

Working Draft, 24~~16~~ March 2003

Maturity Level: Development - 1 ISSUE is highlighted like this.

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

Abstract: This IPP specification extends the IPP Model and Semantics [rfc2911] object model by defining a Document object. The [rfc2911] Job object is extended to contain one or more Document objects which are passive objects operated on by the Job. A new REQUIRED Create-Document operation allows a client to supply the Document Attributes without the data (like Create-Job does for a Job object). Then the client sends the data content for that Document object using the new REQUIRED Send-Document-Data operation.

This specification also defines five new operations for Document objects once they have been created:

1 REQUIRED Job operation: Close-Job

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

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

This specification also lists all of the attributes defined in other IPP specifications to show their relationship to corresponding attributes defined in this IPP specification for use with the Document object.

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



Working Draft, 2016 March 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-ippdoc2003032014.pdf, .doc, .rtf

This document is a Working Draft for an IEEE-ISTO PWG Candidate Standard. For a definition of a "PWG Candidate Standard" and its transition to a "PWG Standard", see: <ftp://ftp.pwg.org/pub/pwg/general/pwg-process.pdf>. After approval by the PWG (by a Last Call) to transition a PWG Working Draft to a PWG Candidate Standard, the resulting PWG Candidate Standard will be available electronically at: <ftp://ftp.pwg.org/pub/pwg/cs/>. After approval by the PWG (by a Last Call) to transition a PWG Candidate Standard to a PWG Standard, the resulting PWG Standard will be available electronically at: <ftp://ftp.pwg.org/pub/pwg/standards/>.

42 **Copyright (C) 2003, IEEE ISTO. All rights reserved.**

43 This document may be copied and furnished to others, and derivative works that comment on, or otherwise explain it
44 or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without
45 restriction of any kind, provided that the above copyright notice, this paragraph and the title of the Document as
46 referenced below are included on all such copies and derivative works. However, this document itself may not be
47 modified in any way, such as by removing the copyright notice or references to the IEEE-ISTO and the Printer
48 Working Group, a program of the IEEE-ISTO.

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

50 The IEEE-ISTO and the Printer Working Group DISCLAIM ANY AND ALL WARRANTIES, WHETHER EXPRESS
51 OR IMPLIED INCLUDING (WITHOUT LIMITATION) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR
52 FITNESS FOR A PARTICULAR PURPOSE.

53 The Printer Working Group, a program of the IEEE-ISTO, reserves the right to make changes to the document
54 without further notice. The document may be updated, replaced or made obsolete by other documents at any time.

55 The IEEE-ISTO takes no position regarding the validity or scope of any intellectual property or other rights that might
56 be claimed to pertain to the implementation or use of the technology described in this document or the extent to
57 which any license under such rights might or might not be available; neither does it represent that it has made any
58 effort to identify any such rights.

59 The IEEE-ISTO invites any interested party to bring to its attention any copyrights, patents, or patent applications, or
60 other proprietary rights which may cover technology that may be required to implement the contents of this
61 document. The IEEE-ISTO and its programs shall not be responsible for identifying patents for which a license may
62 be required by a document and/or IEEE-ISTO Industry Group Standard or for conducting inquiries into the legal
63 validity or scope of those patents that are brought to its attention. Inquiries may be submitted to the IEEE-ISTO by e-
64 mail at:

65 ieee-isto@ieee.org.

66 The Printer Working Group acknowledges that the IEEE-ISTO (acting itself or through its designees) is, and shall at
67 all times, be the sole entity that may authorize the use of certification marks, trademarks, or other special
68 designations to indicate compliance with these materials.

69 Use of this document is wholly voluntary. The existence of this document does not imply that there are no other
70 ways to produce, test, measure, purchase, market, or provide other goods and services related to its scope.

