document object created
461 by Print-Job has an empty group of Document (and Job) Template attributes. Any Job Template attributes supplied
462 that affect Documents have effect on the Document object because the Document object inherits them from the Job
463 object.

464 The Printer MUST populate the single Document object’s “document-state”, “document-state-reasons”, and
465 “document-number” Document Description attributes with appropriate values. Thus a Get-Job-Attributes operation
466 returns the same attributes for a Job created with Print-Job as a Printer that doesn’t support the Document object.
467 However, a Get-Documents or Get-Documents-Attributes for a Job created by Print-Job will return no Document
468 Templates attributes (since the client can’t submit any with Print-Job), but will return the populated Document
469 Description attributes, such as “document-format”, supplied by the client.

470 Note: Using Get-Job-Attributes and Get-Documents-Attributes, a Job created by Print-Job will be indistinguishable to
471 a client from a Job created with Create-Job and Send-Document with no Document Template attributes supplied.
472 Also an old client performing just a Get-Job-Attributes will see the same results from (1) an old Printer that accepted
473 the Print-Job, (2) a new Printer that accepted the Print-Job, and (3) a new Printer that accepted the Create-Job and
474 Send-Document (with no Document Template attributes supplied). However, if a new client supplies Document
475 Template attributes on the Send-Document, instead of the same attributes as Job Template attributes on the Create-

¹¹ In [rfc2911] the Create-Job operation is OPTIONAL for a Printer to support.

¹² In the PWG Semantic Model, attributes are classified as Job Processing versus Document Processing in their definition. The client supplies them in separate Job Processing or Document Processing groups in the Job Creation operation. Such Document Processing attributes are defaults for subsequent Document Creation operations for that Job.

476 Job, then an old client will not see any of the Document Template attributes when it performs the Get-Job-Attributes
477 operation (since the Printer does not "copy up" Document Template attributes to the Job Level).

478 **3.1.4 Print-URI ([rfc2911] § 3.2.2)**

479 This OPTIONAL operation creates one Document object as a side effect of the Print-URI operation in addition to
480 creating the Job object. The Printer MUST copy all of the supported Operation attributes supplied by the client and
481 the Job Template attributes as indicated for Print-Job in section 3.1.3. In addition the Printer MUST copy the
482 "document-uri" Operation attribute to the corresponding Document Description attribute.

483 Note: Using Get-Job-Attributes and Get-Document-Attributes, a Job created by Print-URI will be indistinguishable to
484 a client from a Job created with Create-Job and Send-URI with no Document Template attributes supplied.

485 **3.2 Validate-Job ([rfc2911] § 3.2.4)**

486 This REQUIRED operation is similar to the Print-Job operation ([rfc2911] § 3.2.1 and [this spec] § 3.1.3) except that a
487 client supplies no document data and the Printer allocates no resources (i.e., it creates neither a new Job object nor
488 a Document object). This operation is used only to verify attributes supplied by the client in the Validate-Job request
489 against the capabilities of a Printer object. By using the Validate-Job operation a client can validate that an identical
490 Print-Job operation (with the document data) would be accepted. A client can also use the Validate-Job operation to
491 validate that an identical Send-Document operation (with the document data) would be accepted. Such a client MAY
492 either:

493 (1) perform all of the Validate-Job operations for each of the documents before doing the Create-Job in order
494 to validate all documents before creating the Job and transmitting any document data OR

495 (2) perform a Create-Job and then a Validate-Job before each Send-Document (or Send-URI) operation.

496 There are certain configurations and implementations where the above validation will not completely validate a multi-
497 document job with differing Document Template attributes for the same Job. Consider a Printer that is representing
498 several dissimilar devices in which no device is a superset of the others. In such as case, the Printer MAY reject a
499 Send-Document operation that cannot be supported in the Job because the combination of its supplied Document
500 Template attributes cannot be supported in the same Job in combination with the differing Document Template
501 attributes of the previously supplied documents. In fact, there is no way to completely validate a multi-document job
502 which has documents with differing Document Template attributes using Validate-Job, since each Validate-Job is a
503 separate independent operation. An administrator can avoid such a configuration by making sure that one of the
504 devices is a superset of all of the other devices.

505 **3.3 Get-Documents Operation**

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

509 This operation is similar to the Get-Document-Attributes operation (see section 4.3), except that this Get-Documents
510 operation returns attributes from all Document objects contained in the Job object, instead of from a single selected
511 Document object in the Job object. As with the Get-Document-Attributes operation the Printer MUST only return
512 attributes that were submitted by a client when the Document object was created by the Send-Document or Send-
513 URI operations and possibly modified by the Set-Document-Attributes operation (see section 4.4).

514 3.3.1 Get-Documents Request

515 The client submits the Get-Documents request to a Printer. The Get-Documents is similar to the Get-Jobs
516 operations (see [rfc2911] § 3.2.6) except that there are no equivalents to the "which-jobs" and "my-jobs" Operation
517 attributes.

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

519 Group 1: Operation Attributes

520 Natural Language and Character Set:

521 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.1.

522 Target:

523 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s)
524 which define the target Job object for this operation as described in [rfc2911] § 3.1.5.

525 Requesting User Name:

526 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
527 [rfc2911] § 8.3.

528 3.3.1.1 "limit" (integer(1:MAX)):

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

535 3.3.1.2 "requested-attributes" (1setOf type2 keyword):

536 The client OPTIONALLY supplies this attribute. The Printer MUST support this attribute. It is a set of
537 Document attribute names and/or attribute groups names in whose values the requester is interested. This
538 set of attributes is returned for each Document object that is returned. The allowed attribute group names
539 are the same as those defined in the Get-Documents-Attributes operation in section 4.3.

540 If the client does not supply this attribute, the Printer MUST respond as if the client had supplied this attribute
541 with the single value:

542 'document-number' (see section 9.1.23)
543

544 3.3.2 Get-Documents Response

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

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

550 Group 1: Operation Attributes**551 Status Message:**

552 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
553 "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as
554 described in [rfc2911] § 13 and 3.1.6.

555 Natural Language and Character Set:

556 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.2.

557 Group 2: Unsupported Attributes

558 See [rfc2911] § 3.1.7 for details on returning Unsupported Attributes.

559 The response MAY contain or MAY omit the "requested-attributes" Operation attribute with any supplied
560 values (attribute keywords) that were requested by the client but are not supported by the Printer. If the
561 Printer does return unsupported attributes referenced in the "requested-attributes" Operation attribute and
562 that attribute included group names, such as 'all', the unsupported attributes MUST NOT include attributes
563 described in the standard but not supported by the implementation.

564 Groups 3 to N: Document Object Attributes

565 The Printer responds with one set of Document Template attributes (see the D column in Table 10) and
566 Document Description attributes (see the Doc column in Table 11) for each returned Document object as
567 specified by the "requested-attributes" Operation attribute supplied by the client in the request. The Printer
568 ignores (does not respond with) any requested attribute or value which is not supported or which is restricted
569 by the security policy in force, including whether the requesting user is the user that submitted the job (job
570 originating user) or not (see [rfc2911] § 8). However, the Printer MUST respond with the 'unknown' value for
571 any supported attribute (including all REQUIRED attributes) for which the Printer does not know the value,
572 unless it would violate the security policy. See the description of the "out-of-band" values in the beginning of
573 [rfc2911] § 4.1.

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

576 3.4 Cancel-Job ([rfc2911] § 3.3.3)

577 This REQUIRED operation sets the "document-state" Document Description attribute to 'canceled' and the
578 "document-state-reasons" Document Description attribute with 'canceled-by-user' or 'canceled-by-operator' for *all*
579 Document objects in the identified Job that have not yet reached a terminal state ('completed', 'canceled', or
580 'aborted').

581 3.5 Send-Document ([rfc2911] § 3.3.1)

582 This REQUIRED Job operation is a Document Creation operation that has been extended to accept a new Document
583 Attributes group (Group 4) that the client can supply (see section 4.1 for the extension semantics).

584 3.6 Send-URI ([rfc2911] § 3.3.2)

585 This OPTIONAL Job operation is a Document Creation operation that has been extended to accept a new Document
586 Attributes group (Group 4) that the client can supply (see section 4.2 for the extension semantics).

587 **3.7 Hold-Job** ([rfc2911] § 3.3.5)

588 This OPTIONAL operation moves the job to the 'pending-held' state, and sets the Job's "job-state-reasons" Job
 589 Description attribute as described in [rfc2911] § 3.3.5. The values of the Documents' "document-state-reasons"
 590 Document Description attributes MUST NOT be affected by this operation.

591 **3.8 Release-Job** ([rfc2911] § 3.3.6)

592 This OPTIONAL operation moves the job out of the 'pending-held' state, if there are no other "job-state-reasons" to
 593 hold the job as described in [rfc2911] § 3.3.6. The values of the Documents' "document-state-reasons" Document
 594 Description attributes MUST NOT be affected by this operation.

595 **3.9 Restart-Job** ([rfc2911] § 3.3.7)

596 This OPTIONAL operation starts the Job over again by processing *all* Documents in the Job as described in [rfc2911]
 597 § 3.3.7, including Documents that have been canceled by a previous Cancel-Documents operation (see section 4.5).
 598 Therefore, the Printer removes any 'canceled-by-xxx' values from any of the "document-state-reasons" attributes and
 599 the Job's "job-state-reasons" attribute so that any canceled Documents are reprocessed along with the other
 600 Documents.

601 **3.10 Reprocess-Job** ([adm-ops] § 4.1)

602 This OPTIONAL operation processes the Job again by processing *all* Documents in the Job, including ones that have
 603 been canceled by a previous Cancel-Documents operation. Therefore, the Printer removes any 'canceled-by-xxx'
 604 values from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attribute so that any
 605 canceled Documents are reprocessed along with the other Documents.

606 **4 Document Operations**

607 This section defines the Document Creation and Document operations. The Document object semantics are as
 608 parallel to the Job object semantics as possible. Therefore, most of the Job operations have analogous Document
 609 operations as shown in Table 17 in section "Appendix A: Document operations compared to Job operations".
 610 Operations that can apply only to an entire job have no analogous document operation as indicated. This extension
 611 adds 5 new Document operations that operate on the Document object once it is created by either of the existing four
 612 operations: Send-Document, Send-URI operations, Print-Job and Print-URI.

613 Note: By Document object, this specification means the object once it becomes a contained part of a Job object, not
 614 before or after. So in this specification a Document object does not represent data in a repository.

615 The signatures of the operation requests that create Document objects are very similar as shown in Table 4. The
 616 entries in the table show what a client MUST, MAY, or MUST NOT supply in the indicated operation requests.

617 **Table 4 - Client-supplied Document Creation and Validation Request Signatures**

	Send-Document	Send-URI	Print-Job	Print-URI
Target	MUST be Job	MUST be Job	MUST be Printer	MUST be Printer
"document-uri"	MUST NOT	MUST	MUST NOT	MUST
Document Template attributes	MAY	MAY	MAY	MAY

Data	MUST	MUST NOT	MUST	MUST NOT
------	------	----------	------	----------

618

619 The entries in Table 5 show what a Printer MUST or MAY support and return in the indicated operations responses.

620

Table 5 - Printer-returned Document Creation and Validation Response Signatures

	Create-Job	Send-Document	Send-URI	Print-Job	Print-URI
Status code/message	MUST	MUST	MUST	MUST	MUST
Unsupported Attributes	MUST, if any	MUST, if any	MUST, if any	MUST, if any	MUST, if any
Job status attributes	MUST	MUST	MUST	MUST	MUST
Document status attributes:					
“document-number”	MUST NOT	MUST	MUST	MAY	MAY
“document-state”	MUST NOT	MUST	MUST	MAY	MAY
“document-state-reasons”	MUST NOT	MUST	MUST	MAY	MAY
“document-state-message”	MUST NOT	MAY	MAY	MAY	MAY

621

622 4.1 Send-Document ([rfc2911] § 3.3.1) extension

623 This REQUIRED¹³ Document Creation operation allows a client to submit multiple documents in a single Job by
 624 making a Send-Document request for each Document. In this specification, the Send-Document creates a
 625 Document object ([rfc2911] did not have a Document object). A Printer MUST support this operation with the
 626 semantics specified in [rfc2911] and with the extension defined in this specification, since this specification
 627 REQUIRES the Printer to support multiple document jobs.

628 See [rfc2911] § 3.3.1 for the semantics of the Send-Document operation not reproduced here.

629 *Access Rights:* The authenticated user (see [rfc2911] § 8.3) performing this operation must either be the job owner
 630 (as determined in the Create-Job operation) or an operator or administrator of the Printer (see [rfc2911] § 1 and 8.5).
 631 Otherwise, the Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated',
 632 or 'client-error-not-authorized' as appropriate.

633 4.1.1 Send-Document Request

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

635 Group 1: Operation Attributes (as in [rfc2911])

636 As specified in [rfc2911] § 3.3.1 Send-Document request, plus any extensions indicated in Table 8. For
 637 example, “compression”, “document-format”, and “document-name”.

638 Group 2: Document Template Attributes (new - not in [rfc2911])

639 The client OPTIONALLY supplies a set of Document Template attributes as listed in Table 10. For example,
 640 “media” and “number-up”. If the client is not supplying any Document Template attributes in the request, the

¹³ This specification REQUIRES the Printer to support the Send-Document operation while [rfc2911] did not. This difference is because this specification REQUIRES the Printer to support multiple document jobs, while [rfc2911] did not.

641 client SHOULD omit Group 2 rather than sending an empty group. However, a Printer MUST be able to
642 accept an empty group.

643 **Group 3: Document Content (as in [rfc2911] Group 2)**

644 The client MUST supply the document data in-line to be processed for this Document if the "last-document"
645 flag is set to 'false' or omitted. However, since a client might not know that the previous Document Creation
646 operation that the client had supplied (a Send-Document or a Send-URI operation) was the last document
647 (i.e., the client had supplied the "last-document" attribute with a 'false' value), the client MUST use a Send-
648 Document request with no document data where the "last-document" flag is set to 'true' (see [rfc2911] §
649 3.3.1). For this Send-Document case with no data, the Printer MUST NOT increment the value of the Job
650 object's "number-of-documents" attribute, since no Document object was added to the job. In addition, it is
651 not an error for a client to submit a job with no actual document data, i.e., only a single Create-Job and
652 Send-Document request with a "last-document" Operation attribute set to 'true' with no document data; it is
653 only an empty job which is scheduled and processed normally.

654 **4.1.2 Send-Document Response**

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

656 **Group 1: Operation Attributes (as in [rfc2911] Group 1)**

657 **Status Message:**

658 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
659 "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as
660 described in [rfc2911] § 13 and 3.1.6.

661 **Natural Language and Character Set:**

662 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.2.

663 **Group 2: Unsupported Attributes (as in [rfc2911] Group 2)**

664 See [rfc2911] § 3.1.7 for details on returning Unsupported Attributes.

665 **Group 3: Job Object Attributes (as in [rfc2911] Group 3)**

666 The Printer MUST return the same set of Job status attributes as for the Print-Job response as specified in
667 [rfc2911] § 3.2.1.2.

668 **Group 4: Document Object Attributes (new)**

669 The following Document Description attributes are defined for this Group:

670 **4.1.2.1 document-number (integer(1:MAX))**

671 The Printer MUST return the document number of this Document object that was assigned by the Printer
672 starting with 1 for each Job (see section 9.1.23).

673 **4.1.2.2 document-state (type1 enum)**

674 The Printer MUST return the state of this Document object (see section 9.1.25).

675 4.1.2.3 document-state-reasons (1setOf type2 keyword)

676 The Printer MUST return the associated state reasons for this Document (see section 9.1.27).

677 4.1.2.4 document-state-message (text(MAX))

678 The Printer MAY return the localized description of the "document-state" and "document-state-reasons"
679 values for this Document (see section 9.1.26).

680 4.2 Send-URI ([rfc2911] § 3.3.2) extension

681 This OPTIONAL Document Creation operation has the same request and response semantics as the Send-
682 Document operation (see section 4.1) except that a client MUST supply a URI reference ("document-uri" Operation
683 attribute) rather than the document data itself. If a Printer supports this operation, clients can use either this
684 operation or the Send-Document operation to add new Document objects to an existing multi-document Job object.
685 However, if a client needs to indicate that the previous Send-URI or Send-Document was the last document, the
686 client MUST use the Send-Document operation (see section 4.1) with no document data and the "last-document" flag
687 set to 'true' as specified in [rfc2911] § 3.3.2 (rather than using a Send-URI operation with no "document-uri"
688 Operation attribute).

689 If a Printer supports this operation, it MUST also support the Print-URI operation (see [rfc2911] § 3.2.2).

690 The Printer MUST validate the syntax and URI scheme of the supplied URI before returning a response, just as in
691 the Print-URI operation. The IPP Printer MAY validate the accessibility of the document as part of the operation or
692 subsequently (see [rfc2911] § 3.2.2).

693 4.3 Get-Document-Attributes

694 This REQUIRED Document operation allows a client to request the values of selected attributes of a Document
695 object. This operation is almost identical to the Get-Job-Attributes operation (see [rfc2911] § 3.3.4). The only
696 differences are that the operation is directed at a Document object rather than a Job object and the returned attribute
697 group is a set of Document object attributes rather than a set of Job object attributes.

698 The Printer MUST return the Document Description attributes that a client supplied in the Document Creation
699 operation (Print-Job, Print-URI, Send-Document or Send-URI) as Operation attributes (see the PJ/PU and SD/SU
700 columns in Table 8 and the Doc column in Table 11), any Document Template attributes supplied by Send-Document
701 or Send-URI operations (see the D column in Table 10), plus any additional Document Description attributes that the
702 Printer has generated, such as "document-state" (see the Doc column in Table 11). The Printer MUST NOT return
703 any Job Level attributes that the Document object inherits and MUST NOT factor out common Document object
704 attributes and return them as Job object attributes. Thus Get-Document-Attributes returns to clients only the
705 attributes that clients submitted in Document Creation operations, plus the additional Document Description attributes
706 that the Printer sets.

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

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

715 - 'document-template': the subset of the Document Template attributes (the "D" column in Table 10) that the
716 implementation supports for Document objects.

717 - 'document-description': the subset of the Document Description attributes specified in the "Doc" column of
718 Table 11 that the implementation supports for Document objects.

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

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

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

727 4.3.1 Get-Document-Attributes Request

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

730 Group 1: Operation Attributes

731 Natural Language and Character Set:

732 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.1.

733 Target:

734 The "document-number" (integer(1:MAX)) Operation attribute MUST be supplied immediately after either (1)
735 the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s) which define
736 the target Document object for this operation as described in [rfc2911] § 3.1.5. If the client omits the
737 "document-number" Operation attribute, the Printer MUST reject the request and return the 'client-error-bad-
738 request' status code.

739 Requesting User Name:

740 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
741 [rfc2911] § 8.3.

742 4.3.1.1 "requested-attributes" (1setOf keyword):

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

746 4.3.2 Get-Document-Attributes Response

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

748 Group 1: Operation Attributes

749 Status Message:

750 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
751 "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as
752 described in [rfc2911] § 13 and 3.1.6.

753 Natural Language and Character Set:

754 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.2. The
755 "attributes-natural-language" MAY be the natural language of the Document object, rather than the one
756 requested.

757 Group 2: Unsupported Attributes

758 See [rfc2911] § 3.1.7 for details on returning Unsupported Attributes.

759 The response MAY contain or MAY omit the "requested-attributes" Operation attribute with any supplied
760 values (attribute keywords) that were requested by the client but are not supported by the Printer. If the
761 Printer does return unsupported attributes referenced in the "requested-attributes" Operation attribute and
762 that attribute included group names, such as 'all', the unsupported attributes MUST NOT include attributes
763 described in the standard but not supported by the implementation.

764 Group 3: Document Object Attributes

765 The Printer returns the set of requested Document Template attributes (see the D column in Table 10) and
766 Document Description attributes (see the Doc column in Table 11) and their current values. The Printer
767 ignores (does not respond with) any requested attribute or value which is not supported. Furthermore, the
768 Printer MUST NOT return Document Template attributes that were not supplied by a client in a Send-
769 Document or Send-URI request or set by a Set-Document-Attributes request. So the response reflects what
770 was submitted. The Printer MAY omit returning attributes that are restricted by the Printer's security policy in
771 force, including whether the requesting user is the user that submitted the job (job originating user) or not
772 (see [rfc2911] § 8). However, the Printer MUST respond with the 'unknown' value for any supported attribute
773 (including all REQUIRED attributes) for which the Printer does not know the value, unless it would violate the
774 security policy. See the description of the "out-of-band" values in the beginning of [rfc2911] § 4.1.

775 4.4 Set-Document-Attributes

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

780 This operation is almost identical to the Set-Job-Attributes operation and follows the same rules for validation (see
781 [rfc3380] § 4.2). The only differences are that the Set-Document-Attributes operation is directed at a Document
782 object rather than a Job object. As with the Set-Job-Attributes operation, the Set-Document-Attributes operation can
783 add an attribute to the Target object and accept the 'delete-attributes' out-of-band value to remove an attribute from
784 the Target object. In addition the validation is the same as the Send-Document and Send-URI operations that create
785 Document objects, i.e., the Printer validation depends on the "xxx-supported" Printer Description attributes (see
786 [rfc2911] § 3.1).

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

790 If the client supplies a document attribute with the "out-of-band" value 'delete-attribute' (see [rfc3380] § 8.2), then the
791 Printer MUST remove the attribute and all of its values from the Document object, if present. The semantic effect of
792 the client supplying the 'delete-attribute' value in a Set-Document-Attributes operation MUST be the same as if the
793 attribute had not been supplied with the Document object in the Document Creation operation, i.e., the Printer applies
794 its default attribute or behavior with lower precedence than the PDL (see the beginning of [rfc2911] § 4.2 and
795 [rfc2911] 3.2.1.1). Any subsequent query of the Document object using Get-Document-Attributes or Get-Documents
796 MUST NOT return any attribute that has been deleted using the 'delete-attribute' out-of-band value. However, a

797 client can re-establish such a deleted Document attribute with any supported value(s) using a subsequent Set-
798 Document-Attributes operation.

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

803 The validation of the Set-Documents-Attributes request is performed by the Printer as if the document had been
804 submitted originally with the new attribute values (and the deleted attributes removed) and with "ipp-attribute-fidelity"
805 set to 'true', i.e., all modified Document attributes and values MUST be supported in combination with the Document
806 attributes not modified. If such a Document Creation operation would have been accepted, then the Set-Documents-
807 Attributes MUST be accepted. If such a Document Creation operation would have been rejected, then the Set-
808 Documents-Attributes MUST be rejected and the Document MUST be unchanged. In addition, if any of the supplied
809 attributes are not supported, are not settable, or the values are not supported, the Printer MUST reject the entire
810 operation; the Printer MUST NOT partially set some of the supplied attributes. In other words, after the operation, all
811 the supplied attributes MUST be set or none of them MUST be set, thus making the Set-Documents-Attributes an
812 atomic operation.

813 The value of the "ipp-attribute-fidelity" and "job-mandatory-attributes" Operation attributes supplied in the original Job
814 Creation request, if any, MUST have no effect on the behavior of the Set-Documents-Attributes operation, since the
815 Set-Documents-Attributes request MUST behave as if "ipp-attribute-fidelity" = 'true'. In other words, the Printer MUST
816 reject any attempt to set a Document attribute to an unsupported value or to a value that would conflict with another
817 Document attribute value.

818 The Printer MUST accept or reject this operation when the Document's READ-ONLY "document-state" attribute has
819 the values shown in Table 6. The document's current state MUST affect whether the Printer accepts or rejects the
820 request. However, the Set-Documents-Attributes operation MUST NOT change the state of the Document object
821 (since the Document is a passive object and the Document state is a subset of the Job State). For example, in the
822 case where the operation creates a request for unavailable resources, the Job (but not the Document) transitions to a
823 new state. Table 6 shows the allowed behaviors in each document state.

824 **Table 6 - 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).
'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'

825
826 This operation MUST NOT change the value of attributes not specified in the operation unless the definition of the
827 attribute explicitly specifies such side effects. In general, Document attribute definitions that are settable will not
828 define side effects on other attributes that are settable, only side effects on READ-ONLY attributes, if any.

829 4.4.1 Settable and READ-ONLY Document Description attributes

830 If the Printer supports the Set-Document-Attributes operation, then it SHOULD support setting of:
831 all Document Template ("xxx") attributes
832 that the implementation supports (see the "D" column in Table 10).

833 Almost all Document Description attributes (see [rfc2911] § 4.3) MUST NOT be settable, i.e., they are defined to be
834 READ-ONLY. Only Document Description attributes marked with "(r/w)" in Table 11 MAY be settable using Set-
835 Document-Attributes. The Printer MUST reject a Set-Document-Attributes request that attempts to set any attributes
836 in Table 11 that are not marked "(r/w)".

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

840 *Access Rights:* The authenticated user (see [rfc2911] § 8.3) performing this operation must either be the job owner
841 (as determined in the Job Creation operation) or an operator or administrator of the Printer (see [rfc2911] § 1 and
842 8.5).

843 4.4.2 Set-Document-Attributes Request

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

845 Group 1: Operation Attributes

846 Natural Language and Character Set:

847 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.1.

848 Target:

849 The client MUST supply the "document-number" (integer(1:MAX)) Operation attribute immediately after
850 either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s)
851 which define the target Document object for this operation as described in [rfc2911] § 3.1.5. If the client
852 omits the "document-number" Operation attribute, the Printer MUST reject the request and return the 'client-
853 error-bad-request' status code.

854 Note: There is no way in a single operation for the client to set all of a Job's Document objects to the same
855 attribute value. Either (1) the client sets the corresponding attribute in each Document object in the Job with
856 separate Set-Document-Attributes requests, or (2) the client sets the corresponding attribute at the Job Level
857 using the Set-Job-Attributes operation. Setting the corresponding attribute at the Job Level (or supplying that
858 attribute initially in the Job Creation operation) causes each Document object to inherit the Job Level
859 attribute value, if the Document object doesn't have a corresponding explicit attribute supplied at the
860 Document Level. In other words, supplying an attribute at the Job Level will affect all the Job's Document
861 objects that don't have that attribute also explicitly supplied at the Document Level.

862 Requesting User Name:

863 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
864 [rfc2911] § 8.3.

865 Group 2: Document Attributes

866 The client MUST supply a set of Document Template attributes with one or more values (including explicitly
867 allowed out-of-band values) as listed in the "D" column in Table 10, and Document Description attributes
868 flagged with "(r/w)" and listed in the "Doc" column in Table 11, and any attribute extensions supported by the
869 Printer. The value(s) of each Document attribute supplied in Group 2 replaces the value(s) of the
870 corresponding Document attribute on the target Document object. For attributes that can have multiple

871 values (1setOf), all values supplied by the client replace all values of the corresponding Document object
872 attribute.

873 In order to set the Document's "document-message" Document Description attribute (see section 9.1.20), the
874 client MUST supply the attribute in Group 2, rather than supplying a "document-message" Operation attribute
875 in Group 1.

876 If the client supplies an "xxx" attribute with the 'delete-attribute' out-of-band value (see [rfc3380] § 8.2), the
877 Printer MUST remove the "xxx" attribute from the Document object, if present.

878 4.4.3 Set-Document-Attributes Response

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

880 Group 1: Operation Attributes

881 Status Message:

882 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
883 "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as
884 described in [rfc2911] § 13 and 3.1.6.

885 Natural Language and Character Set:

886 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.2.

887 Group 2: Unsupported Attributes

888 See [rfc2911] § 3.1.7 for details on returning Unsupported Attributes.

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

- 894 1. The number of attributes supplied by the client exceeds the maximum number that the Printer
895 supports in a Set-Printer-Attributes request: return the 'client-error-request-entity-too-large' (see
896 [rfc2911] § 13.1.4.9).
- 897 2. The Printer doesn't support the attribute: return the attribute with the 'unsupported' out-of-band
898 attribute value (see [rfc2911] § 3.1.7 and [rfc2910]) and the 'client-error-attributes-or-values-not-
899 supported' (see [rfc2911] § 13.1.4.12).
- 900 3. The attribute is READ-ONLY (in its definition) or is not-settable in this implementation: return the
901 attribute with the 'not-settable' out-of-band attribute value (see [rfc3380] § 8.1) and the 'client-
902 error-attributes-not-settable' status code (see [rfc3380] § 7.1).
- 903 4. The Printer doesn't support the value: if the attribute in the operation has a single value, return it.
904 If the attribute in the operation is multi-valued, return only those values in a 1setOf that are not
905 supported. Return the 'client-error-attributes-or-values-not-supported' status code (see [rfc2911] §
906 13.1.4.12).
- 907 5. The values of some of the supplied attributes conflict with one another and/or other Document
908 attribute values not being set: if the conflicting attribute in the operation has a single value, return
909 the attribute and the value. If the attribute in the operation is multi-valued, return only the attribute

910 and those values in a 1setOf that are conflicting with other attributes. Return the 'client-error-
911 conflicting-attributes' status code (see [rfc2911] § 13.1.4.15).

912 4.5 Cancel-Document

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

917 The Cancel-Document operation does not remove the Document from the Job and Printer, but only sets the specified
918 Document's "document-state" Document Description attribute to 'canceled' and the Document's "document-state-
919 reasons" Document Description attribute with 'canceled-by-user' or 'cancel-by-operator'. If the Job object is printed
920 again using operations such as the Reprocess-Job operation (see [adm-ops] § 4.1) or the Restart-Job operation (see
921 [rfc2911] § 3.3.7), any canceled Documents are also printed again. Thus Cancel-Document has the same semantics
922 as Cancel-Job (see [rfc2911] § 3.3.3), which only cancels the processing of the job, and doesn't delete the Job object
923 itself. See the Delete-Document operation (section 5.4) to remove the Document object itself immediately from the
924 Job and Printer.

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

929 The Printer MUST accept or reject the request based on the document's current state and transition the document to
930 the indicated new state as follows:

Current "document-state"	New "document-state"	Printer'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'

931
932 Rule 1: If the implementation requires some measurable time to cancel the document in the 'processing' document
933 states, the Printer MUST add the 'processing-to-stop-point' value to the document's "document-state-reasons"
934 attribute and then transition the document to the 'canceled' state when the processing ceases (see [rfc2911] § 4.3.8).

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

937 *Access Rights:* The authenticated user (see [rfc2911] § 8.3) performing this operation must either be the job owner or
938 an operator or administrator of the Printer (see [rfc2911] § 1 and 8.5). Otherwise, the Printer MUST reject the
939 operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as
940 appropriate.

941 4.5.1 Cancel-Document Request

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

943 **Group 1: Operation Attributes**

944 **Natural Language and Character Set:**

945 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.1.

946 **Target:**

947 The client MUST supply the "document-number" (integer(1:MAX)) Operation attribute immediately after
948 either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s)
949 which define the target Document object for this operation as described in section [rfc2911] 3.1.5. If the
950 client omits the "document-number" Operation attribute, the Printer MUST reject the request and return the
951 'client-error-bad-request' status code.

952 **Requesting User Name:**

953 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
954 [rfc2911] § 8.3.

955 **4.5.1.1 document-message (text(MAX)):**

956 The client MAY supply this Operation attribute. If the Printer supports this attribute, the Printer MUST also
957 support the corresponding "document-message" (text(MAX)) Document Description attribute (see section
958 9.1.20) and copy this value to the "document-message" Document Description attribute. The end user can
959 use this Document Description attribute as a message to the operator and the operator can use it as a
960 message to the end user. The Printer MAY print this message on a document start sheet for this document,
961 if any.

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

964 **4.5.2 Cancel-Document Response**

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

966 **Group 1: Operation Attributes**

967 **Status Message:**

968 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
969 "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as
970 described in [rfc2911] § 13 and 3.1.6.

971 **Natural Language and Character Set:**

972 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] § 3.1.4.2.

973 **Group 2: Unsupported Attributes**

974 See [rfc2911] § 3.1.7 for details on returning Unsupported Attributes.

975 Once a successful response has been sent, the implementation guarantees that the Document will eventually end up
976 in the 'canceled' state. Between the time the Cancel-Document operation is accepted and when the document
977 enters the 'canceled' document-state (see section 9.1.25), the "document-state-reasons" attribute (see section
978 9.1.27) MUST contain the 'processing-to-stop-point' value which indicates to later queries that although the
979 Document might still be 'processing', it will eventually end up in the 'canceled' state, not the 'completed' state.

980 **5 Administrative Job and Document operations**

981 This section summarizes the extensions to existing Administrative Job and Printer operations and defines new
982 Document Administrative operations. The following administrative operations: **Promote-Job** ([adm-ops] § 4.4.1),
983 **Release-Held-New-Jobs** ([adm-ops] § 3.3.2), **Resume-Job** ([adm-ops] § 4.3.2), **Schedule-Job-After** ([adm-ops] §
984 4.4.2) do not affect the Document objects because they are defined to affect the Job object as a whole.

985 **5.1 Purge-Jobs** ([rfc2911] § 3.2.9)

986 This OPTIONAL Administrative Printer operation removes all Jobs and all of their contained Document objects.

987 **5.2 Cancel-Current-Job** ([adm-ops] § 4.2)

988 This OPTIONAL Administrative Printer operation sets the “document-state” Document Description attribute to
989 ‘canceled’ and the “document-state-reasons” Document Description attribute to ‘canceled-by-xxx’ for any documents
990 in the current Job that have not yet reached a terminal state (‘completed’, ‘canceled’, or ‘aborted’), where ‘xxx’ is
991 ‘user’ or ‘operator’. See [adm-ops] § 4.2.

992 Note: There is no Cancel-Current-Document operation defined, since it is too likely that the Printer would have
993 moved onto the next document before the operation could issue the request.

994 **5.3 Suspend-Current-Job** ([adm-ops] § 4.3.1)

995 This OPTIONAL Administrative Printer operation suspends the current job and sets the Job’s “job-state” Job
996 Description attribute to ‘processing-stopped’ and “job-state-reasons” to ‘job-suspended-by-xxx’, where ‘xxx’ is ‘user’
997 or ‘operator’. The Documents’ “document-state” and “document-state-reasons” Document Description attributes are
998 unaffected (but the Documents are not processed any further, since the Job is stopped).

999 **5.4 Delete-Document**

1000 This OPTIONAL Administrative Document operation removes the specified Document object and its data
1001 immediately from the specified Job. The Printer MUST reject the request if the Document is in any state other than
1002 ‘pending’ (there is no ‘pending-held’ state for Documents). The Printer does not reassign the “document-number”
1003 Document Description attribute values of the remaining Document objects in the Job, so that the deleted Document
1004 object leaves a gap in the document numbering space for the Job. The Printer MUST return a ‘client-error-not-found’
1005 status code, in a subsequent Get-Document-Attributes operation for this Document object specifying its former
1006 “document-number”. This operation is similar to the Purge-Jobs operation that immediately deletes all jobs from the
1007 Printer. However, the Delete-Document operation only deletes a single Document from the specified Job.

1008 *Access Rights:* The authenticated user (see [rfc2911] § 8.3) performing this operation MUST be an operator or
1009 administrator of the Printer (see [rfc2911] § 1 and 8.5). Otherwise, the Printer MUST reject the operation and return:
1010 ‘client-error-forbidden’, ‘client-error-not-authenticated’, or ‘client-error-not-authorized’ as appropriate. This operation
1011 requires operator/administrator privileges, otherwise a rogue client could submit, then delete, at will using up valuable
1012 spooling space. Instead of using this operation, unprivileged users use Cancel-Document which goes through the
1013 normal accounting, if any.

1014 The Delete-Document request and Delete-Document response have the same attribute groups and attributes as the
1015 Cancel-Document operation (see section 4.5).

1016 6 Job and Document Template Attribute Precedence during Job processing

1017 This section defines the Attribute Precedence rules that the Printer MUST follow when processing jobs, including
 1018 instructions in the PDL data. These rules cover Queue Override attributes, Page Override attributes, Document
 1019 Object attributes (Operation/Document Description and Document Template), Document Override attributes, Job
 1020 Object attributes (Operation/Job Description and Job Template), PDL instructions, PDL Interpreter initialization files,
 1021 and Printer defaults. Since each attribute can be specified at all of these levels, it is important to define which level
 1022 takes precedence when the same attribute occurs at different levels with differing values.

1023 The attribute precedence model has the following features:

- 1024 1) In principle, each defined attribute can occur at each of the precedence levels.
- 1025 2) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print
 1026 driver, submission client, protocol, and Printer:
- 1027 ? Attributes are supplied by different agents in the system: application, user, print driver, administrator,
 1028 operator, Printer, and the output device hardware.
- 1029 ? Attributes are supplied at different points in time: PDL generation, job submission, job acceptance, job
 1030 pending, job processing.
- 1031 3) The later that an attribute is introduced into the work flow or the closer the specified scope of the attribute is to
 1032 the affected object, the higher the precedence is assigned to that attribute, since precedence is intended to
 1033 reflect the user's wishes.

1034 The following levels of Attribute Precedence are defined in order of decreasing priority:

- 1035 1. **Document Level - page override programming** - The special "overrides" collection Document
 1036 Template attribute (see [OvrRide]) supplied at the Document Level, that is, as a Document Template
 1037 Attribute in a Send-Document or Send-URI operation, that contains the attributes that are to have the
 1038 page override status for the specified ranges of pages. This can be supplied by the client when
 1039 submitting a Document object, or set either by the user or operator after the Document has been
 1040 accepted using the Set-Document-Attributes operation, or by the operator using means local to the
 1041 Printer. Example: " overrides" = {"pages" = '1:1'; " media" = 'letterhead'}
- 1042 2. **Job Level - page override programming** - The special "overrides" collection Job Template attribute
 1043 (see [OvrRide]) supplied at the Job Level, that is, in a Job Creation operation, that contains the attributes
 1044 that are to have the page override status for the specified ranges of pages in the specified Document.
 1045 This can be supplied by the client when submitting a job, or set either by the user or operator after the
 1046 job has been accepted using the Set-Job-Attributes operation, or by the operator using means local to
 1047 the Printer. Example: " overrides" = {"pages" = '1:1'; "document-numbers" = '1:1'; "media" = 'letterhead'}
- 1048 3. **Document Level - Document object attributes** - The Document attributes supplied at the Document
 1049 Level, that is, Operation/Document Description and Document Template attributes supplied in a Send-
 1050 Document or Send-URI operation to apply to the Input Document. This can be supplied by the client
 1051 when submitting a Document object, or set either by the user or operator after the Document has been
 1052 accepted using the Set-Document-Attributes operation, or by the operator using means local to the
 1053 Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
- 1054 4. **Job Level - Job object and Document object attributes** - The Job attributes (Operation/Job
 1055 Description and Job Template) and Document attributes (Operation/Document Description and
 1056 Document Template) supplied at the Job Level, i.e., with a Create-Job, Print-Job, or Print-URI operation.