71

About the IEEE-ISTO

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

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

About the IEEE-ISTO PWG

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

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

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

Contact information:

IPP Web Page: <http://www.pwg.org/ipp/>
IPP Mailing List: ipp@pwg.org

To subscribe to the ipp mailing list, send the following email:

- 1) send it to majordomo@pwg.org
- 2) leave the subject line blank
- 3) put the following two lines in the message body:
subscribe ipp
end

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

Contents

111			
112	1	Introduction and Summary	11
113	1.1	Scope.....	11
114	2	Terminology	12
115	2.1	Conformance Terminology	12
116	2.2	Other Terminology	13
117	3	Document Operations	14
118	3.1	Create-Document Operation	15
119	3.1.1	Create-Document Request	16
120	3.1.1.1	last-document (boolean)	17
121	3.1.1.2	document-message (text(MAX))	17
122	3.1.1.3	Additional Operation attributes:	17
123	3.1.1.4	Ignoring unsupported or improper Operation attributes:	17
124	3.1.2	Create-Document Response.....	18
125	3.1.2.1	document-number (integer(1:MAX))	19
126	3.1.2.2	document-id-uri (uri)	19
127	3.1.2.3	document-state (type1 enum)	19
128	3.1.2.4	document-state-reasons (1setOf type2 keyword)	20
129	3.1.2.5	document-state-message (text(MAX))	20
130	3.2	Send-Data Operation.....	20
131	3.2.1	Send-Data request	20
132	3.2.2	Send-Data Response.....	21
133	3.3	Send-Document Operation.....	21
134	3.3.1	Send-Document Request.....	21
135	3.3.2	Send-Document Response	22
136	3.4	Send-URI Operation	23
137	3.5	Get-Document-Attributes Operation.....	23
138	3.5.1	Get-Document-Attributes Request.....	24
139	3.5.1.1	"requested-attributes" (1setOf keyword):	24
140	3.5.2	Get-Document-Attributes Response	24
141	3.6	Get-Documents Operation.....	25
142	3.6.1	Get-Documents Request.....	25
143	3.6.1.1	"limit" (integer(1:MAX)):	26
144	3.6.1.2	"requested-attributes" (1setOf type2 keyword):	26
145	3.6.2	Get-Documents Response	26
146	3.7	Set-Document-Attributes Operation	27
147	3.7.1	Settable and READ-ONLY Document Description attributes	28
148	3.7.2	Set-Document-Attributes Request	28
149	3.7.3	Set-Document-Attributes Response.....	29
150	3.8	Cancel-Document Operation.....	30
151	3.8.1	Cancel-Document Request.....	31
152	3.8.1.1	document-message (text(MAX)) Operation attribute	32
153	3.8.2	Cancel-Document Response	32
154	3.9	Delete-Document Operation.....	32
155	4	Semantic extensions to Job operations	33

156	4.1	Cancel-Current-Job ([adm-ops] section 4.2)	33
157	4.2	Cancel-Job ([rfc2911] section 3.3.3)	33
158	4.3	Close-Job	33
159	4.3.1	Close-Job Request	34
160	4.3.2	Close-Job Response	34
161	4.4	Job Creation operations	35
162	4.4.1	ipp-attribute-fidelity (boolean) ([rfc2911] section 3.2.1 and 15)	35
163	4.4.2	job-mandatory-attributes (1setOf type2 keyword) Operation attribute	35
164	4.4.3	Create-Job ([rfc2911] section 3.2.4)	36
165	4.4.4	Print-Job ([rfc2911] section 3.2.1)	36
166	4.4.5	Print-URI ([rfc2911] section 3.2.2)	36
167	4.5	Purge-Jobs ([rfc2911] section 3.2.9)	37
168	4.6	Release-Job ([rfc2911] section 3.3.6)	37
169	4.7	Reprocess-Job ([adm-ops] section 4.1)	37
170	4.8	Restart-Job ([rfc2911] section 3.3.7)	37
171	4.9	Send-Document ([rfc2911] section 3.3.1)	37
172	4.10	Send-URI ([rfc2911] section 3.3.2)	37
173	4.11	Suspend-Current-Job ([adm-ops] section 4.3.1)	37
174	5	Attribute Precedence during job processing	37
175	6	Operation Attributes for the Job and Document Creation operations	40
176	6.1	Operation Attributes supplied at the Job and Document Levels for Creation	40
177	6.1.1	document-format (mimeType)	42
178	6.1.2	document-format-details (1setOf collection)	42
179	6.1.2.1	document-creator-application-name (name(MAX))	44
180	6.1.2.2	document-creator-application-version (text(127))	44
181	6.1.2.3	document-creator-os-name (name(40))	44
182	6.1.2.4	document-creator-os-version (text(40))	44
183	6.1.2.5	document-format (mimeType)	45
184	6.1.2.6	document-format-device-id (text(127))	45
185	6.1.2.7	document-format-version (text(127))	45
186	6.1.2.8	document-natural-language (naturalLanguage)	45
187	6.2	Override Operation attributes in Send-Document and Send-URI	46
188	6.3	Operation Attributes returned in Job and Document Creation responses	46
189	7	Job Template and Document Template attributes	47
190	7.1	Job Template attributes defined for use with multi-document jobs	54
191	7.1.1	job-copies (integer(1:MAX))	54
192	7.1.2	job-cover-back (collection)	54
193	7.1.3	job-cover-front (collection)	55
194	7.1.4	job-finishings (1setOf type2 enum)	55
195	7.1.5	job-finishings-col (1setOf collection)	55
196	7.1.6	media-size-name (type3 keyword name(MAX))	55
197	7.1.7	media-type (type3 keyword name(MAX))	55
198	7.2	Document Template attributes	55
199	8	Job Description and Document Description attributes	56
200	8.1	Job Description attributes	59