- 1057 This can be supplied by the client when submitting a Job, or set either by the user or operator after the
 1058 job has been accepted using the Set-Job-Attributes operation, or by the operator using means local to
 1059 the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
- 1060 5. **PDL document data** - An instruction in the PDL document data. This is supplied by the application or
 1061 print driver that created the PDL. Example: PostScript setPageDevice specifying na-letter media.
 1062 Whether PDL document data is actually lower precedence than the preceding levels depends on the
 1063 implementation as expressed in the "pdl-override-supported" Printer Description attribute (see [rfc2911] §
 1064 4.4.28).
 1065
 1066 Job Template and Document Template attributes of the form "xxx-requested", such as "orientation-
 1067 requested" (see [rfc2911] § 4.2.10) have a lower priority than the PDL. If the PDL contains a
 1068 corresponding instruction, that PDL instruction will be used instead of the supplied "xxx-requested"
 1069 attribute. For example, PostScript PDL data always has a well-defined orientation, so that "orientation-
 1070 requested" never affects the result. On the other hand, PDLs such as text/plain never have orientation
 1071 and PCL MAY omit orientation, in which case, "orientation-requested" takes effect.
- 1072 6. **PDL Init File data** - A file that the Printer uses to initialize the PDL Interpreter before it starts interpreting
 1073 each document in a Job. It is immaterial how this file is specified, whether it be by job object attribute or
 1074 printer default – the precedence of the contents of this file is at this level.
- 1075 7. **Printer default** - A Printer "xxx-default" attribute that is applied by the Printer provided that none of the
 1076 higher levels have supplied a value. The Printer implementation supplies values for the Printer's "xxx-
 1077 default" attributes that reflect the out-of-the-box action by the output device. For example, if the output
 1078 device will use media from the large-capacity input tray if not directed otherwise, the implementation
 1079 supplies the Printer's "media-default" attribute with the 'large-capacity' keyword value without requiring
 1080 the administrator to configure that value. Implementations might allow the administrator to configure the
 1081 Printer's "xxx-default" attributes to other values, if other values are supported by the implementation.
 1082 Example: The administrator changes the Printer's "media-default" from 'large-capacity' to 'na-letter'.
- 1083 8. **Hardware default** - When none of the above conditions supply an explicit value, the printer will apply the
 1084 defaults supplied by the hardware. An example of these implicit defaults would be a "copies" value of 1
 1085 or a "sides" value of 'one-sided'. Note that this level is outside the scope of IPP. The defaults at this
 1086 level only apply if there are no explicit values in the higher level. Since this level is outside the scope of
 1087 IPP there is no IPP specific way to query the defaults at this level.

1088 7 Operation Attributes for the Job and Document Creation operations

1089 This section defines some new Operation/Description attributes and lists *all* the Operation/Description attributes that
 1090 have been defined in other IPP specifications that are used in Job Creation operations and extends their use to the
 1091 Document Creation operations. In addition, some new Job/Document Description attributes have been defined to be
 1092 set from existing Operation attributes. Note: Operation attributes relate to the operation and do not depend on the
 1093 printing capabilities of the Printer.

1094 7.1 Operation Attributes *supplied* at the Job and Document Levels for Creation

1095 Table 7 lists all the Operation attributes and their attribute syntax supplied in Job Creation and Document Creation
 1096 operations and the attribute syntaxes of their corresponding "xxx-default" and "xxx-supported" Printer Description
 1097 attributes, if any. A "-" indicates that there isn't an "xxx-default" or "xxx-supported" Printer Description attribute.

1098

Table 7- Operation, Default, and Supported Attributes

Operation attribute	Operation attribute syntax	Printer: Default Value attribute syntax	Printer: Supported Values attribute syntax
attributes-charset	charset	-	1setOf charset ¹⁴
attributes-natural-language	naturalLanguage	-	1setOf naturalLanguage ¹⁵
compression	type3 keyword	-	1setOf type3 keyword
document-charset	charset	charset	1setOf charset
document-digital-signature	type2 keyword	type2 keyword	1setOf type2 keyword
document-format	mimeMediaType	mimeMediaType	1setOf mimeMediaType
document-format-details	1setOf collection	1setOf collection	1setOf type2 keyword
document-source-application-name	name(MAX)	name(MAX)	-
document-source-application-version	text(127)	text(127)	-
document-source-os-name	name(40)	name(40)	-
document-source-os-version	text(40)	text(40)	-
document-format	mimeMediaType	mimeMediaType	-
document-format-device-id	text(127)	text(127)	-
document-format-version	text(127)	text(127)	-
document-natural-language	naturalLanguage	naturalLanguage	-
document-format-version	text(127)	text(127)	1setOf text(127)
document-message	text(MAX)	-	-
document-name	name(MAX)	-	-
document-natural-language	naturalLanguage	naturalLanguage	1setOf naturalLanguage
document-uri	uri	-	1setOf uriScheme ¹⁶
ipp-attribute-fidelity	boolean	-	-
[job-]impressions	integer(0:MAX)	-	rangeOfInteger(0:MAX)
[job-]k-octets	integer(0:MAX)	-	rangeOfInteger(0:MAX)
job-mandatory-attributes	1setOf type2 keyword	-	-
[job-]media-sheets	integer(0:MAX)	-	rangeOfInteger(0:MAX)
job-name	name(MAX)	-	-
job-password	octetString(255)	-	integer(0:127)
job-password-encryption	type3 keyword name(MAX)	-	1setOf (type3 keyword name(MAX))
last-document	boolean	-	-
operation-id	integer(1:0x8FFF)	-	1setOf type2 enum ¹⁷
original-requesting-user-name	name(MAX)	-	-
output-device-requested	name(127)	name(127) ¹⁸	1setOf name(MAX) ¹⁹
printer-uri	uri	-	1setOf uri
request-id	integer(1:MAX)	-	-

¹⁴ The Supported Printer attribute is named "charset-supported" (see [rfc2911] section 4.4.18), rather than "attributes-charset-supported".

¹⁵ The Supported Printer attribute is named "generated-natural-language-supported" (see [rfc2911] section 4.4.20), rather than "attributes-natural-language-supported".

¹⁶ The Supported Printer attribute is named "reference-uri-schemes-supported" (see [rfc2911] section 4.4.27), rather than "document-uri-supported".

¹⁷ The Supported Printer attribute is named "operations-supported" (see [rfc2911] section 4.4.15), rather than "operation-id-supported".

¹⁸ The Default Printer attribute is name "output-device-default" (see [jobx] section 7.11) and is the default for both the "output-device-requested" and "output-device-assigned" Job Description attributes.

¹⁹ The Supported Printer attribute is named "output-device-supported" (see [jobx] section 7.12) and is the list of supported output devices for both the "output-device-requested" and "output-device-assigned" Job Description attributes.

Operation attribute	Operation attribute syntax	Printer: Default Value attribute syntax	Printer: Supported Values attribute syntax
requesting-user-name	name(MAX)	-	-
version-number	X.Y	-	1setOf type2 keyword ²⁰

1099

1100 Table 8 lists the Operation attributes that clients supply at the Job Level and/or the Document Level and whether the
 1101 Printer copies (indicated by “? ”) the supplied value to corresponding Job Description and/or Document Description
 1102 attributes.

1103 **Legend:**

1104 ****** an attribute that has a “job-” prefix in its name in [rfc2911]. The “job-” prefix is omitted in the table. Job level
 1105 attributes use the “-job” prefix. Document level attributes do not use the prefix. The only difference in the
 1106 semantics are whether it applies to just the Document or to the entire Job. Note: For the PWG Semantic
 1107 Model, the “**job-**” prefix is dropped altogether.

1108 **“Level Supplied”** column indicates whether the Operation attribute can be supplied at the Job Level (PJ=Print-Job,
 1109 PU=Print-URI, and CJ=Create-Job) and at the Document Level (SD=Send-Document, and SU=Send-URI).

1110 **“y”** the Operation attribute is defined for the indicated operation, but does not have a corresponding Job
 1111 Description or Document Description attribute (no “?”).

1112 **“y?”** the Operation attribute has a corresponding Job Description (y? J) or Document Description (y? D) attribute
 1113 to which the Printer **MUST** copy this Operation attribute. See Table 11 for the corresponding Job and
 1114 Document Description attributes.

1115 **“-”** the Operation attribute is *not* defined for the indicated operation.

1116 ****** these Operation attributes are defined for *all* operations, not just Job Creation and Document Creation
 1117 operations.

1118 **“Conformance”** column indicates the conformance requirements for what the client supplies in a request and the
 1119 Printer supports in a request. If an Operation attribute that is a collection attribute is supported (see
 1120 [rfc3382]), then there are conformance requirements for which member attributes **MUST** be supported by a
 1121 Printer and which member attributes a client **MUST** supply as indicated in the Conformance column for each
 1122 collection member attribute in Table 8.

1123 **“Reference and Section”** column indicates where the Operation attribute is defined in other IPP specs and this spec.
 1124

1125 **Table 8 - Operation Attributes supplied at the Job and Document Levels in Job and Document Creation**
 1126 **Requests**

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied			Conformance		Reference and Section
		Job		Doc	Client supply	Printer support	
		CJ	PJ, PU	SD, SU			
attributes-charset **	charset	y? J	y? J	y? D	MUST	MUST	[rfc2911] §3.1.4
attributes-natural-language **	naturalLanguage	y? J	y? J	y? D	MUST	MUST	[rfc2911] §3.1.4
compression	type3 keyword	-	y? D	y? D	MAY	MUST	[rfc2911] §3.2.1.1
document-charset	charset	-	y? D	y? D	MAY	CMUST ²¹	[jobx] §43.2.1

²⁰ The Supported Printer attribute is named “ipp-versions-supported” (see [rfc2911] section 4.4.14), rather than “version-number-supported”.

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied			Conformance		Reference and Section
		Job		Doc	Client supply	Printer support	
		CJ	PJ, PU	SD, SU			
document-digital-signature	type2 keyword	-	y? D	y? D	MAY	MAY	[jobx] §3.2.2
document-format	mimeMediaType	-	y? ²² D	y? D	MAY	MUST	[rfc2911] §3.2.1.1, [jobx] §3.2.3
document-format-details	1 setOf collection	-	y? D	y? D	MAY	CMUST ²³	[jobx] §3.2.4
document-source-application-name	name(MAX)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.4.1
document-source-application-version	text(127)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.4.2
document-source-os-name	name(40)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.4.3
document-source-os-version	text(40)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.4.4
document-format	mimeMediaType	-	y? D	y? D	MUST	MUST	[jobx] §3.2.4.5
document-format-device-id	text(127)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.4.6
document-format-version	text(127)	-	y? D	y? D	SHOULD	MUST	[jobx] §3.2.4.7
document-natural-language	naturalLanguage	-	y? D	y? D	MAY	MAY	[jobx] §3.2.4.8
document-format-version	text(127)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.5
document-message	text(MAX)	-	y? D	y? D	MAY	MAY	[jobx] §3.2.6
document-name	name(MAX)	-	y? D	y? D	MAY	MUST	[rfc2911] §3.2.1.1
document-natural-language	naturalLanguage	-	y? D	y? D	MAY	MAY	[rfc2911] §3.2.1.1, [this spec] §7.2.1
document-uri	uri	-	y? D ²⁴	y? D ²⁵	CMUST ²⁶	MAY	[rfc2911] §3.2.2
impressions*	integer(0:MAX)	y? J	y? J	y? D	MAY	MAY	[rfc2911] §3.2.1.1
ipp-attribute-fidelity	boolean	y? J ²⁷	y? J ²⁷	-	MAY	MUST	[rfc2911] §3.2.1.1, [this spec] §3.1.1.1

²¹ The Printer MUST support the “document-charset” Operation/Document Description attributes, if the Printer supports a charset-ambiguous document format (see [jobx] §3.2.1).

²² The Printer MUST copy the “document-format” Operation attribute to the corresponding (new) Document Description attribute defined in this specification.

²³ The Printer MUST support the “document-format-details” Operation/Document Description attributes if the Printer supports a *packaging* MIME type document format, such as ‘application/zip’ or ‘multipart/related’.

²⁴ The Printer MUST copy the “document-uri” Operation attribute to the corresponding (new) Document Description attribute defined in this specification **for Print-Uri. The document-Uri does not apply to Print-Job.**

²⁵ The Printer MUST copy the “document-uri” Operation attribute to the corresponding (new) Document Description attribute defined in this specification **for Send-Uri. The document-Uri does not apply to Send-Document.**

²⁶ 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.

²⁷ The Printer MUST copy the “ipp-attribute-fidelity” Operation attribute to the corresponding (new) Job Description attribute defined in this specification so that the Printer can remember its value for subsequent Document Creation operations.

Operation attribute name for Job and Document Creation <i>requests</i>	Attribute Syntax	Level Supplied			Conformance		Reference and Section
		Job		Doc	Client supply	Printer support	
		CJ	PJ, PU	SD, SU			
job-mandatory-attributes	1setOf type2 keyword	y? J ²⁸	y? J	-	MAY	MUST	[this spec] §3.1.1.2
job-name	name(MAX)	y? J	y? J	-	MAY	MUST	[rfc2911] §4.3.5
k-octets*	integer(0:MAX)	y? J	y? J	y? D	MAY	MAY	[rfc2911] §3.2.1.1
last-document	boolean	-	-	y? D ²⁹	MUST	MUST	[rfc2911] §3.3.1.1
media-sheets*	integer(0:MAX)	y? J	y? J	y? D	MAY	MAY	[rfc2911] §3.2.1.1
operation-id **	integer(1:0x8FF F)	y	y	y	MUST	MUST	[rfc2911] §3.1.2
original-requesting-user- name **	name(MAX)	y? J	y? J	-	MAY	MAY	[adm-ops] §11.7.2.2
output-device-requested	name(127)	y? J	y? J	-	MAY	MAY	[jobx] §5.5
printer-uri **	uri	y? J ³⁰	y? J ³⁰	y? D ³⁰	MUST	MUST	[rfc2911] §3.1.5
request-id **	integer(1:MAX)	y	y	y	MUST	MUST	[rfc2911] §3.1.2
requesting-user-name **	name(MAX)	y? J ³¹	y? J ³¹	y	SHOUL D	MUST	[rfc2911] §3.2.1.1
version-number **	X.Y	y	y	y	MUST	MUST	[rfc2911] §3.1.8

1127 “y”, “y? ”, and “***”: see Legend at the beginning of the Table.

1128 7.2 Operation/Document Description attributes

1129 The rest of this section defines the semantics for the Operation attributes that a client MAY supply in a Document
1130 Creation operation and their corresponding Document Description attributes. The following statements apply to all of
1131 these Operation/Document Description attributes and are *not* repeated in each Description:

1132 If the Printer doesn't support the “xxx” Operation attribute, the Printer MUST ignore the “xxx” attribute (as with any
1133 OPTIONAL Operation attribute) and return the “xxx” attribute with the supplied value as unsupported in the
1134 Unsupported Attributes group as specified in [rfc2911] §3.1.7.

1135 If the Printer supports the “xxx” Operation attribute, the Printer MUST support it at the Job and Document level. The
1136 Printer MUST also:

²⁸ The Printer MUST copy the “job-mandatory-attributes” Operation attribute to the corresponding (new) Job Description attribute defined in this specification so that the Printer can remember its value for subsequent Document Creation operations.

²⁹ The Printer MUST copy the “last-document” Operation attribute to the corresponding (new) Document Description attribute defined in this specification so that the client can determine the last document when querying the Document objects.

³⁰ The Printer MUST copy the “printer-uri” Operation attribute to the Job's “job-printer-uri” Job Description attribute and Document's “document-printer-uri” Document Description attribute.

³¹ The operational attribute “requesting-user-name” may be copied to the Job Description attribute “job-originating-user-name” per the rules specified in [rfc2911] §4.3.6.

- 1137 1. support the corresponding "xxx" Document Description attribute of the same name (see section 9.1) and vice
1138 versa.
- 1139 2. copy the value of the "xxx" Operation attribute, if supplied by the client, to the corresponding "xxx" Document
1140 Description attribute.
- 1141 3. support the corresponding "xxx-default" and "xxx-supported" Printer Description attributes as well, if defined
1142 (see section 9.2) and vice versa.
- 1143 4. validate the values supplied by the client in the "xxx" Operation attribute against the values indicated in the
1144 Printer's corresponding "xxx-supported" Printer Description attribute (see section 9.2). If the values do not
1145 validate, the Printer MUST either reject the operation or accept the operation as indicated for each of the
1146 attributes described below.

1147 If the client supplies one of the "xxx" Operation/Document attributes with a value that the Printer does not support,
1148 the Printer MUST perform one of the actions indicated for that Operation, unless specified otherwise, such as (1)
1149 reject the request, (2) accept the request and either (a) hold the job for operator intervention or (b) print the Job
1150 ignoring the attribute. In all of these cases, the Printer MUST return the Operation attribute with the unsupported
1151 value in the Unsupported Attributes group in the response (see [rfc2911] § 3.1.7).

1152

1153 7.2.1 document-natural-language (naturalLanguage)

1154 This OPTIONAL Operation attribute specifies the natural language of the Document Object content (see [rfc2911] §
1155 3.2.1.1 and section 4.1.8).

1156 If the client supplies this "document-natural-language" Operation attribute with a value that the Printer doesn't
1157 support, the Printer MUST perform one of the following actions: (1) reject the request OR (2) accept the request and
1158 either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 7.2 above
1159 for more details.

1160 The values MAY include the region as well as the language according to [rfc2911] § 4.1.8. If the document contains
1161 more than one language, the value is the first or primary language of the document. The Printer MAY use this value
1162 to select fonts or other Internationalization processing. As indicated in [rfc2911] § 4.1.8, examples include:

- 1163 'en': for English
- 1164 'en-us': for US English
- 1165 'fr': for French
- 1166 'de': for German
- 1167

1168 7.3 Operation Attributes *returned* in Job and Document Creation responses

1169 Table 9 lists the Operation attributes that Printers return in Job Creation operation *responses* (Print-Job, Print-URI
1170 and Create-Job) and in Document Creation operation *responses* (Send-Document and Send-URI). The column
1171 labeled "Conformance" indicates the conformance for what the Printer returns and what the Printer supports. The
1172 References column lists the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

1173 **Table 9 - 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

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
	'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-messages *	text(MAX)	MAY	MAY	[rfc2911] §3.1.6.3
document-access-error	text(MAX)	MAY	MAY	[rfc2911] §3.1.6.4
document-number	integer(1:MAX)	MUST	MUST	§9.1.23
job-id	integer(1:MAX)	MUST	MUST	[rfc2911] §4.3.2
job-uri	uri	MUST	MUST	[rfc2911] §4.3.1
redirect-uri ³²	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

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

1174
1175

1176 8 Job Template and Document Template attributes

1177 Table 10 lists *all* of the Job Template attributes defined in other IPP specifications and lists their corresponding
1178 Document Template attributes defined in this IPP specification. The Job Template attributes can be supplied in the
1179 Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

1180 A subset of these Job Template attributes (e.g. "number-up" and "media", but not "job-priority") are also defined to
1181 apply to Documents and are called Document Template attributes when supplied at the Document Level. Document
1182 Template attributes can be supplied in the Send-Document and Send-URI operations.

1183 A subset of the Document Template attributes that apply to pages (e.g., "media", but not "document-format") can also
1184 be supplied as Page Overrides using the "overrides" Job Template collection attribute (see [OvrRide]) or Document
1185 Template attribute.

1186 Job Template and Document Template attributes are OPTIONAL for a Printer to support and for a client to supply in
1187 a Job Creation or Document Creation request or Page Overrides. If a Printer supports a Job Template or Document
1188 Template attribute, then it MUST copy the supplied attribute to the Job or Document object, respectively, so that a
1189 client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs and Get-Document-Attributes/Get-
1190 Documents operations, respectively. The effect of Job Template Attributes supplied in Job Creation requests are
1191 inherited by the Document objects, unless the Document Creation operation supplies the attribute with a different
1192 value.

³² 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.

1193 Every Job or Document Template attribute (e.g. “copies”) has associated printer attributes that provide the default
 1194 value(s) (e.g. “finishings-default) and the supported value(s)³³ (e.g. “finishings -supported”). Also allowed is the list of
 1195 values that are ready to use without human intervention (e.g. “finishings-ready”). Since some attributes (e.g.
 1196 “finishings”) can be Job Template and Document Template attributes both the Job and the Document share the same
 1197 default and supported values.

1198 If a Job Template collection attribute is supported (see [rfc3382]), then there are conformance requirements for which
 1199 member attributes MUST be supported by a Printer and which member attributes a client MUST supply as indicated
 1200 in the Conformance column for each collection member attribute in Table 10.

1201 The “Defined for use” column indicates whether the client MAY supply and the Printer support the attribute at the
 1202 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” and “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.
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.

1203
 1204 “***” - Most Job Template and Document Template attributes correspond to the PWG Semantic Model Job
 1205 Processing and Document Processing attributes, respectively. However, 4 of the IPP Job Template
 1206 attributes are represented in the PWG Semantic Model as Job Description attributes, instead of Job
 1207 Processing attributes. These are indicated in the first column with “***”.

Table 10 - 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 ³⁴	y	n	MAY	MAY	[rfc2911] §4.2.5

³³ Note that collections follow their own rules for the “xxx-supported” Printer attribute.

³⁴ 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 produces N copies of the first input document followed by N copies of the second input document, and so on. The ‘separate-document-collated-copies’ value produces N successive job copies, each job copy consisting of 1 copy of the first document followed by 1 copy of the second document, and so on.

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	[pwg5100.3] §3.1
cover-type	type2 keyword				MUST	MUST	[pwg5100.3] §3.1.2
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[pwg5100.3] §3.1.1
media-col	collection					MAY	[pwg5100.3] §3.1.1
cover-front	collection	y	y	n	MAY	MAY	[pwg5100.3] §3.1
cover-type	type2 keyword				MUST	MUST	[pwg5100.3] §3.1.2
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[pwg5100.3] §3.1.1
media-col	collection					MAY	[pwg5100.3] §3.1.1
finishings	1setOf type2 enum	y ³⁵	y	y	MAY be neither or one of, but NOT both	MAY, MUST if "finishing-col" is supported	[rfc2911] §4.2.6 [pwg5100.1] §2
finishings-col	collection	y ³⁵	y	y		MAY	[pwg5100.3] §3.2
finishing-template	name(MAX)				MAY	MAY	[pwg5100.3] §3.2.1
stitching	collection				MAY	MAY	[pwg5100.3] §3.2.2
stitching-reference-edge	type2 keyword				MUST	MUST	[pwg5100.3] §3.2.2.1
stitching-offset	integer (0:MAX)				MUST	MUST	[pwg5100.3] §3.2.2.2
stitching-locations	1setOf integer(0:MAX)				MUST	MUST	[pwg5100.3] §3.2.2.3
force-front-side	1setOf integer(1:MAX)	y ³⁶	y	y	MAY	MAY	[pwg5100.3] §3.3
imposition-template	type3 keyword name(MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.4
insert-sheet	1setOf collection	y ³⁶	y	y	MAY	MAY	[pwg5100.3] §3.5
insert-after-page-number	integer(0:MAX)				MUST	MUST	[pwg5100.3] §3.5.1
insert-count	integer(0:MAX)				MAY	MUST	[pwg5100.3] §3.5.2
media	type3 keyword name(MAX)				MUST be one or the other, but NOT both	MUST	[pwg5100.3] §3.5.3
media-col	collection					MAY	[pwg5100.3] §3.5.3
job-account-id **	name(MAX)	y	n	n	MAY	MAY	[pwg5100.3] §3.6

³⁵ 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' values 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.

³⁶ 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.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
job-accounting-sheets	collection	y	n	n	MAY	MAY	[pwg5100.3] §3.8
job-accounting-sheets -type	type3 keyword name(MAX)				MUST	MUST	[pwg5100.3] §3.8.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[pwg5100.3] §3.8.2
media-col	collection					MAY	[pwg5100.3] §3.8.2
job-accounting-output-bin	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.8.3
job-accounting-user-id**	name(MAX)	y	n	n	MAY	MAY	[pwg5100.3] §3.7
job-copies	integer(1:MAX)	y	n ³⁷	n	MAY	MAY	[jobx] §4.1.1
job-cover-back	collection	y	n ³⁸	n	MAY	MAY	[jobx] §4.1.2
same as cover-back	see cover-back						
job-cover-front	collection	y	n ³⁹	n	MAY	MAY	[jobx] §4.1.3
same as cover-front	see cover-front						
job-error-sheet	collection	y	n	n	MAY	MAY	[pwg5100.3] §3.9
job-error-sheet-type	type3 keyword name(MAX)				MUST	MUST	[pwg5100.3] §3.9.1
job-error-sheet-when	type2 keyword				MAY	MAY	[pwg5100.3] §3.9.2
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[pwg5100.3] §3.9.3
media-col	collection					MAY	[pwg5100.3] §3.9.3
job-finishings	1setOf type2 enum	y	n ⁴⁰	n	MAY	MAY	[jobx] §4.1.4
job-finishings-col	collection	y	n ⁴¹	n	MAY	MAY	[jobx] §4.1.5
same as finishings-col	see finishings-col						
job-hold-until	type3 keyword name(MAX)	y	n	n	MAY	MAY	[rfc2911] §4.2.2
job-message-to-operator	text(MAX)	y	n ⁴²	n	MAY	MAY	[pwg5100.3] §3.10
job-priority	integer(1:100)	y	n	n	MAY	MAY	[rfc2911] §4.2.1

³⁷ The “job-copies” Job Template attribute makes copies of the entire job and MUST NOT be supplied at the Document or Page Level. The “job-copies” Job Template attribute is equivalent to “copies” with “multiple-document-handling” = ‘single-document-new-sheet’.

³⁸ The “job-cover-back” Job Template attribute makes a single back cover for each job copy and MUST NOT be supplied at the Document or Page Level. The “job-cover-back” Job Template attribute is equivalent to “cover-back” with “multiple-document-handling” = ‘single-document-new-sheet’.

³⁹ The “job-cover-front” Job Template attribute makes a single front cover for each job copy and MUST NOT be supplied at the Document or Page Level. The “job-cover-front” Job Template attribute is equivalent to “cover-front” with “multiple-document-handling” = ‘single-document-new-sheet’.

⁴⁰ The “job-finishing” Job Template attribute finishes each job copy as a whole and MUST NOT be supplied at the Document or Page Level. The “job-finishings” Job Template attribute is equivalent to “finishings” with “multiple-document-handling” = ‘single-document-new-sheet’.

⁴¹ The “job-finishing-col” Job Template attribute finishes each job copy as a whole and MUST NOT be supplied at the Document or Page Level. The “job-finishings-col” Job Template attribute is equivalent to “finishings-col” with “multiple-document-handling” = ‘single-document-new-sheet’.

⁴² 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-sheet-message	text(MAX)	y	n	n	MAY	MAY	[pwg5100.3] §3.12
job-sheets	type3 keyword name(MAX)	y	n	n	MAY be neither or one of, but NOT both	MAY, MUST if "job-sheets-col" supported	[rfc2911] §4.2.3
job-sheets-col	collection	y	n	n		MAY	[pwg5100.3] §3.11
job-sheets	type3 keyword name(MAX)				MUST	MUST	[pwg5100.3] §3.11.1
media	type3 keyword name(MAX)				MUST be one or the other, but NOT both	MUST	[pwg5100.3] §3.11.2
media-col	collection					MAY	[pwg5100.3] §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	[pwg5100.3] §3.13
media-back-coating	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.10
media-color	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.4
media-front-coating	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.10
media-hole-count	integer(0:MAX)				MAY	MAY	[pwg5100.3] §3.13.6
media-info	text(255)				MAY	MAY	[pwg5100.3] §3.13.3
media-key	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.1
media-order-count	integer(1:MAX)				MAY	MAY	[pwg5100.3] §3.13.7
media-preprinted	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.5
media-recycled	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.11
media-size	collection				MAY	MUST	[pwg5100.3] §3.13.8
x-dimension	integer(0:MAX)				MUST	MUST	[pwg5100.3] §3.13.8.1
y-dimension	integer(0:MAX)				MUST	MUST	[pwg5100.3] §3.13.8.2
media-type	type3 keyword name(MAX)				MAY	MAY	[pwg5100.3] §3.13.2
media-weight-metric	integer(0:MAX)				MAY	MAY	[pwg5100.3] §3.13.9
media-input-tray-check	type3 keyword name(MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.14
media-type ⁴³	type3 keyword name(MAX)	y	y	y	MAY	MAY	[upnp], [pwg5100.3] §3.13.2
multiple-document-handling	type2 keyword	y	n	n	MAY	MUST ⁴⁴	[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	[pwg5100.2] §2.1
Output-device	name(MAX)	y	y	y	MAY	MAY	[jobx] §3.1.3

⁴³ UPnPv1 and UPnPv2 define a separate MediaType Job Template attribute with the same values as the "media-type" member attribute of "media-col".

⁴⁴ A Printer MUST support the "multiple-document-handling" Job Template attribute with at least one value.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
overrides	1setOf collection	y	y	n	MAY	MAY	[OvrRide] §4.1, also see §8.2
pages	1setOf rangeOfInteger(1:MAX)				MUST	MUST	[OvrRide] §4.1.1
document-numbers	1setOf rangeOfInteger(1:MAX)				MAY	MUST	[OvrRide] §4.1.2
document-copies	1setOf rangeOfInteger(1:MAX)				MAY	MAY	[OvrRide] §4.1.3
<i>any other Template attributes that affect pages, such as "media" or "media-col"</i>					MAY	MAY	[OvrRide] §4.1.4
page-delivery	type2 keyword	y	y	n	MAY	MAY	[pwg5100.3] §3.15
page-order-received**	type2 keyword	y	y	n	MAY	MAY	[pwg5100.3] §3.16
page-ranges	1setOf rangeOfInteger(1:MAX)	y	y	n	MAY	MAY	[rfc2911] §4.2.7
presentation-direction-number-up	type2 keyword	y	y	y	MAY	MAY	[pwg5100.3] §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
separator-sheets	collection	y	y	n	MAY	MAY	[pwg5100.3] §3.18
separator-sheets-type	type3 keyword name(MAX)				MUST	MUST	[pwg5100.3] §3.18.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[pwg5100.3] §3.18.2
media-col	collection					MAY	[pwg5100.3] §3.18.2
sheet-collate	type2 keyword	y	y	n	MAY	MAY	[rfc3381] §3.1
sides	type2 keyword	y	y	y	MAY	MAY	[rfc2911] §4.2.8
x-image-position	type2 keyword	y	y	y	MAY	MAY	[pwg5100.3] §3.19.2
x-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.19.3
x-side1-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.19.4
x-side2-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.19.5
y-image-position	type2 keyword	y	y	y	MAY	MAY	[pwg5100.3] §3.19.6
y-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.19.7
y-side1-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.19.8
y-side2-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.19.9

1209 *** - These 4 attributes are Job Description attributes, not Job Processing attributes, in the PWG Semantic Model
 1210 [pwg-sm] - see the comment just before the Table.
 1211

1212 8.1 Document Template attributes

1213 Most Job Template attributes can be used as Document Template attributes for use in Document Creation
1214 operations to apply to the Document object. However, the Job Template attributes that have the "job-" prefix MUST
1215 NOT be used as Document Template attributes, since they are defined to apply to the job as a whole. Table 10
1216 shows lists all of the Document Template attributes for use with the Document Creation operations and the
1217 Document object. All of the definitions of the Document Template attributes are done by reference to the
1218 corresponding Job Template attributes in other specifications. However, the semantics of each Document Template
1219 attribute only applies to the Document object with which the attribute is associated either by being supplied by the
1220 client in the Document Creation operation or supplied by the Printer as a default because the client did not (and the
1221 PDL did not have any corresponding instruction). See section 6 for defaulting semantics.

1222 The Document Template attributes share the same "xxx-default", "xxx-supported", and "xxx-ready" Printer attributes
1223 with the Job Template attributes of the same name.

1224 The Document object also has the corresponding "xxx-actual" READ-ONLY Document Description attributes defined
1225 that correspond to the "xxx" Document Template attributes (see [ippact]).

1226 8.2 Document Template attributes containing explicit Document numbers

1227 Job Template attributes that contain explicit Document numbers, such as "overrides", must have an appropriate
1228 value. The Document number MUST have a single value and the single value MUST match the Document number
1229 to which the Document Template attributes are being applied. If they do not match, the Printer MUST reject the
1230 request with a status of 'client-error-bad-request'.

1231 8.3 Sheet Collation at the Document Level

1232 Since "sheet-collate" can be applied at the Document level it is possible for a Job to contain some Documents which
1233 are collated and others that are not. To describe this condition the Printer MUST set the "job-collation-type" to a
1234 value of '3' (i.e 'other').

1235 9 Job Description and Document Description attributes

1236 Table 11 lists all the Job Description attributes defined in other IPP specifications and the corresponding Document
1237 Description attributes defined in this IPP specification. Job Description and Document Description attributes are Job
1238 object and Document object attributes, respectively, that are filled in by the Printer. Some Job/Document Description
1239 attribute values are supplied by the client in the Job/Document Creation operation using corresponding Operation
1240 attributes as flagged with "? ". Unless specified otherwise herein, the Printer MUST NOT support modification of Job
1241 Description and Document Descriptions attributes.

1242 The column labeled "attribute syntax" indicates the attribute syntax (see [rfc2911] § 4.1). The Printer conformance is
1243 indicated along with the reference to the specification in which the attribute is defined. The conformance for
1244 Document Description attributes (if the Printer supports the Document object) is the same as the corresponding Job
1245 Description attributes.

1246 Each of the Document Description attributes have a sub-section in section 9.1. The column labeled References
1247 contains references to the sub-section in this document if there is significant information there. Those subsections
1248 that are only references to other specifications contain only that reference in the Reference column. Those attributes
1249 that are only Job Description attributes with no subsection in this specification have an "n/a" in the "Doc Desc"
1250 column.

1251 Note: There are no corresponding Page Range (or Page Override) Description attributes. The Page Range is not an
 1252 object with a state and it cannot be queried.

1253 **Legend:**

1254 ****"** an attribute that has a "job-" prefix in its name in [rfc2911]. The "job-" prefix is omitted in the table. Job level
 1255 attributes use the "-job" prefix. Document level attributes do not use the prefix. The only difference in the
 1256 semantics are whether it applies to just the Document or to the entire Job. Note: For the PWG Semantic
 1257 Model, the **"job-"** prefix is dropped altogether.

1258 **"-"** indicates that the Job or Document attribute is *not* defined.

1259 **"? y"** the Printer MUST populate this Job or Document Description attribute by copying *from* the corresponding
 1260 Operation attribute that the client MAY supply⁴⁵ in a Job or Document Creation operation. See Table 8 for
 1261 the corresponding Operation attribute.

1262 (r/w) indicates that the Job Description or Document Description attribute is read/write, so that the client can
 1263 changes its value using the Set-Job-Attributes or Set-Documents-Attributes operation (see section 4.4).
 1264

1265 **Table 11 - Job and Document Description attributes**

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference	
					Job Description Attr	Doc Desc.
attributes-charset	charset	? y	? y	MUST	[rfc2911] §4.3.19	§9.1.1
attributes-natural-language	naturalLanguage	? y	? y	MUST	[rfc2911] §4.3.20	§9.1.2
compression	type3 keyword	-	? y	MUST	[rfc2911] §3.2.1.1	§9.1.3
current-page-order	type2 keyword	y	y	MAY	[pwg5100.3] §4.1	§9.1.4
date-time-at-completed	dateTime	y	y	MAY	[rfc2911] §4.3.14.7	§9.1.5
date-time-at-creation	dateTime	y	y	MAY	[rfc2911] §4.3.14.5	§9.1.6
date-time-at-processing	dateTime	y	y	MAY	[rfc2911] §4.3.14.6	§9.1.7
detailed-status-messages*	1setOf text(MAX)	y	y	MAY	[rfc2911] §4.3.10	§9.1.8
document-access-errors*	1setOf text(MAX)	y	y	MAY	[rfc2911] §4.3.11	§9.1.9
document-charset	charset	-	? y	CMUST ⁴⁶	-	§9.1.10
document-digital-signature	type2 keyword	-	? y	MAY	-	§9.1.11
document-format	mimeMediaType	-	? y	MUST	[rfc2911] §3.2.1.1	§9.1.12
document-format-details	1setOf collection	-	? y	CMUST ⁴⁷	[jobx] §3.2.4	§9.1.13
document-format	mimeMediaType	-	? y	MUST	[jobx] §3.2.4.5	
document-format-device-id	text(127)	-	? y	MUST	[jobx] §3.2.4.6	
document-format-version	text(127)	-	? y	MAY	[jobx] §3.2.4.7	
document-source-application-name	name(MAX)	-	? y	MAY	[jobx] §3.2.4.1	
document-source-application-version	text(127)	-	? y	MAY	[jobx] §3.2.4.2	
document-source-os-name	name(40)	-	? y	MAY	[jobx] §3.2.4.3	
document-source-os-version	text(40)	-	? y	MAY	[jobx] §3.2.4.4	
document-natural-language	naturalLanguage	-	? y	MAY	[jobx] §3.2.4.8	

⁴⁵ Document Description attributes that the client can supply in a Job or Document operation as Operation attributes (indicated with ?) comprise *all* of the Document Description attributes in the PWG Semantic Model ([pwgsm]). Those Document Description attributes that clients cannot supply values correspond to Document Status attributes in the PWG Semantic Model.

⁴⁶ The Printer MUST support the "document-charset" Operation/Document Description attributes if the Printer supports any charset-ambiguous document formats (see [jobx] §3.2.1).

⁴⁷ The Printer MUST support the "document-format-details" Operation/Document Description attributes if the Printer supports a packaging MIME type document format, such as 'application/zip' or 'multipart/related'.

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform-ance	Reference	
					Job Description Attr	Doc Desc.
document-format-details-detected	1setOf collection	-	y	MAY	-	§9.1.14
document-format-detected	mimeMediaType	-	y	MAY	-	§9.1.15
document-format-version	text(127)	-	? y	MAY	[jobx] §3.2.5	§9.1.16
document-format-version-detected	text(127)	-	y	MAY	-	§9.1.17
document-job-id	integer(1:MAX)	-	y	MUST	-	§9.1.18
document-job-uri	uri	-	y	MUST	-	§9.1.19
document-message (r/w)	text(MAX)	-	y	MAY	[jobx] §3.2.6	§9.1.20
document-name (r/w)	name(MAX)	-	? y	MUST	[rfc2911] §3.2.1.1	§9.1.21
document-natural-language	naturalLanguage	-	? y	MAY	-	§9.1.22
document-number	integer(1:MAX)	-	y	MUST	-	§9.1.23
document-printer-uri	uri	-	y	MUST	-	§9.1.24
document-state	type1 enum	-	y	MUST	-	§9.1.25
document-state-message	text(MAX)	-	y	MAY	-	§9.1.26
document-state-reasons	1setOf type2 keyword	-	y	MUST	-	§9.1.27
document-uri	uri	-	? y	MAY	-	§9.1.28
errors-count	integer(0:MAX)	y	y	MAY	[jobx] §5.2	§9.1.29
Impressions*	integer(0:MAX)	? y	? y	MAY	[rfc2911] §4.3.17.2	§9.1.30
impressions-completed*	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.2	§9.1.31
impressions-completed-current-copy	integer(0:MAX)	y	y	MAY	[rfc3381] §4.4	§9.1.32
ipp-attribute-fidelity	boolean	? y	-	MUST	[rfc2911] §3.2.1.1 [jobx] §5.1	-
job-collation-type	type2 enum	y	-	MAY	[rfc3381] §4.1	-
job-id	integer (1:MAX)	y	-	MUST	[rfc2911] §4.3.2	-
job-mandatory-attributes	1setOf type2 keyword	? y	-	MUST	[jobx] §5.3	-
job-message-from-operator	text(127)	y	- ⁴⁸	MAY	[rfc2911] §4.3.16	-
job-name (r/w)	name(MAX)	? y	- ⁴⁹	MUST	[rfc2911] §4.3.5	-
job-originating-user-name	name (MAX)	y	-	MUST	[rfc2911] §4.3.6	-
job-printer-uri	uri	? ⁵⁰ y	-	MUST	[rfc2911] §4.3.3	-
job-state	type1 enum	y	- ⁵¹	MUST	[rfc2911] §4.3.7	-
job-state-message	text(MAX)	y	- ⁵²	MAY	[rfc2911] §4.3.9	-
job-state-reasons	1setOf type2 keyword	y	- ⁵³	MUST	[rfc2911] §4.3.8	-

⁴⁸ 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 9.1.20) to communicate with each other.