201	8.1.1 ipp-attribute-fidelity (boolean).....	59
202	8.1.2 job-mandatory-attributes (1setOf type2 keyword).....	59
203	8.2 Document Description attributes	60
204	8.2.1 attributes-charset (charset)	60
205	8.2.2 attributes-natural-language (naturalLanguage).....	60
206	8.2.3 compression (type3 keyword)	60
207	8.2.4 current-page-order (type2 keyword).....	60
208	8.2.5 date-time-at-completed (dateTime).....	60
209	8.2.6 date-time-at-creation (dateTime).....	60
210	8.2.7 date-time-at-processing (dateTime).....	60
211	8.2.8 document-format (mimeType).....	61
212	8.2.9 document-format-details (1setOf collection)	61
213	8.2.10 document-format-details-detected (1setOf collection)	61
214	8.2.11 document-format-detected (mimeType).....	61
215	8.2.12 document-id-uri (uri).....	61
216	8.2.13 document-job-id (integer(1:MAX)).....	62
217	8.2.14 document-job-printer-uri (uri)	62
218	8.2.15 document-job-uri (uri).....	62
219	8.2.16 document-message (text(MAX))	62
220	8.2.17 document-name (name(MAX)).....	62
221	8.2.18 document-natural-language (naturalLanguage).....	62
222	8.2.19 document-number (integer(1:MAX))	62
223	8.2.20 document-state (type1 enum) and job-state (type1 enum).....	63
224	8.2.20.1 The "job-state" Job Description attribute and the Job Life Cycle	65
225	8.2.20.2 The "document-state" Document Description attribute and the Document object life Cycle	65
226	8.2.20.3 Forwarding Servers	66
227	8.2.20.4 Partitioning of Job/Document States	66
228	8.2.21 document-state-message (text(MAX)) and job-state-message (text(MAX)).....	67
229	8.2.22 document-state-reasons (1setOf type2 keyword) and job-state-reasons(1setOf type2 keyword)	67
230	8.2.23 document-uri (uri).....	73
231	8.2.24 impressions-completed-current-copy (integer(0:MAX))	73
232	8.2.25 [job-]detailed-status-message (1setOf text(MAX)).....	73
233	8.2.26 [job-]document-access-errors (1setOf text(MAX))	73
234	8.2.27 [job-]impressions (integer(0:MAX))	73
235	8.2.28 [job-]impressions-completed (integer(0:MAX))	74
236	8.2.29 [job-]k-octets (integer(0:MAX)).....	74
237	8.2.30 [job-]k-octets-processed (integer(0:MAX))	74
238	8.2.31 [job-]media-sheets (integer(0:MAX)).....	74
239	8.2.32 [job-]media-sheets-completed (integer(0:MAX)).....	74
240	8.2.33 [job-]more-info (uri).....	74
241	8.2.34 [job-]printer-up-time (integer (1:MAX)).....	74
242	8.2.35 [job-]warnings-count (integer(0:MAX)).....	74
243	8.2.36 last-document (boolean)	75
244	8.2.37 output-device-assigned (name(127)).....	75
245	8.2.38 sheet-completed-copy-number (integer(0:MAX)).....	75
246	8.2.39 time-at-completed (integer (MIN:MAX)).....	75
247	8.2.40 time-at-creation (integer (MIN:MAX)).....	75
248	8.2.41 time-at-processing (integer (MIN:MAX)).....	75
249	9 Printer attributes	75
250	9.1 document-creation-attributes-supported (1setOf type2 keyword).....	81
251	9.2 document-format-details-supported (1setOf type2 keyword).....	81
252	9.3 document-format-details-implemented (1setOf collection).....	82