⁴⁹ The Document Description attribute that corresponds to the “job-name” Job Description attribute is the (existing) “document-name” attribute defined in [rfc2911] and also discussed in this spec in section 9.1.21.

⁵⁰ The Printer sets the “job-printer-uri” Job Description attribute from the “printer-uri” Operation attribute.

⁵¹ The Document Description attribute that corresponds to the “job-state” Job Description attribute is the (new) “document-state” attribute.

⁵² The Document Description attribute that corresponds to the “job-state-message” Job Description attribute is the (new) “document-state-message” attribute.

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform-ance	Reference	
					Job Description Attr	Doc Desc.
job-uri	uri	y	-	MUST	[rfc2911] §4.3.1	-
k-octets*	integer(0:MAX)	? y	? y	MAY	[rfc2911] §4.3.17.1	§9.1.33
k-octets-processed*	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.1	§9.1.34
last-document	boolean	-	? y	MUST	-	§9.1.35
media-sheets*	integer(0:MAX)	? y	? y	MAY	[rfc2911] §4.3.17.3	§9.1.36
media-sheets-completed*	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.3	§9.1.37
more-info*	uri	y	y	MAY	[rfc2911] §4.3.4	§9.1.38
number-of-documents	integer(0:MAX)	y	-	MUST	[rfc2911] §4.3.12	-
number-of-intervening-jobs	integer(0:MAX)	y	-	MAY	[rfc2911] §4.3.15	-
output-device-assigned	name(127)	y	y	MAY	[rfc2911] §4.3.13	§9.1.39
output-device-requested	name(127)	y	-	MAY	[jobx] §5.5	-
printer-up-time*	integer (1:MAX)	y	y	MUST	[rfc2911] §4.3.14.4	§9.1.40
sheet-completed-copy-number	integer(0:MAX)	y	y	MAY	[rfc3381] §4.2	§9.1.41
sheet-completed-document-number	integer(0:MAX)	y	-	MAY	[rfc3381] §4.3	-
time-at-completed	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.3	§9.1.42
time-at-creation	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.1	§9.1.43
time-at-processing	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.2	§9.1.44
warnings-count*	integer(0:MAX)	y	y	MAY	[jobx] §5.3	§9.1.45

1266 "y", "? y", "-" See the description in the Legend before the table.

1267

1268 Most of the existing "job-state" and "job-state-reasons" Job Description attribute values apply equally well to
 1269 individual documents in a multi-document job (with removal of the 'job-' prefix for those that apply to both Job and
 1270 Document). The reason for separating state from reasons is so that the states can be the fundamental states that
 1271 most implementations have, while the state reasons can vary depending on the sophistication of the system. The
 1272 states are the ones that clients are most likely to base actions upon, and the state reasons are more information,
 1273 both for programs and people.

1274 **9.1 Document Description attributes**

1275 This section contains *all* of the Document Description attributes for use with the Document object. Most of these
 1276 definitions refer to the corresponding Job Template attribute semantics in other specifications. However, the
 1277 semantics of each Document Description attribute only applies to the Document object containing the Document
 1278 Description attribute. The Printer MAY support changing these Document Description attributes with the Set-
 1279 Document-Attributes operation (see section 4.4), but only if indicated explicitly in this section.

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!

1280 **9.1.1 attributes-charset (charset)**

1281 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
 1282 attribute (see [rfc2911] §4.3.19) applied to the Document object. The Printer sets this Document Description attribute
 1283 from the corresponding Operation attribute supplied by the client in the Document Creation operation (see Table 3).

⁵³ The Document Description attribute that corresponds to the "job-state-reasons" Job Description attribute is the (new) "document-state-reasons" attribute.

1284 **9.1.2 attributes-naturalLanguage (naturalLanguage)**

1285 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1286 attribute (see [rfc2911] §4.3.20) applied to the Document object. The Printer sets this Document Description attribute
1287 from the corresponding Operation attribute supplied by the client in the Document Creation operation (see Table 3).

1288 **9.1.3 compression (type3 keyword)**

1289 This REQUIRED Document Description attribute specifies the compression used to represent this document (see
1290 [rfc2911] §3.2.1.1). The Printer sets this Document Description attribute from the corresponding Operation attribute
1291 supplied by the client in the Document Creation operation (see Table 3).

1292 **9.1.4 current-page-order (type2 keyword)**

1293 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1294 attribute (see [pwg5100.3] §4.1) applied to the Document object.

1295 **9.1.5 date-time-at-completed (dateTime)**

1296 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1297 attribute (see [rfc2911] §4.3.14.7) applied to the Document object.

1298 **9.1.6 date-time-at-creation (dateTime)**

1299 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1300 attribute (see [rfc2911] §4.3.14.5) applied to the Document object.

1301 **9.1.7 date-time-at-processing (dateTime)**

1302 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1303 attribute (see [rfc2911] §4.3.14.6) applied to the Document object.

1304 **9.1.8 detailed-status-messages (1setOf text(MAX))**

1305 This OPTIONAL “detailed-status-messages” Document Description attribute has the same semantics as the
1306 corresponding “job-detailed-status-messages” Job Description attribute (see [rfc2911] §4.3.10) applied to the
1307 Document object.

1308 **9.1.9 document-access-errors (1setOf text(MAX))**

1309 This OPTIONAL “document-access-errors” Document Description attribute has the same semantics as the
1310 corresponding “job-document-access-errors” Job Description attribute (see [rfc2911] job-document-access-errors
1311 §4.3.11) applied to the Document object.

1312 **9.1.10 document-charset (charset)**

1313 This CONDITIONALLY REQUIRED Document Description attribute specifies the charset used to represent this
1314 document (see [jobx] §4.2.1). The Printer sets this Document Description attribute from the corresponding Operation
1315 attribute supplied by the client in the Document Creation operation (see Table 3). This attribute is REQUIRED for a
1316 Printer to support if the Printer supports any charset-ambiguous document formats; otherwise, this attribute is
1317 OPTIONAL. Note, however, that if a Printer supports the “document-charset” Operation attribute, the Printer MUST
1318 support this “document-charset” Document Description attribute.

1319 9.1.11 document-digital-signature (type2 keyword)

1320 This OPTIONAL Document Description attribute specifies the digital signature technology used in the Document
1321 content. The Printer sets this Document Description attribute from the corresponding "document-digital-signature"
1322 Operation attribute ([jobx] §4.2.2 for the semantics), if supplied by the client in the Document Creation operation (see
1323 Table 3). If a Printer supports the "document-digital-signature" Operation attribute, the Printer MUST support this
1324 "document-digital-signature" Document Description attribute.

1325 9.1.12 document-format (mimeMediaType)

1326 This REQUIRED⁵⁴ Document Description attribute specifies the document format of the Document Object content.
1327 The Printer sets this Document Description attribute from the corresponding "document-format" Operation attribute
1328 (see section [jobx] §4.2.3 for the semantics), if supplied by the client in the Document Creation operation (see Table
1329 3).

1330 9.1.13 document-format-details (1setOf collection)

1331 This CONDITIONALLY REQUIRED Document Description attribute specifies the details of the document format(s) of
1332 the Document Object content. The Printer sets this Document Description attribute from the corresponding
1333 "document-format-details" Operation attribute ([jobx] §4.2.4 for the semantics), if supplied by the client in the
1334 Document Creation operation (see Table 3). This attribute is REQUIRED for a Printer to support if the Printer
1335 supports a packaging MIME type document format, such as 'application/zip' or 'multipart/related'; otherwise, this
1336 attribute is OPTIONAL. Note, however, that if a Printer supports the "document-format-details" Operation attribute,
1337 the Printer MUST support this "document-format-details" Document Description attribute.

1338 9.1.14 document-format-details-detected (1setOf collection)

1339 This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format
1340 details of the Document object as detected by the Printer. The member attributes are the same as the "document-
1341 format-details" Operation attribute. (see [jobx] §6.6.4 for details)

1342 9.1.15 document-format-detected (mimeMediaType)

1343 This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format of
1344 the Document object content as detected by the Printer. See [jobx] §6.6.5 for detailed semantics.

1345 9.1.16 document-format-version (text(127))

1346 This OPTIONAL Document Description attribute specifies the version of the document format of the Document
1347 Object content. The Printer sets this Document Description attribute from the corresponding "document-format-
1348 version" Operation attribute ([jobx] §4.2.6 for the semantics), if supplied by the client in the Document Creation
1349 operation (see Table 3). If a Printer supports the "document-format-version" Operation attribute, the Printer MUST
1350 support this "document-format-version" Document Description attribute.

1351 9.1.17 document-format-version-detected (text(127))

1352 This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format
1353 version of the Document content as detected by the Printer. See [jobx] §6.6.7 for detailed semantics.

⁵⁴ [rfc2911] did not define a "document-format" Document Description attribute; it is a new attribute defined in this specification.

1354 **9.1.18 document-job-id (integer(1:MAX))**

1355 This REQUIRED Document Description attribute is a *copy* of the Job's "job-id" Job Description attribute (see
1356 [rfc2911] §4.3.2), i.e., the "job-id" of the Job containing this Document.

1357 **9.1.19 document-job-uri (uri)**

1358 This REQUIRED Document Description attribute is a *copy* of the Job's "job-uri" Job Description attribute (see
1359 [rfc2911] §4.3.1), i.e., the URI of the Job that contains this Document. Example:
1360 `ipp://www.company.com/printers/myprinter/jobs/22`

1361 **9.1.20 document-message (text(MAX))**

1362 This OPTIONAL Document Description attribute contains a message from either (1) the user to the operator about
1363 the Document or (2) from the operator, system administrator, or "intelligent" process to indicate to the end user the
1364 reasons for modification or other management action taken on the Document. The Printer populates this Document
1365 Description attribute from the "document-message" (text(MAX)) Operation attribute value supplied by the client in any
1366 of the Document Creation operations (see Table 3) or in a Cancel-Document operation (see section 4.5).

1367 In addition, the user and the operator can set the value of this Document Description attribute explicitly using the Set-
1368 Document-Attributes operation (see section 4.4).

1369 **9.1.21 document-name (name(MAX))**

1370 This REQUIRED⁵⁵ Document Description attribute specifies the name of the document (see [rfc2911] §3.2.1.1). The
1371 Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in
1372 the Document Creation operation (see Table 3).

1373 This attribute may be modified by a client using the Set-Document-Attributes operation (see section 4.4).

1374 **9.1.22 document-natural-language (naturalLanguage)**

1375 This OPTIONAL Document Description attribute specifies the natural language of the Document Object content. The
1376 Printer sets this Document Description attribute from the corresponding "document-natural-language" Operation
1377 attribute (section 7.2.1 for the semantics), if supplied by the client in the Document Creation operation (see Table 3).
1378 If a Printer supports the "document-natural-language" Operation attribute, the Printer MUST support this "document-
1379 natural-language" Document Description attribute.

1380 **9.1.23 document-number (integer(1:MAX))**

1381 This REQUIRED Document Description attribute is the ordinal number of the document within the job, and
1382 determines its order of being printed in a multi-document job. The Printer MUST generate the values monotonically
1383 increasing from 1 for each job.

1384 **9.1.24 document-printer-uri (uri)**

1385 This REQUIRED Document Description attribute is a *copy* of the "printer-uri" Operation attribute (see [rfc2911]
1386 §3.1.5), i.e., the URI of the Printer containing the Job which contains this Document. Example:
1387 `ipp://www.company.com/printers/myprinter`.

⁵⁵ [rfc2911] did not define a "document-name" Document Description attribute; it is a new attribute defined in this specification.

1388 **9.1.25 document-state (type1 enum)**

1389 The REQUIRED "document-state" Document Description attributes identifies the current state of the document. The
 1390 values for "document-state" are a subset of the values for "job-state" ([rfc2911] §4.3.7); in particular, the "job-state"
 1391 values 'pending-held' and 'processing-stopped' do not apply to "document-state". Even though IPP defines five
 1392 values for document state (plus the out-of-band 'unknown' value - see [rfc2911] § 4.1), implementations only need to
 1393 support those states which are appropriate for the particular implementation. In other words, an IPP Printer
 1394 implementation supports only those document states implemented by the output device and available to the IPP
 1395 Printer implementation.

1396 Table 12 lists the "document-state" attribute values.

1397 **Table 12 - "document-state" attribute values**

"document-state" Values	
3	pending
5	processing
7	canceled
8	aborted
9	completed

1398

1399 Standard enum values are:

Value	Symbolic Name and Description
'3'	'pending' : The Document has not started to be processed at all.
'5'	'processing' : One or more of: <ol style="list-style-type: none"> 1. The job has begun using, or is attempting to use, one or more purely software processes that are analyzing, creating, or interpreting a PDL, etc. for the Document, 2. The job has begun 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. for the Document, 3. The Document is ready for printing, but the output device is not yet printing it, either because the Document hasn't reached the output device or because the Document is queued in the output device or some other spooler, awaiting the output device to print it.

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

Implementations MAY include additional values in the document's "document-state-reasons" attribute to indicate the progress of the Document, such as adding the '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 Document.

'7' **'canceled'** : The Document has been canceled by a Cancel-Document operation and the Printer has completed canceling the Document and all Document status attributes have reached their final values for the Document. While the Printer is canceling the Document, the Document remains in its current state, but the Document's "document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' value and one of the 'canceled-by-

Value	Symbolic Name and Description
	user', 'canceled-by-operator', or 'canceled-at-device' values. When the Document moves to the 'canceled' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'canceled-by-xxx', if present, MUST remain.
'8'	'aborted' : The Document has been aborted by the system, usually while the Document was in the 'processing' state and the Printer has completed aborting the Document and all Document status attributes have reached their final values for the Document. While the Printer is aborting the Document, the Document remains in its current state, but the Document's " document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' and 'aborted-by-system' values. When the Document moves to the 'aborted' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'aborted-by-system' value, if present, MUST remain.
'9'	'completed' : The Document has completed successfully or with warnings or errors after processing and all of the Document media sheets have been successfully stacked in the appropriate output bin(s) and all Document status attributes have reached their final values for the Document. The Document's " document-state-reasons" attribute SHOULD contain one of: 'completed-successfully', 'completed-with-warnings', or 'completed-with-errors' values.

1400 The final value for this attribute MUST be one of: 'completed', 'canceled', or 'aborted' before the Printer removes the
 1401 Document altogether. The length of time that Documents remain in the 'canceled', 'aborted', and 'completed' states
 1402 depends on implementation.

1403 Documents reach one of the three terminal states: 'completed', 'canceled', or 'aborted', after the Job has completed
 1404 all activity for the Document, including stacking output media, and all Document status attributes have reached their
 1405 final values for the Document.

1406

1407 **9.1.25.1 The “document-state” Document Description attribute and the Document object life Cycle**

1408 The “document-state” attribute is one of the most important Document Description attributes. Figure 1 shows the
 1409 values of the “document-state” attribute and the Document object life cycle as affected by actions on the Job,
 1410 Document, Printer, and job processing. Documents are not active objects. Active objects in IPP are Printers and
 1411 Jobs. Printers and Jobs have URIs where requests are sent and acted upon. Documents have no such URI.
 1412 Printers schedule Jobs and Jobs, once scheduled, process the Documents that they contain. The Document's life
 1413 cycle is closely tied to the lifecycle of a Job⁵⁶. Documents basically have three states. The first is waiting to be
 1414 processed by a Job (i.e. pending). The second state is from the time the Job first starts processing the Document
 1415 (i.e. processing) and until it reaches one of its terminal states. The third state for a Document is one of its terminal
 1416 states (i.e. completed, canceled, or aborted).

⁵⁶ 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.

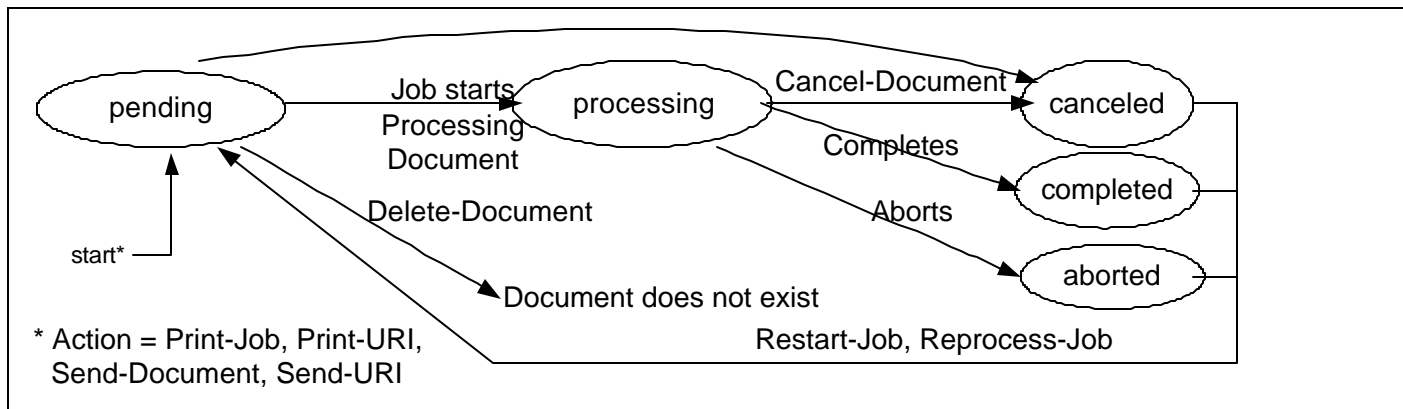


Figure 1 - The "document-state" Document Description attribute and the Document object life cycle

1417

1418

1419 A Document object has a much simpler life cycle than a Job object. A Document always progresses from left to right
 1420 in the state diagram. No other state transitions are defined.

1421 **9.1.26 document-state-message (text(MAX))**

1422 This OPTIONAL Document Description attribute specifies information about the "document-state" and "document-
 1423 state-reasons" attributes in human readable text. If the Printer supports this attribute, the Printer MUST be able to
 1424 generate this message in any of the natural languages identified by the Printer's "generated-natural-language-
 1425 supported" attribute (see the "attributes-natural-language" Operation attribute specified in [rfc2911] § 3.1.4.1).

1426 The value SHOULD NOT contain additional information not contained in the values of the "document-state" and
 1427 "document-states-reasons" attributes, such as interpreter error information. Otherwise, application programs might
 1428 attempt to parse the (localized text). For additional information such as interpreter errors for application program
 1429 consumption or specific document access errors, new attributes with keyword values, needs to be developed and
 1430 registered.

1431 **9.1.27 document-state-reasons (1setOf type2 keyword)**

1432 The REQUIRED "document-state-reasons" Document Description attribute provides additional information about
 1433 each document's current state, i.e., information that augments the value of the Document's "document-state"
 1434 attribute.

1435 These values MAY be used with any document state for which the reason makes sense. Some of these value
 1436 definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when implemented, the Printer
 1437 MUST return these values when the reason applies and MUST NOT return them when the reason no longer applies
 1438 whether the value of the Document's "document-state" attribute changed or not. When the Document does not have
 1439 any reasons for being in its current state, the value of the Document's "document-state-reasons" attribute MUST be
 1440 'none'.

1441 Some of the Job's "job-state-reasons" values affect job scheduling, such as 'resources-are-not-ready' and 'job-hold-
 1442 until-specified'. However, "document-state-reasons" values MUST NOT affect job scheduling, since Document
 1443 objects are passive objects operated on by the containing Job object.

1444 Note: While values cannot be added to the "document-state" attribute without impacting deployed clients that take
 1445 actions upon receiving "document-state" values, it is the intent that additional "document-state-reasons" values can
 1446 be defined and registered without impacting such deployed clients. In other words, the "document-state-reasons"
 1447 attribute is intended to be extensible.

1448 Table 13 lists the standard keyword values for the "document-state-reasons" attribute defined in this specification and
 1449 derived from "job-state-reasons" defined in other IPP specifications as indicated in the References column. In Table
 1450 13 the keywords are listed in alphabetic order, while in their descriptions following Table 13, they are listed in the
 1451 most likely order of occurrence to help understanding.

1452 When the Document object is supported, the Printer implementation SHOULD still support the corresponding Job
 1453 level "job-state-reasons", so that clients that do not support the Document object will receive the same information.
 1454 Also it is usually more convenient for the client to obtain just the Job level status. However, the client SHOULD
 1455 query both Job and Document attributes and convert them to some canonical form for display to the user, so that all
 1456 Jobs and their Documents are displayed in a uniform manner, no matter from which clients they were submitted.

1457 **Table 13 - "document-state-reasons" attribute values**

IPP Job Description / Document Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
document-state-reasons	1setOf type2 keyword	MUST	9.1.27
	aborted-by-system	MAY	[rfc2911] §4.3.8
	compression-error	MAY	[rfc2911] §4.3.8
	digital-signature-did-not-verify	MAY	[jobx] §6.1
	digital-signature-type-not-supported	MAY	[jobx] §6.1
	document-access-error	MAY	[rfc2911] §4.3.8
	document-format-error	MAY	[rfc2911] §4.3.8
	canceled-at-device	MAY	[rfc2911] §4.3.8 *
	canceled-by-operator	MAY	[rfc2911] §4.3.8 *
	canceled-by-user	MAY	[rfc2911] §4.3.8 *
	completed-successfully	MAY	[rfc2911] §4.3.8 *
	completed-with-errors	MAY	[rfc2911] §4.3.8 *
	completed-with-warnings	MAY	[rfc2911] §4.3.8 *
	data-insufficient	MAY	[rfc2911] §4.3.8 *
	digital-signature-wait	MAY	[jobx] §6.1 *
	errors-detected	MAY	[jobx] §6.1 *
	incoming	MAY	[rfc2911] §4.3.8 *
	interpreting	MAY	[rfc2911] §4.3.8 *
	none	MUST	[rfc2911] §4.3.8
	outgoing	MAY	[rfc2911] §4.3.8 *
	printing	MAY	[rfc2911] §4.3.8 *
	processing-to-stop-point	MAY	[rfc2911] §4.3.8
	queued	MAY	[rfc2911] §4.3.8 *
	queued-for-marker	MAY	[rfc2911] §4.3.8 *
	queued-in-device	MAY	[rfc2911] §4.3.8
	resources-are-not-ready	MAY	[rfc2911] §4.3.8
	resources-are-not-supported	MAY	[pwg5100.3] §6.1
	submission-interrupted	MAY	[rfc2911] §4.3.8
	transforming	MAY	[rfc2911] §4.3.8 *
	unsupported-compression	MUST	[rfc2911] §4.3.8
	unsupported-document-format	MUST	[rfc2911] §4.3.8
	warnings-detected	MAY	[jobx] §6.1 *

1458 * The state reason keyword value is derived from an existing "job-state-reasons" value. The associated value is
 1459 prefixed by 'job-' when it is a value of the "job-state-reasons" attribute⁵⁷. The semantics for the reasons differ
 1460 only by the object to which they are bound. For example 'job-printing' means that at least one document in
 1461 the job is printing, i.e. the job is printing, while 'printing' means the document within the job is printing.
 1462

1463 For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely
 1464 to occur (if implemented), starting with the 'none' value:

1465 **'none'** : There are no reasons for the Document's current state. This state reason is semantically equivalent
 1466 to "document-state-reasons" without any value and MUST be used when there is no other value,
 1467 since the 1setOf attribute syntax requires at least one value. [rfc2911] §4.3.8

1468 **'resourcesare-not-supported'** : At least one of the resources needed by the Document, such as media,
 1469 fonts, resource objects, etc., is not supported on any of the physical printers for which the Document
 1470 is a candidate. This condition MAY be detected when the Document is accepted, or subsequently
 1471 while the Document is pending or processing, depending on implementation. The Job containing the
 1472 Document may (1) remain in its current state, (2) be moved to the 'pending-held' state, depending on
 1473 implementation and/or job scheduling policy, or (3) scheduled normally, but the Printer is put into the
 1474 'stopped' state when the Document is attempted to be processed on the Printer. This value is
 1475 intended for use with an implementation that supports the "user-defined-values-supported" Printer
 1476 attribute (see [pwg5100.3] § 6.1), which allows a Job to be accepted with an unsupported 'name'
 1477 value. [pwg5100.3] §6.1

1478 **'resourcesare-not-ready'** : At least one of the resources needed by the Document, such as media, fonts,
 1479 resource objects, etc., is not ready on any of the physical printers for which the Document is a
 1480 candidate. This condition MAY be detected when the Document is accepted, or subsequently while
 1481 the Document is pending or processing, depending on implementation. The Job containing the
 1482 Document may remain in its current state or be moved to the 'pending-held' state, depending on
 1483 implementation and/or scheduling policy. [rfc2911] §4.3.8

1484 **'digital-signature-type-not-supported'** : The Document contains a digital signature type that is not
 1485 supported. Implementation or site policy determines the state of the Job containing the Document
 1486 once this condition is detected. [jobx] § 6.1.

1487 **'incoming'** : The Printer is retrieving/accepting Document data as a result of a Print-Job, Print-URI, Send-
 1488 Document or Send-URI operation. [rfc2911] §4.3.8

1489 **'data-insufficient'** : The Printer is expecting additional Document data before it can move the Document
 1490 into the 'processing' state. If a Printer starts processing before it has received all data, the Printer
 1491 removes the 'data-insufficient' reason, but the 'incoming' remains. If a Printer starts processing after
 1492 it has received all data, the Printer removes the 'data-insufficient' reason and the 'incoming' at the
 1493 same time. [rfc2911] §4.3.8

1494 **'unsupported-compression'** : The document was aborted by the system because the Printer determined
 1495 while attempting to decompress the Document data that the compression is actually not among
 1496 those supported by the Printer. This value MUST be supported, since "compression" is a
 1497 REQUIRED Operation attribute. [rfc2911] §4.3.8

1498 **'compression-error'** : The document was aborted by the system because the Printer encountered an error
 1499 in the Document data while decompressing it. If the Printer posts this reason, the Document data
 1500 has already passed any tests that would have led to the 'unsupported-compression' job-state-
 1501 reason/document-state-reason. [rfc2911] §4.3.8

1502 **'document-access-error'** : After accepting a Print-URI or Send-URI request, the Printer could not access
 1503 the Document's reference. This reason is intended to cover any file access problem, including file
 1504 does not exist and access denied because of an access control problem. The Printer MAY also

⁵⁷ 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.

- 1505 indicate the Document access error using the "document-access-errors" Printer Description attribute.
1506 Whether the Printer aborts the Document and moves the Document to the 'aborted' Document state
1507 or prints all Documents that are accessible and moves the Document to the 'completed' Document
1508 state and adds the 'completed-with-errors' value in the Job's "job-state-reasons" or Document's
1509 "document-state-reasons" attribute depends on implementation and/or site policy. This value
1510 SHOULD be supported if the Print-URI or Send-URI operations are supported. [rfc2911] §4.3.8
- 1511 **'unsupported-document-format'** : The Document was aborted by the system because the Document data's
1512 document-format is not among those supported by the Printer. If the client specifies the document -
1513 format as 'application/octet-stream', the printer MAY abort the Document and post this reason even
1514 though the format is a member of the "document-format-supported" printer attribute, but not among
1515 the auto-sensed document-formats. This value MUST be supported, since "document-format" is a
1516 REQUIRED Operation attribute. [rfc2911] §4.3.8
- 1517 **'document-format-error'** : The Document was aborted by the system because the Printer encountered an
1518 error in the Document data while processing it. If the Printer posts this reason, the Document data
1519 has already passed any tests that would have led to the 'unsupported-document-format' job-state-
1520 reason/document-state-reason. [rfc2911] §4.3.8
- 1521 **'submission-interrupted'** : The Document was not completely submitted for some unforeseen reason, such
1522 as: (1) the Printer has crashed before the document was closed by the client, (2) the Printer or the
1523 document transfer method has crashed in some non-recoverable way before the Document data was
1524 entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-out
1525 period. See the description of the "multiple-operation-time-out" Printer attribute in [rfc2911] § 4.4.31.
1526 [rfc2911] §4.3.8
- 1527 **'digital-signature-wait'** : The Job is currently being held because the Document was submitted with a
1528 "document-digital-signature" attribute value that is not supported. The operator MAY either cancel
1529 the job or release it to be processed. [jobx] §6.1.
- 1530 **'outgoing'** : The Printer is transmitting the Document to the output device. [rfc2911] §4.3.8
- 1531 **'queued'** : The Document is in the 'processing' state, but more specifically, the Printer has queued the
1532 Document data. [rfc2911] §4.3.8
- 1533 **'interpreting'** : The Document is in the 'processing' state, but more specifically, the Printer is interpreting the
1534 Document data. [rfc2911] §4.3.8
- 1535 **'queued-for-marker'** : The Document is in the 'processing' state, but more specifically, the Printer has
1536 completed enough processing of the document to be able to start marking and the document is
1537 waiting for the marker. rfc2911] §4.3.8
- 1538 **'printing'** : The output device is marking media for this Document. This value is useful for Printers which
1539 spend a great deal of time processing (1) when no marking is happening and then want to show that
1540 marking is now happening or (2) when the Document is in the process of being canceled or aborted
1541 while the Document remains in the 'processing' state, but the marking has not yet stopped so that
1542 impression or sheet counts are still increasing for the Document. [rfc2911] §4.3.8
- 1543 **'digital-signature-did-not-verify'** : The Document contains a digital signature type that is supported but the
1544 signature did not verify when the Printer attempted to verify the signature. [jobx] §6.1
- 1545 **'canceled-by-user'** : The Document was canceled by the owner of the Job containing the Document using
1546 the Cancel-Document request, i.e., by a user whose authenticated identity is the same as the value
1547 of the originating user that created the Job, or by some other authorized end-user, such as a
1548 member of the job owner's security group. The 'canceled-by-user' value SHOULD be supported for
1549 the "document-state-reasons" attribute for use with the Cancel-Document. [rfc2911] §4.3.8
- 1550 **'canceled-by-operator'** : The Document was canceled by the operator using the Cancel-Document request,
1551 i.e., by a user who has been authenticated as having operator privileges (whether local or remote). If
1552 the security policy is to allow anyone to cancel anyone's Document, then these values may be used
1553 when the Document is canceled by other than the owner of the job. For such a security policy, in

1554 effect, everyone is an operator as far as canceling Documents is concerned. This value SHOULD be
 1555 supported if the implementation permits canceling by other than the owner of the job. [rfc2911]
 1556 §4.3.8

1557 **'canceled-at-device'** : The Document was canceled by an unidentified local user, i.e., a user at a console at
 1558 the device. This value SHOULD be supported if the implementation supports canceling
 1559 Jobs/Documents at the console. [rfc2911] §4.3.8

1560 **'aborted-by-system'** : The Document (1) is in the process of being aborted, or (2) has been aborted by the
 1561 system and placed in the 'aborted' state.. This value SHOULD be supported. [rfc2911] §4.3.8

1562 **'processing-to-stop-point'** : The requester has issued a Cancel-Document operation or the Printer has
 1563 aborted the Document, but is still performing some actions on the Document until a specified stop
 1564 point occurs or Document termination/cleanup is completed.
 1565 If the implementation requires some measurable time to cancel the Document in the 'processing' or
 1566 'processing-stopped' Document states, the Printer MUST use this value to indicate that the Printer is
 1567 still performing some actions on the Document while the Document remains in the 'processing' state.
 1568 After all the Document's Document Description attributes have stopped incrementing, the Printer
 1569 moves the Document from the 'processing' state to the 'canceled' or 'aborted' Document states.
 1570 [rfc2911] §4.3.8

1571 **'errors-detected'** : Errors were detected during the processing of this Document. If the Printer supports this
 1572 value, the Printer MUST add the value to "document-state-reasons" when it generates the first error
 1573 message. That is, a single occurrence of this value is present in the "document-state-reasons" if the
 1574 Printer has generated one or more errors. An error indicates loss of information, such as a page not
 1575 imaged. A warning indicates no loss of information (see 'warnings-detected' state reason). [jobx]
 1576 §6.1

1577 **'warnings-detected'** : Warnings were detected during the processing of this Document. If the Printer
 1578 supports this value, the Printer MUST add the value to "document-state-reasons" when it generates
 1579 the first warning message. That is, a single occurrence of this value is present in the "document-
 1580 state-reasons" if the Printer has generated one or more warnings. A warning indicates something
 1581 did not go as expected, but there was no loss of information; for example, a font substitution. An
 1582 error indicates loss of information (see 'errors-detected' state reason). [jobx] §6.1

1583 **'completed-successfully'** : The Document completed successfully. There were no warnings or errors in
 1584 printing. This value SHOULD be supported. [rfc2911] §4.3.8

1585 **'completed-with-warnings'** : The printing of the Document completed with warnings This value SHOULD
 1586 be supported if the implementation detects warnings. [rfc2911] §4.3.8

1587 **'completed-with-errors'** : The printing of the Document completed with errors (and possibly warnings too).
 1588 This value SHOULD be supported if the implementation detects errors. [rfc2911] §4.3.8

1589 **'queued-in-device'** : The Document has been forwarded to a device or print system that is unable to send
 1590 back status. The Printer sets the Document's "document-state" attribute to 'completed' and adds
 1591 the 'queued-in-device' value to the Document's "document-state-reasons" attribute to indicate that
 1592 the Printer has no additional information about the Document and never will have any better
 1593 information. See the description of the "document-state" attribute above, as well as the description
 1594 of "Forwarding Servers" in [rfc2911] § 4.3.7.1. [rfc2911] §4.3.8

1595 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

1596 9.1.28 document-uri (uri)

1597 This Document Description attribute is the URI that the client supplied in the corresponding Operation attribute in a
 1598 Send-URI operation (see [rfc2911] § 3.3.2). The Printer MUST support this attribute if the Printer supports the Send-
 1599 URI operation (see section 4.2).

1600 Note: this URI identifies the source location of the document data. This URI is NOT the identifier of the Document
1601 Object. The simple identifier of the Document is the "document-number".

1602 **9.1.29 errors-count (integer(0:MAX))**

1603 This OPTIONAL "errors-count" Document Description attribute counts the number of errors that the Printer
1604 encounters while processing and printing the Document object. An error indicates loss of information, such as a
1605 page not imaged. A warning indicates no loss of information (see [jobx] job-errors-count §5.2).

1606 **9.1.30 impressions (integer(0:MAX))**

1607 This OPTIONAL "impressions" Document Description attribute has the same semantics as the corresponding "job-
1608 impressions" Job Description attribute (see [rfc2911] job-impressions §4.3.17.2) applied to the Document object.
1609 The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client
1610 in the Document Creation operation (see §4), but may, as with "job-impressions", change the value if it is able to
1611 compute a value that is more accurate than the client supplied value (see [rfc2911] §4.3.17).

1612 **9.1.31 impressions-completed (integer(0:MAX))**

1613 This OPTIONAL "impressions-completed" Document Description attribute has the same semantics as the
1614 corresponding "job-impressions-completed" Job Description attribute (see [rfc2911] job-impressions-completes
1615 §4.3.18.2) applied to the Document object.

1616 **9.1.32 impressions-completed-current-copy (integer(0:MAX))**

1617 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1618 attribute (see [rfc3381] §4.4) applied to the Document object.

1619 **9.1.33 k-octets (integer(0:MAX))**

1620 This OPTIONAL "k-octets" Document Description attribute has the same semantics as the corresponding "job-k-
1621 octets" Job Description attribute (see [rfc2911] job-k-octets §4.3.17.1) applied to the Document object. The Printer
1622 sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the
1623 Document Creation operation (see §4), but may, as with "job-k-octets" change the value if it is able to compute a
1624 value that is more accurate than the client supplied value (see [rfc2911] §4.3.17).

1625 **9.1.34 k-octets-processed (integer(0:MAX))**

1626 This OPTIONAL "k-octets-processed" Document Description attribute has the same semantics as the corresponding
1627 "job-k-octets-processed" Job Description attribute (see [rfc2911] job-k-octets-processed §4.3.18.1) applied to the
1628 Document object.

1629 **9.1.35 last-document (boolean)**

1630 This REQUIRED Document Description attribute indicates whether or not this Document is the last Document in the
1631 Job. See [rfc2911] §4.3.12. The Printer sets this Document Description attribute from the corresponding Operation
1632 attribute supplied by the client in the Document Creation operation (see §4). **Note that the last Document in a Job
1633 may not be known by the Printer until the client sends a final request containing no document data and the "last-
1634 document" attribute set to 'true'. In this event the Printer MUST set the "last-document" attribute of the Document
1635 created from the most recent Document Creation request 'true'. No Document object is created from the final
1636 request containing no document data and the "last-document" attribute set to 'true' sent to close the Job.**

1637 9.1.36 media-sheets (integer(0:MAX))

1638 This OPTIONAL "media-sheets" Document Description attribute has the same semantics as the corresponding "job-
1639 media-sheets" Job Description attribute (see [rfc2911] job-media-sheets §4.3.17.3) applied to the Document object.
1640 The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client
1641 in the Document Creation operation (see §4), but may, as with "job-media-sheets", change the value if it is able to
1642 compute a value that is more accurate than the client supplied value (see [rfc2911] §4.3.17).

1643 9.1.37 media-sheets-completed (integer(0:MAX))

1644 This OPTIONAL "media-sheets-completed" Document Description attribute has the same semantics as the
1645 corresponding "job-media-sheets-completed" Job Description attribute (see [rfc2911] §job-media-sheets-completed
1646 4.3.18.3) applied to the Document object.

1647 9.1.38 more-info (uri)

1648 This OPTIONAL "more-info" Document Description attribute has the same semantics as the corresponding "job-
1649 more-info" Job Description attribute (see [rfc2911] job-more-info §4.3.4) applied to the Document object.

1650 9.1.39 output-device-assigned (name(127))

1651 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1652 attribute (see [rfc2911] §4.3.7.2) applied to the Document object.

1653 9.1.40 printer-up-time (integer (1:MAX))

1654 This REQUIRED "printer-up-time" Document Description attribute indicates the amount of time (in seconds) that the
1655 Printer implementation has been up and running. This attribute is an alias for the "printer-up-time" Printer Description
1656 attribute (see [rfc2911] job-printer-up-time §4.4.29).

1657 A client MAY request this attribute in a Get-Document-Attributes or Get-Documents request and use the value
1658 returned in combination with other requested Event Time Document Description Attributes in order to display time
1659 attributes to a user. The difference between this attribute and the 'integer' value of a "time-at-xxx" attribute is the
1660 number of seconds ago that the "time-at-xxx" event occurred. A client can compute the wall-clock time at which the
1661 "time-at-xxx" event occurred by subtracting this difference from the client's wall-clock time.

1662 9.1.41 sheet-completed-copy-number (integer(0:MAX))

1663 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
1664 attribute (see [rfc3381] §4.2) applied to the Document object.

1665 9.1.42 time-at-completed (integer (MIN:MAX))

1666 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1667 attribute (see [rfc2911] §4.3.14.3) applied to the Document object.

1668 9.1.43 time-at-creation (integer (MIN:MAX))

1669 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
1670 attribute (see [rfc2911] §4.3.14.1) applied to the Document object.