253	9.4	printer-state-reasons (1setOf type2 keyword).....	82
254	10	New Values for Existing Printer Description Attributes	86
255	10.1	operations-supported (1setOf type2 enum).....	86
256	11	Encodings of Additional Attribute Tags	86
257	12	Conformance Requirements	86
258	12.1	Printer conformance requirements	86
259	12.2	Client conformance requirements	87
260	13	Normative References	88
261	14	Informative References	89
262	15	IANA Considerations	90
263	15.1	Attribute Registrations	90
264	15.2	Keyword attribute values	94
265	15.3	Enum Attribute Values	94
266	15.4	Operations	95
267	15.5	Attribute Group tags	95
268	16	Internationalization Considerations	95
269	17	Security Considerations	95
270	18	Contributors	96
271	19	Acknowledgments	96
272	20	Author's Address	96
273	21	Appendix A: Document operations compared to Job operations	96
274	22	Annex B: Change Log (informative)	97
275			

Table of Tables

277	Table 1 - List of operations	12
278	Table 2 - Job Creation and Document Creation operations	14
279	Table 3 - Client-supplied Document Creation and Validation Request Signatures	15
280	Table 4 - Printer-returned Document Creation and Validation Response Signatures	15
281	Table 5 - Document State Table for the Set-Documents-Attributes operation	28
282	Table 6 - Operation Attributes supplied at the Job and Document Levels in Creation Requests	40
283	Table 7 - "document-format-details" member Operation attributes	43
284	Table 8 - Operation attributes <i>returned</i> in Job and Document Creation operation <i>responses</i>	46
285	Table 9 - Job Template and Document Template attributes	48
286	Table 10 - Job and Document Description attributes	56
287	Table 11 - "job-state" and "document-state" attribute values	63
288	Figure 1 - The "job-state" Job Description attribute and the Job object life cycle	65
289	Figure 2 - The "document-state" Document Description attribute and the Document object life Cycle	66
290	Table 12 - "job-state-reasons" and "document-state-reasons" attribute values	68
291	Table 13 - Printer attributes (Job Template and Printer Description)	76
292	Table 14 - Keyword values of "document-format-details-supported Printer attribute	81
293	Table 15 - Member attributes of the "document-format-details-implemented" Printer attribute	82
294	Table 16 - Values of the "printer-state-reasons" Printer attribute	82
295	Table 17 - Operation-id assignments	86
296	Table 18 - Document operations compared to Job operations	96
297		

Table of Figures

299	Figure 1 - The "job-state" Job Description attribute and the Job object life cycle	65
300	Figure 2 - The "document-state" Document Description attribute and the Document object life Cycle	66
301		

302

303 1 Introduction and Summary

304 This IPP specification extends the IPP Model and Semantics [rfc2911] object model by defining a Document object.
305 The [rfc2911] Job object is extended to contain one or more Document objects which are passive objects operated
306 on by the Job. The Job object is created by the REQUIRED¹ Create-Job (see [rfc2911] section 3.2.4) operation and
307 is closed by the Close-Job operation (~~see new - defined in~~ section 4.3). The Document object is created by the
308 REQUIRED² Send-Document (see [rfc2911] section 3.3.1) and OPTIONAL Send-URI (see [rfc2911] section 3.3.2)
309 operations and represents an Input Document to the Job. This specification also adds a Document Attributes group
310 (and tag) to these Send-Document and Send-URI requests. The Document Attributes group contains any Document
311 Template attributes to be applied to this Document object being created, overriding any corresponding Job Template
312 attribute supplied at the job level. A new REQUIRED Create-Document operation allows a client to supply the
313 Document Attributes without the data (like Create-Job does for a Job object). Then the client sends the data content
314 for that Document object using the new REQUIRED Send-~~Document~~-Data operation.