1671 **9.1.44 time-at-processing (integer (MIN:MAX))**

1672 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
 1673 attribute (see [rfc2911] §4.3.14.2) applied to the Document object.

1674 **9.1.45 warnings-count (integer(0:MAX))**

1675 This OPTIONAL “warnings-count” Document Description attribute has the same semantics as the corresponding
 1676 “job-warnings-count” Job Description attribute (see [jobx] job-warnings-count §5,4) applied to the Document object.
 1677 .A warning indicates something did not go as expected, but there was no loss of information; for example, a font
 1678 substitution. An error indicates loss of information (see section 9.1.29).

1679 **9.2 “-actual” Job and Document Description Attributes**

1680 For each Template attribute defined in this specification or in any other IPP extension documents, an associated
 1681 Description attribute is defined. The associated attribute is referred to as an “-actual” attribute,. The name of such
 1682 attributes is found by taking the name of the Template attribute and appending “-actual”. The “-actual” attribute is
 1683 always multi-valued. The base type of the multi-valued attribute is derived from the Description attribute.

1684 The “-actual” attributes provide a summary of the Template attribute values that were applied at the level it occurs.
 1685 For the Document Description “-actual”, it contains all the values of the Document Template attribute that were
 1686 applied to the Document and the pages within the Document. The Job Description “-actual” lists all the Document
 1687 and Job Template values that were applied to the Job, its contained Documents, and the pages of the Document.
 1688 These new attributes are OPTIONAL for a Printer to support, and are OPTIONAL for a client to use.

1689 Table 14 lists the “-actual” Document Description attributes for all Document Template defined in this specification.

1690 **Table 14 “-actual” Job/Document Description attributes**

Template Attribute	“-actual” Description attribute	Job	Document
copies (integer(1:MAX))	copies-actual (1setOf integer(1:MAX))	Yes	Yes
cover-back (collection)	cover-back-actual (1setOf (collection))	Yes	Yes
cover-front (collection)	cover-front-actual (1setOf (collection))	Yes	Yes
finishings (1setOf (type2 enum))	finishings-actual (1setOf (type2 enum))	Yes	Yes
finishings-col (collection)	finishings-col-actual (1setOf (collection))	Yes	Yes
force-front-side (1setOf integer(1:MAX))	force-front-side-actual (1setOf (1setOf integer(1:MAX)))	Yes	Yes
imposition-template (type3 keyword name(MAX))	imposition-template-actual (1setOf (type3 keyword name(MAX)))	Yes	Yes
insert-sheet (collection)	insert-sheet-actual (1setOf (collection))	Yes	Yes
job-account-id (name(MAX))	job-account-id-actual (1setOf (name(MAX)))	Yes	No
job-accounting-sheets (collection)	job-accounting-sheets-actual (1setOf (collection))	Yes	No
job-accounting-user-id (name(MAX))	job-accounting-user-id-actual (1setOf (name(MAX)))	Yes	No
job-copies (integer(1:MAX))	job-copies-actual (1setOf integer(1:MAX))	Yes	No
job-collation-type (type2 keyword)	job-collation-type-actual (1setOf (type2 keyword))	Yes	No
job-cover-back (collection)	job-cover-back-actual (1setOf (collection))	Yes	No
job-cover-front (collection)	job-cover-front-actual (1setOf (collection))	Yes	No
job-error-sheet (collection)	job-error-sheet-actual (1setOf (collection))	Yes	No
Job-finishings (1setOf (type2 enum))	Job-finishings-actual (1setOf (type2 enum))	Yes	No
Job-finishings-col (collection)	Job-finishings-col-actual (1setOf (collection))	Yes	No

Template Attribute	"-actual" Description attribute	Job	Document
job-hold-until (type3 keyword name)	job-hold-until-actual (1setOf (type3 keyword name))	Yes	No
job-message-to-operator (text(MAX))	job-message-to-operator-actual (1setOf (text(MAX)))	Yes	No
job-priority (integer(1:100))	job-priority-actual (1setOf integer(1:100))	Yes	No
job-sheet-message (text(MAX))	job-sheet-message-actual (1setOf (text(MAX)))	Yes	No
job-sheets (type3 keyword name)	job-sheets-actual (1setOf (type3 keyword name))	Yes	No
job-sheets-col (collection)	job-sheets-col-actual (1setOf (collection))	Yes	No
media (type3 keyword name(MAX))	media-actual (1setOf (type3 keyword name(MAX)))	Yes	Yes
media-col (collection)	media-col-actual (1setOf (collection))	Yes	Yes
media-input-tray-check (type3 keyword name(MAX))	media-input-tray-check-actual (1setOf (type3 keyword name(MAX)))	Yes	Yes
multiple-document-handling (type2 keyword)	multiple-document-handling-actual (1setOf (type2 keyword))	Yes	No
number-up (integer(1:MAX))	number-up-actual (1setOf integer(1:MAX))	Yes	Yes
orientation-requested (type2 enum)	orientation-requested-actual (1setOf (type2 enum))	Yes	Yes
output-bin (type2 keyword name(MAX))	output-bin-actual (1setOf (type2 keyword name(MAX)))	Yes	Yes
output-bin(name(MAX))	output-bin-actual(1setOf (name(MAX)))		
overrides (1setOf collection)	overrides-actual (1setOf collection)	Yes	Yes
page-delivery (type2 keyword)	page-delivery-actual (1setOf (type2 keyword))	Yes	Yes
page-order-received (type2 keyword)	page-order-received-actual (1setOf (type2 keyword))	Yes	Yes
page-ranges (1setOf rangeOfInteger(1:MAX))	page-ranges-actual (1setOf rangeOfInteger(1:MAX))	Yes	Yes
presentation-direction-number-up (type2 keyword)	presentation-direction-number-up-actual (1setOf (type2 keyword))	Yes	Yes
print-quality (type2 enum)	print-quality-actual (1setOf (type2 enum))	Yes	Yes
printer-resolution (resolution)	printer-resolution-actual (1setOf resolution)	Yes	Yes
separator-sheets (collection)	separator-sheets-actual (1setOf (collection))	Yes	Yes
sheet-collate (type2 keyword)	sheet-collate-actual (1setOf (type2 keyword))	Yes	Yes
sides (type2 keyword)	sides-actual (1setOf (type2 keyword))	Yes	Yes
x-image-position (type2 keyword)	x-image-position-actual (1setOf (type2 keyword))	Yes	Yes
x-image-shift (integer (MIN:MAX))	x-image-shift-actual (1setOf (integer (MIN:MAX)))	Yes	Yes
x-side1-image-shift (integer (MIN:MAX))	x-side1-image-shift-actual (1setOf (integer (MIN:MAX)))	Yes	Yes
x-side2-image-shift (integer (MIN:MAX))	x-side2-image-shift-actual (1setOf (integer (MIN:MAX)))	Yes	Yes
y-image-position (type2 keyword)	y-image-position-actual (1setOf (type2 keyword))	Yes	Yes
y-image-shift (integer (MIN:MAX))	y-image-shift-actual (1setOf (integer (MIN:MAX)))	Yes	Yes
y-side1-image-shift (integer (MIN:MAX))	y-side1-image-shift-actual (1setOf (integer (MIN:MAX)))	Yes	Yes
y-side2-image-shift (integer (MIN:MAX))	y-side2-image-shift-actual (1setOf (integer (MIN:MAX)))	Yes	Yes

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1692 Note that Table 14 is not meant to be an exhaustive list of the "-actual" attributes a Printer might implement. Any
 1693 Document Template attributes created by present, or future IPP standard documents, implies a corresponding "-
 1694 actual" Document Description attribute exists and can be implemented by a Printer or queried by a client.

1695 **10 New Printer attributes**

1696 This section newly defined Printer attributes. Printer attributes are divided into three disjoint groups:
 1697

Job Template attributes (JT)	<p>These Printer attributes are related directly to the “xxx” Job Template attributes that a client can supply in a Job Creation request as follows:</p> <ol style="list-style-type: none"> 1. “xxx-supported” indicates the supported values. 2. “xxx-default” indicates the values that will be used if the client and the PDL omit the attribute. 3. “xxx-ready” indicates the supported values that are available without human intervention, for those few attributes that require human intervention, such as “media” and possibly “job-finishing”. <p>These Printer attributes are also returned in a Get-Printer-Attributes response when the client supplies: “requested-attributes” = ‘job-template’.</p>
Document Template attributes (DT)	<p>These Printer attributes are related directly to the “xxx” Document Template attributes that a client can supply in a Document Creation request as follows:</p> <ol style="list-style-type: none"> 1. “xxx-supported” indicates the supported values. 2. “xxx-default” indicates the values that will be used if the client and the PDL omit the attribute. 3. “xxx-ready” indicates the supported values that are available without human intervention, for those few attributes that require human intervention, such as “media” and possibly “finishing”. <p>These Printer attributes are also returned in a Get-Printer-Attributes response when the client supplies: “requested-attributes” = ‘document-template’ (new value defined in this specification).</p>
Printer Description attributes (PD)	<p>These Printer attributes describe the Printer, such as “printer-current-time” and “printer-is-accepting-jobs”. Some of them are “xxx-supported” and “xxx-default” for Operation attributes that the client can supply in a Job Creation request.</p>
neither (-)	<p>These Printer attributes describe supported and defaults for member attributes of collection Job Template attributes.</p>

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In a Get-Printer-Attributes request, a client can request all of the Printer attributes in the Job Template (JT), Document Template (DT), or Printer Description (PD) groups by supplying the ‘job-template’, ‘document-template’, or ‘printer-description’ group name, respectively. The client can also request ‘all’.

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In Table 15, the column labels are:

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1707

“**Attribute Syntax**” - indicates the attribute syntax (see [rfc2911] § 4.1). Many “xxx-default” and “xxx-supported” attributes have the ‘collection’ syntax which consists of a number of member attributes. These member attributes are not listed in this table when they are the same as the corresponding “xxx” attribute in Table 10. Only those few Printer attribute collection attributes that do not have a corresponding Job Template attribute show the member attributes in this table.

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“**Grp**” - indicates to which group the attribute belongs. “PD” = Printer Description; “JT” = Job Template; “DT” = Document Template as explained above.

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

1717

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

1718

Table 15 – New Printer attributes

Printer attribute name (Job Template, Document Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
document-creation-attributes-supported	1setOf type2 keyword	PD	MUST	[this-spec] §10.1

1719

1720 **10.1 document-creation-attributes-supported (1setOf type2 keyword)**

1721 This REQUIRED Printer Description attribute lists the keyword names of the Document Template and Operation
 1722 attributes that the Printer will accept in the Send-Document and Send-URI Document Creation operations. **Note: The**
 1723 **attribute “document-uri” is operation specific. Implementations that support Send-URI MUST include the ‘document-**
 1724 **uri’ keyword in “document-creation-attributes-supported”. Implementations that do not support Send-URI MUST NOT**
 1725 **include the ‘document-uri’ keyword in “document-creation-attributes-supported”. Inclusion of the ‘document-uri’**
 1726 **keyword in “document-creation-attributes-supported” does not imply that the “document-URI” attribute is valid for**
 1727 **Send-Document.**

1728 **11 New Values for Existing Printer Description Attributes**

1729 This section contains those attributes for which additional values are added.

1730 **11.1 operations-supported (1setOf type2 enum)**

1731 The following “operation-id” values are added in order to support the new operations defined in this document:

1732 **Table 16 – Operation-id assignments**

Value	Operation Name	Reference
0x0033	Cancel-Document	§4.5
0x0034	Get-Document-Attributes	§4.3
0x0035	Get-Documents	§3.3
0x0036	Delete-Document	§5.4
0x0037	Set-Document-Attributes	§4.4

1733

1734 **12 Encodings of Additional Attribute Tags**

1735 This section assigns values to an attributes tag as an extension to the encoding defined in [rfc2910].

1736 The “document-attributes-tag” delimits Document Template Attributes Groups in requests and Document Attributes
 1737 Groups in responses.

1738 The following table specifies the values for the delimiter tag:

Tag Value (Hex)	Meaning
0x09	“document-attributes-tag”

1739

1740 13 Conformance Summary

1741 This section specifies the conformance requirements for Printers and clients. This section does not change any of
1742 the preceding normative definitions. If there is any conflict, the previous definitions apply.

1743 13.1 Printer conformance requirements

1744 In order to conform to this specification, a Printer:

- 1745 1. MUST meet the conformance requirements for Printers specified in [rfc2911].
- 1746 2. MUST support the Job operation that section 3 REQUIRES a Printer to support.
- 1747 3. MUST support the Document operations that section 4 REQUIRES a Printer to support.
- 1748 4. MAY support any of the Administrative operations in section 5.
- 1749 5. MUST support the Attribute Precedence semantics specified in section 6 for the levels that the Printer
1750 supports.
- 1751 6. MUST support the Operation attributes in the Print-Job and Send-Document operations and, if
1752 supported, the Print-URI and Send-URI operations, that section 7 REQUIRES a Printer to support.
- 1753 7. MUST support any Operation attributes that section 7 REQUIRES a Printer to support along with the
1754 corresponding Document Description attributes that section 9.1 REQUIRES a Printer to support and any
1755 "xxx-default" and "xxx-supported" Printer attributes that section 9.2 REQUIRES a Printer to support.
- 1756 8. MAY support any of the Document Template attributes in Document Creation operations as indicated in
1757 section 8 and MUST NOT support them for contexts for where they are not defined as indicated in Table
1758 10 with an "n".
- 1759 9. MUST support the Document Description attributes that section 9.1 REQUIRES a Printer to support.
- 1760 10. MUST support the Printer attributes that section 9.2 REQUIRES a Printer to support..
- 1761 11. MUST support the values of Printer Description attributes that section 11 REQUIRES a Printer to
1762 support.

1763 13.2 Client conformance requirements

1764 In order to conform to this specification, a client:

- 1765 1. MUST meet the conformance requirements for clients specified in [rfc2911].
- 1766 2. MAY support any of the new operations, or new semantics for existing operations, defined in sections 3, 4,
1767 and 5.
- 1768 3. MUST supply the Operation attributes that section 7 REQUIRES a client to supply in operation requests.
- 1769 4. MUST supply any Document Template attributes in the format that section 8 REQUIRES a client to supply in
1770 Document Creation operations and MUST NOT support them for contexts for where they are not defined as
1771 indicated in the Table 10 with an "n".

- 1772 5. SHOULD support any of the Document Description attributes that section 9.1 REQUIRES a Printer to support.
- 1773 6. MAY support any of the Printer attributes listed in section 9.2.
- 1774 7. MAY support any of the values of the Printer Description attributes in section 11.

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1886 16 IANA Considerations

1887 This section contains the registration information for IANA to add to the various IPP Registries according to the
 1888 procedures defined in RFC 2911 [rfc2911] § 6 to cover the definitions in this document. The resulting registrations
 1889 will be published in the <http://www.iana.org/assignments/ipp-registrations-registry>.

1890 *Note to the RFC Editor: Replace the References below to [this spec] with the IEEE PWG number for the*
 1891 *appropriate document, so that it accurately reflects the content of the information for the IANA Registry.*

1892 16.1 Attribute Registrations

1893 The following table lists all the attributes defined in this specification. These are to be registered according to the
 1894 procedures in RFC 2911 [rfc2911] § 6.2. If the attribute has a separate sub-section definition in this specification,
 1895 that sub-section is listed as the Reference. This specification lists most Job Template attributes as also being
 1896 Document Template attributes. However, the definitions of these Document Template attributes are not duplicated in
 1897 this specification. Instead, the Reference column in this sub-section indicates Section 8 which contains a table of all
 1898 Job Template and corresponding Document Template attributes (including dropping the "job-" prefix). This table
 1899 contains the reference in another specification that completely defines each attribute. These Document Template
 1900 attributes will also be added to the IANA IPP Registry under the Document Template attributes with a reference to
 1901 this specification and Section 8.

1902	1903	1904	1905
	Attribute Name (attribute syntax)	Reference	Section
	-----	-----	-----
1906	Document Description attributes:		
1907	attributes-charset (charset)	[this spec]	9.1.1
1908	attributes-natural-language (naturalLanguage)	[this spec]	9.1.2
1909	compression (type3 keyword)	[this spec]	9.1.3
1910	copies-actual (1setOf integer(1:MAX))	[this spec]	9.2
1911	cover-back-actual (1setOf collection)	[this spec]	9.2
1912	cover-type (type2 keyword)	[this spec]	8
	media (type3 keyword name)	[this spec]	8

1913	media-col (collection)	[this spec]	8
1914	cover-front-actual (1setOf collection)	[this spec]	9.2
1915	cover-type (type2 keyword)	[this spec]	8
1916	media (type3 keyword name)	[this spec]	8
1917	media-col (collection)	[this spec]	8
1918	current-page-order (type2 keyword)	[this spec]	9.1.4
1919	date-time-at-completed (dateTime)	[this spec]	9.1.5
1920	date-time-at-creation (dateTime)	[this spec]	9.1.6
1921	date-time-at-processing (dateTime)	[this spec]	9.1.7
1922	detailed-status-messages (1setOf text(MAX))	[this spec]	9.1.8
1923	document-access-errors (1setOf text(MAX))	[this spec]	9.1.9
1924	document-charset (charset)	[this spec]	9.1.10
1925	document-digital-signature (type2 keyword)	[this spec]	9.1.11
1926	document-format (mimeMediaType)	[this spec]	9.1.12
1927	document-format-details (1setOf collection)	[this spec]	9.1.13
1928	document-format-details-detected (1setOf collection)		
1929		[this spec]	9.1.14
1930	document-format-detected (mimeMediaType)	[this spec]	9.1.15
1931	document-format-version (text(127))	[this spec]	9.1.16
1932	document-format-version-detected (text(127))	[this spec]	9.1.17
1933	document-job-id (integer(1:MAX))	[this spec]	9.1.11
1934	document-job-uri (uri)	[this spec]	9.1.19
1935	document-message (text(MAX))	[this spec]	9.1.20
1936	document-name (name(MAX))	[this spec]	9.1.21
1937	document-natural-language (naturalLanguage)	[this spec]	9.1.22
1938	document-number (integer(1:MAX))	[this spec]	9.1.23
1939	document-printer-uri (uri)	[this spec]	9.1.24
1940	document-state (type1 enum)	[this spec]	9.1.25
1941	document-state-message (text(MAX))	[this spec]	9.1.26
1942	document-state-reasons (1setOf type2 keyword)	[this spec]	9.1.27
1943	document-uri (uri)	[this spec]	9.1.28
1944	errors-count (integer(0:MAX))	[this spec]	9.1.29
1945	finishings-actual (1setOf type2 enum)	[this spec]	9.2
1946	finishings-col-actual (1setOf collection)	[this spec]	9.2
1947	finishing-template (name (MAX))	[this spec]	8
1948	stitching (collection)	[this spec]	8
1949	stitching-reference-edge (type2 keyword)	[this spec]	8
1950	stitching-offset (integer(0:MAX))	[this spec]	8
1951	stitching-locations (1setOf integer(0:MAX))	[this spec]	8
1952	force-front-side-actual (1setOf integer(1:MAX))	[this spec]	9.2
1953	impressions (integer(0:MAX))	[this spec]	9.1.30
1954	impressions-completed (integer(0:MAX))	[this spec]	9.1.31
1955	impressions-completed-current-copy (integer(0:MAX))		
1956		[this spec]	9.1.32
1957	imposition-template-actual (1setOf type3 keyword name)		
1958		[this spec]	9.2

1959	insert-sheet-actual (1setOf collection)	[this spec]	9.2
1960	insert-after-page-number (integer(0:MAX))	[this spec]	8
1961	insert-count (integer(0:MAX))	[this spec]	8
1962	media (type3 keyword name)	[this spec]	8
1963	media-col (collection)	[this spec]	8
1964	k-octets (integer(0:MAX))	[this spec]	9.1.33
1965	k-octets-processed (integer(0:MAX))	[this spec]	9.1.34
1966	last-document (boolean)	[this spec]	9.1.35
1967	media-actual (1setOf type3 keyword name)	[this spec]	9.2
1968	media-col-actual (1setOf collection)	[this spec]	9.2
1969	media-back-coating (type3 keyword name(MAX))	[this spec]	8
1970	media-color (type3 keyword name(MAX))	[this spec]	8
1971	media-front-coating (type3 keyword name(MAX))	[this spec]	8
1972	media-hole-count (integer(0:MAX))	[this spec]	8
1973	media-info (text(255))	[this spec]	8
1974	media-key (type3 keyword name(MAX))	[this spec]	8
1975	media-order-count (integer(1:MAX))	[this spec]	8
1976	media-preprinted (type3 keyword name(MAX))	[this spec]	8
1977	media-recycled (type3 keyword name(MAX))	[this spec]	8
1978	media-size (collection)	[this spec]	8
1979	x-dimension (integer(0:MAX))	[this spec]	8
1980	y-dimension (integer(0:MAX))	[this spec]	8
1981	media-type (type3 keyword name(MAX))	[this spec]	8
1982	media-weight-metric (integer(0:MAX))	[this spec]	8
1983	media-input-tray-check-actual (1setOf type3 keyword name)		
1984		[this spec]	9.2
1985	media-sheets (integer(0:MAX))	[this spec]	9.1.36
1986	media-sheets-completed (integer(0:MAX))	[this spec]	9.1.37
1987	more-info (uri)	[this spec]	9.1.38
1988	number-up-actual (1setOf integer)	[this spec]	9.2
1989	orientation-requested-actual (1setOf type2 enum)	[this spec]	9.2
1990	output-bin-actual (1setOf name(MAX))	[this spec]	9.2
1991	overrides-actual (1setOf collection)	[this spec]	9.2
1992	pages (1setOf RangeOfInteger(1:MAX))	[this spec]	8
1993	document-numbers (1setOf RangeOfInteger(1:MAX))		
1994		[this spec]	8
1995	document-copies (1setOf RangeOfInteger(1:MAX))		
1996		[this spec]	8
1997	<any other Template attribute affecting pages>	[this spec]	8
1998	output-device-assigned (name(127))	[this spec]	9.1.39
1999	page-delivery-actual (1setOf type2 keyword)	[this spec]	9.2
2000	page-order-received-actual (1setOf type2 keyword)	[this spec]	9.2
2001	page-ranges-actual (1setOf rangeOfInteger(1:MAX))	[this spec]	9.2
2002	presentation-direction-number-up-actual (1setOf type2 keyword)		
2003		[this spec]	9.2
2004	print-quality-actual (1setOf type2 enum)	[this spec]	9.2

2005	printer-resolution-actual (1setOf resolution)	[this spec]	9.2
2006	printer-up-time (integer (1:MAX))	[this spec]	9.1.40
2007	separator-sheets-actual (1setOf collection)	[this spec]	9.2
2008	separator-sheets-type (type3 keyword name(MAX))	[this spec]	8
2009	media(type3 keyword name(MAX))	[this spec]	8
2010	media-col(collection)	[this spec]	8
2011	sheet-collate-actual (1setOf type2 keyword)	[this spec]	9.2
2012	sheet-completed-copy-number (integer(0:MAX))	[this spec]	9.1.41
2013	sides-actual (1setOf type2 keyword)	[this spec]	9.2
2014	time-at-completed (integer (MIN:MAX))	[this spec]	9.1.42
2015	time-at-creation (integer (MIN:MAX))	[this spec]	9.1.43
2016	time-at-processing (integer (MIN:MAX))	[this spec]	9.1.44
2017	x-image-position-actual (1setOf type2 keyword)	[this spec]	9.2
2018	x-image-shift-actual (1setOf integer(MIN:MAX))	[this spec]	9.2
2019	x-side1-image-shift-actual (1setOf integer(MIN:MAX))		
2020		[this spec]	9.2
2021	x-side2-image-shift-actual (1setOf integer(MIN:MAX))		
2022		[this spec]	9.2
2023	y-image-position-actual (1setOf type2 keyword)	[this spec]	9.2
2024	y-image-shift-actual (1setOf integer(MIN:MAX))	[this spec]	9.2
2025	y-side1-image-shift-actual (1setOf integer(MIN:MAX))		
2026		[this spec]	9.2
2027	y-side2-image-shift-actual (1setOf integer(MIN:MAX))		
2028		[this spec]	9.2

2029
2030

Document Templates attributes:

2031			
2032	copies (integer(1:MAX))	[this spec]	8
2033	cover-back (collection)	[this spec]	8
2034	cover-type (type2 keyword)	[this spec]	8
2035	media (type3 keyword name(MAX))	[this spec]	8
2036	media-col (collection)	[this spec]	8
2037	cover-front (collection)	[this spec]	8
2038	cover-type (type2 keyword)	[this spec]	8
2039	media (type3 keyword name(MAX))	[this spec]	8
2040	media-col (collection)	[this spec]	8
2041	feed-orientation (type3 keyword)	[this spec]	8
2042	finishings (1setOf type2 enum)	[this spec]	8
2043	finishings-col (collection)	[this spec]	8
2044	finishing-template (name(MAX))	[this spec]	8
2045	stitching (collection)	[this spec]	8
2046	stitching-locations (1setOf integer(0:MAX))	[this spec]	8
2047	stitching-offset (integer (0:MAX))	[this spec]	8
2048	stitching-reference-edge (type2 keyword)	[this spec]	8
2049	font-name-requested (name(MAX))	[this spec]	8
2050	font-size-requested (integer(1:MAX))	[this spec]	8

2051	force-front-side (1setOf integer(1:MAX))	[this spec]	8
2052	imposition-template (type3 keyword name(MAX))	[this spec]	8
2053	insert-sheet (1setOf collection)	[this spec]	8
2054	insert-after-page-number (integer(0:MAX))	[this spec]	8
2055	insert-count (integer(0:MAX))	[this spec]	8
2056	media (type3 keyword name(MAX))	[this spec]	8
2057	media-col (collection)	[this spec]	8
2058	media (type3 keyword name(MAX))	[this spec]	8
2059		[this spec]	8
2060	media-col (collection)	[this spec]	8
2061	media-back-coating (type3 keyword name(MAX))	[this spec]	8
2062	media-color (type3 keyword name(MAX))	[this spec]	8
2063	media-front-coating (type3 keyword name(MAX))	[this spec]	8
2064	media-grain (type3 keyword name(MAX))	[this spec]	8
2065	media-hole-count (integer(0:MAX))	[this spec]	8
2066	media-info (text(255))	[this spec]	8
2067	media-key (type3 keyword name(MAX))	[this spec]	8
2068	media-material (type3 keyword name(MAX))	[this spec]	8
2069	media-order-count (integer(1:MAX))	[this spec]	8
2070	media-preprinted (type3 keyword name(MAX))	[this spec]	8
2071	media-recycled (type3 keyword name(MAX))	[this spec]	8
2072	media-size (collection)	[this spec]	8
2073	x-dimension (integer(0:MAX))	[this spec]	8
2074	y-dimension (integer(0:MAX))	[this spec]	8
2075	media-thickness (integer(1:MAX))	[this spec]	8
2076	media-tooth (type3 keyword name(MAX))	[this spec]	8
2077	media-type (type3 keyword name(MAX))	[this spec]	8
2078	media-weight-metric (integer(0:MAX))	[this spec]	8
2079	media-input-tray-check (type3 keyword name(MAX))		
2080		[this spec]	8
2081	media-type (type3 keyword name(MAX))	[this spec]	8
2082	number-up (integer(1:MAX))	[this spec]	8
2083	orientation-requested (type2 enum)	[this spec]	8
2084	overrides (1setOf collection)	[this spec]	8
2085	pages (1setOf rangeOfInteger(MAX))	[this spec]	8
2086	document-numbers (1setOf rangeOfInteger(MAX))	[this spec]	8
2087	document-copies (1setOf rangeOfInteger(MAX))	[this spec]	8
2088	page-delivery (type2 keyword)	[this spec]	8
2089	page-order-received (type2 keyword)	[this spec]	8
2090	page-ranges (1setOf rangeOfInteger(1:MAX))	[this spec]	8
2091	pdl-init-file (1setOf collection)	[this spec]	8
2092	pdl-init-file-entry (name(MAX))	[this spec]	8
2093	pdl-init-file-location (uri)	[this spec]	8
2094	pdl-init-file-name (name(MAX))	[this spec]	8
2095	presentation-direction-number-up (type2 keyword)	[this spec]	8
2096	print-quality (type2 enum)	[this spec]	8

2097	printer-resolution (resolution)	[this spec]	8
2098	separator-sheets (collection)	[this spec]	8
2099	media (type3 keyword name(MAX))	[this spec]	8
2100	media-col (collection)	[this spec]	8
2101	separator-sheets-type (type3 keyword name(MAX))		
2102		[this spec]	8
2103	sheet-collate (type2 keyword)	[this spec]	8
2104	sides (type2 keyword)	[this spec]	8
2105	x-image-position (type2 keyword)	[this spec]	8
2106	x-image-shift (integer(MIN:MAX))	[this spec]	8
2107	x-side1-image-shift (integer(MIN:MAX))	[this spec]	8
2108	x-side2-image-shift (integer(MIN:MAX))	[this spec]	8
2109	y-image-position (type2 keyword)	[this spec]	8
2110	y-image-shift (integer(MIN:MAX))	[this spec]	8
2111	y-side1-image-shift (integer(MIN:MAX))	[this spec]	8
2112	y-side2-image-shift (integer(MIN:MAX))	[this spec]	8

2113
2114
2115

Job Description attributes:

2117	job-copies-actual (1setOf integer(1:MAX))	[this spec]	9.2
2118	job-cover-back-actual (1setOf collection)	[this spec]	9.2
2119	job-cover-front-actual (1setOf collection)	[this spec]	9.2
2120	job-collation-type-actual (1setOf type2 keyword)	[this spec]	9.2
2121	job-finishings-actual (1setOf type2 enum)	[this spec]	9.2
2122	job-finishings-col-actual (1setOf collection)	[this spec]	9.2

2123
2124

Job Template attributes:

2126	job-copies (integer(1:MAX))	[this spec]	8
2127	job-copies-default (integer(1:MAX))	[this spec]	8
2128	job-copies-supported (rangeOfInteger (1:MAX))	[this spec]	8
2129	job-cover-back (collection)	[this spec]	8
2130	job-cover-back-default (collection)	[this spec]	8
2131	job-cover-back-supported (1setOf type2 keyword)	[this spec]	8
2132	job-cover-front (collection)	[this spec]	8
2133	job-cover-front-default (collection)	[this spec]	8
2134	job-cover-front-supported (1setOf type2 keyword)	[this spec]	8
2135	job-finishings (1setOf type2 enum)	[this spec]	8
2136	job-finishings-default (1setOf type2 enum)	[this spec]	8
2137	job-finishings-supported (1setOf type2 enum)	[this spec]	8
2138	job-finishings-col (collection)	[this spec]	8
2139	job-finishings-col-default (collection)	[this spec]	8
2140	job-finishings-col-supported (1setOf type2 keyword)		

2141 [this spec] 8
2142

2143
 2144 **Printer Description attributes:**
 2145 document-creation-attributes-supported (1setOf type2 keyword)
 2146 [this spec] 10.1

2147 **16.2 Keyword attribute values**

2148	document-state-reasons (1setOf type2 keyword)	[this spec]	9.1.27
2149	aborted-by-system	[this spec]	9.1.27
2150	compression-error	[this spec]	9.1.27
2151	digital-signature-did-not-verify	[this spec]	9.1.27
2152	digital-signature-type-not-supported	[this spec]	9.1.27
2153	document-access-error	[this spec]	9.1.27
2154	document-format-error	[this spec]	9.1.27
2155	canceled-at-device	[this spec]	9.1.27
2156	canceled-by-operator	[this spec]	9.1.27
2157	canceled-by-user	[this spec]	9.1.27
2158	completed-successfully	[this spec]	9.1.27
2159	completed-with-errors	[this spec]	9.1.27
2160	completed-with-warnings	[this spec]	9.1.27
2161	data-insufficient	[this spec]	9.1.27
2162	digital-signature-wait	[this spec]	9.1.27
2163	errors-detected	[this spec]	9.1.27
2164	incoming	[this spec]	9.1.27
2165	interpreting	[this spec]	9.1.27
2166	none	[this spec]	9.1.27
2167	outgoing	[this spec]	9.1.27
2168	printing	[this spec]	9.1.27
2169	processing-to-stop-point	[this spec]	9.1.27
2170	queued	[this spec]	9.1.27
2171	queued-for-marker	[this spec]	9.1.27
2172	queued-in-device	[this spec]	9.1.27
2173	resources-are-not-ready	[this spec]	9.1.27
2174	resources-are-not-supported	[this spec]	9.1.27
2175	submission-interrupted	[this spec]	9.1.27
2176	transforming	[this spec]	9.1.27
2177	unsupported-compression	[this spec]	9.1.27
2178	unsupported-document-format	[this spec]	9.1.27
2179	warnings-detected	[this spec]	9.1.27

2180 **16.3 Enum Attribute Values**

2181 The following table lists all the new enum attribute values defined in this document as additional type2 enum values.
 2182 These are to be registered according to the procedures in RFC 2911 [rfc2911] § 6.1.

2183	Value	Name	Reference	Section:
2185	-----	-----	-----	-----
2186	document-state	(type1 enum)	[this spec]	9.1.25

2187	3	pending	[this spec]	9.1.25
2188	5	processing	[this spec]	9.1.25
2189	7	canceled	[this spec]	9.1.25
2190	8	aborted	[this spec]	9.1.25
2191	9	completed	[this spec]	9.1.25
2192	operations-supported (1setOf type2 enum)		[rfc2911]	4.4.15
2193	0x0033	Cancel-Document	[this spec]	4.5
2194	0x0034	Get-Document-Attributes	[this spec]	4.3
2195	0x0035	Get-Documents	[this spec]	3.3
2196	0x0036	Delete-Document	[this spec]	5.4
2197	0x0037	Set-Document-Attributes	[this spec]	4.4
2198				

2199 **16.4 Operations**

2200 The following table lists all of the operations defined in this document. These are to be registered according to the
 2201 procedures in RFC 2911 [rfc2911] § 6.4.
 2202

2203	Operations	Reference	Section
2204	-----	-----	-----
2205	Cancel-Document	[this spec]	4.5
2206	Delete-Document	[this spec]	5.4
2207	Get-Document-Attributes	[this spec]	4.3
2208	Get-Documents	[this spec]	3.3
2209	Set-Document-Attributes	[this spec]	4.4
2210			

2211 **16.5 Attribute Group tags**

2212 The following table lists all the attribute group tags defined in this specification. These are to be registered according
 2213 to the procedures in RFC 2911 [rfc2911] § 6.5.

2214	Value	Name	Reference	Section
2215	-----	-----	-----	-----
2216	0x09	document-attributes-tag	[this spec]	12
2217				

2218 **16.6 Status codes**

2219 The following table lists all the status codes defined in this specification. These are to be registered according to the
 2220 procedures in RFC 2911 [rfc2911] § 6.6.

2221	Value	Status Code Name	Reference	Section
2222	-----	-----	-----	-----
2223	0x0500:0x05FF	- Server Error:		
2224	0x050B	server-error-too-many-jobs	[this spec]	Error!
2225	Reference source not found.			
2226	0x050C	server-error-too-many-documents	[this spec]	Error!
2227	Reference source not found.			
2228				

2229 16.7 Attribute Group name Registrations

2230 The following table lists the one new attribute group name defined in this document. This is to be registered
2231 according to the procedures in RFC 2911 [rfc2911] § 6.2.

2232	Attribute Group name	Reference	Section
2233	-----	-----	-----
2234	document-template	[this spec]	4.3

2235 17 Internationalization Considerations

2236 The internationalization considerations for this extension for handling the Document object are the same as for
2237 handling the Job object in [rfc2911].

2238 18 Security Considerations

2239 The Document object should provide no more increased security considerations than the Job object. The Printer
2240 MUST provide the same access control for Document objects as for Job objects.

2241 The Printer implementer needs to consider counter measures for denial of service attacks for the Create-Job
2242 operation. For example, a rogue client could issue repeated Create-Job and/or Send-Document/Send-URI requests
2243 in an attempt to exceed the capacity of the Printer to absorb such requests and thereby deny Job Creation and
2244 Document Creation requests from other clients. For example, a Printer might avoid a fixed set of allocations for Jobs
2245 and Documents and also be able to detect when an excessive number of Create-Job and Send-Document/Send-URI
2246 requests have been supplied. In such a case, the Printer would return either a 'server-error-too-many-jobs' status-
2247 code (see section **Error! Reference source not found.**) or a 'server-error-too-many-documents' status-code (see
2248 section **Error! Reference source not found.**).

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2284 **22 Appendix A: Document operations compared to Job operations**
 2285 **(Informative)**

2286 This appendix compares the Document operations with the existing Job operations to show the parallelism.

2287 Table 17 compares the Job and Document operations. The two Conf. columns indicate the conformance
 2288 requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ"
 2289 in the Document Conformance column means if the Document object is supported. Whether a Document operation
 2290 is a method on the Job object or the Document object depends on the modeling regime and is not an essential part
 2291 of the semantics described here, since these semantics are intended to apply to both object-oriented and object-
 2292 based protocols, APIs, and implementations.

2293 **Table 17 - 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>	
Cancel-Job	REQ	Cancel-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 4.1)	REQ
Print-URI	OPT	Send-URI (existing operation - see [rfc2911] with an additional Document attributes group defined in section 4.2)	OPT
Promote-Job	OPT	<i>N/A, can only promote an entire job</i>	
Purge-Jobs	OPT	Delete-Document	OPT

Job operations	Job Conf.	Document operations	Doc Conf.
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 each document in a multi-document job</i>	

2294
2295

2296 **23 Annex B: IEEE-ISTO 5100.4-2001 Document Overrides (informative)**

2297 With the introduction of the Document Object, there is no longer a need for the “document-overrides” (1setOf
2298 collection) attribute [pwg5100.4-2001] as an Operation attribute or a Job Template attribute. A new Overrides
2299 document [OvrRide] without the “document-overrides” attribute will be published. With the introduction of the
2300 Document object, the client simply supplies the Document Template attributes (see Table 10) for each Document
2301 Creation request (in a new Document Template attribute group). There is no longer a need for the “document-
2302 overrides” attribute.

2303 Page Overrides will be specified in a new document [OvrRide] that replaces the obsolete [pwg5100.4-2001]. Other
2304 [pwg5100.4-2001] features such as Subset Processing and Error/Warning counts have been moved to other
2305 specifications.

2306 **24 Annex C: Change Log (informative)**

2307 The following summaries of the changes in chronological order:

2308 Version 0.15, August 8, 2003,

- 2309 1. changed server-error-too-many-* text
- 2310 2. added “-actual”
- 2311 3. updated IANA registrations
- 2312 4. added clarifying text to sections 3.1.1, 6, 7.1, 8, 9.1.35, 10.1 and 14
- 2313 5. Moved “server-error-too-many-*” to status codes to JobX
- 2314 6. clarified how “job-collation-type” handles mixed sheet collation beteen Documents

2315

2316 Version 0.14, July 1, 2003,

- 2317 7. Moved to Prototype Maturity
- 2318 8. Removed previous change log
- 2319 9. Finished editorial changes from PWG Face-to-Face and Dennis Carney
- 2320 10. Removed ippsave
- 2321 11. changed section to § in all references
- 2322 12. Removed Previously defined Printer attributes from Table 14
- 2323 13. Removed xxx-supported and xxx-defaults from IANA registry (They have already been defined), added
2324 keyword & enum registrations

2325