315 This specification defines one new operation for Job objects and five new operations for Document objects once they
316 have been created:

- 317 1 REQUIRED Job operation: Close-Job
- 318 3 REQUIRED Document operations: Cancel-Document, Get-Document-Attributes, Get-Documents
- 319 2 OPTIONAL Document operations: Delete-Document, Set-Document-Attributes.

320 This specification also lists all of the attributes defined in other IPP specifications³ to show their relationship to
321 corresponding attributes defined in this IPP specification for use with the Document object. The full semantics of the
322 “document-state”, “document-state-reasons”, and “document-state-message” Document Description attributes are
323 given along side of the corresponding [rfc2911] “job-state”, “job-state-reasons”, and “job-state-message” Job
324 Description attributes. Finally, the analogous Document Descriptions attributes that correspond to the Job
325 Description attributes are defined.

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

330 This specification also defines “media-size-name” and “media-type” as Job Template and Document Template
331 attributes to provide a detailed specification for reference from the PWG Semantic Model.

332 1.1 Scope

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

¹ The Create-Job operation is OPTIONAL in [rfc2911], but is REQUIRED by this specification in order to support the Document object defined in this specification.

² The Send-Document is OPTIONAL in [rfc2911], but is REQUIRED by this specification in order to support the Document object defined in this specification.

³ 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.

The Document object is a passive object⁴ and is operated upon by the Job. The client uses the new Create-Document operation or either of the existing Send-Document and Send-URI operations to create a Document object. In addition there are 8 new operations that affect the Document object after it has been created as summarized in Table 1.

Table 1 - List of operations

Operation Name	Printer support	Brief Description
Close-Job	REQUIRED	Closes the Job object that was created with Document objects.
Create-Document ⁵	REQUIRED	Creates a Document object with Document attributes, but no data.
Send-Document-Data	REQUIRED	Sends data to the Document object created by Create-Document.
Send-Document *	REQUIRED	Creates a Document object with Document attributes and data.
Send-URI *	OPTIONAL	Creates a Document object with Document attributes and a URL reference to the data (print-by-reference).
Get-Document-Attributes	REQUIRED	Get requested attributes of specified Document in the specified Job.
Get-Documents	REQUIRED	Get requested attributes of all of the Documents in the specified Job.
Set-Document-Attributes	OPTIONAL	Set the supplied Document attributes on the specified Document.
Cancel-Document	REQUIRED	Cancel the specified Document in the specified Job, but don't remove it.
Delete-Document	OPTIONAL	Remove the specified Document object and its data from the Job.

* The existing IPP/1.1 operations defined in [rfc2911] with an extension so the client can supply Document Template attributes in a new attribute Group in the request.

~~This specification also specifies the life cycle of the Document object by defining the "document-state", "document-state-reasons", and "document state message" attributes. Finally, the analogous Document Descriptions attributes that correspond to the Job Description attributes are defined.~~

2 Terminology

This section defines terminology used throughout this document.

2.1 Conformance Terminology

Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, ~~NEED NOT~~, and **OPTIONAL**, have special meaning relating to conformance as defined in RFC 2119 [rfc2119] ~~and [rfc2911] section 4.2.4~~. If an implementation supports the extension defined in this document, then these terms apply; otherwise, they do not. These terms define conformance to *this document (and [rfc2911]) only*; they do not affect conformance to other documents, unless explicitly stated otherwise. ~~For example, To be more specific:~~

~~**REQUIRED**—an adjective used to indicate that a conforming IPP Printer implementation MUST support the indicated operation, object, attribute, attribute value, status code, or out-of-band value in requests and responses. See [rfc2911] "Appendix A—Terminology for a definition of "support". Since support of this entire Document Object specification is OPTIONAL for conformance to IPP/1.1, the use of the term REQUIRED in this document means "REQUIRED if this OPTIONAL Document Object specification is implemented".~~

⁴ 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.

⁵ The Create-Document operation maps to the PWG PSI Send-Document-By-Post operation and the Send-Document-Data maps to the HTTP Post operation.

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

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

2.2 Other Terminology

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

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

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

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

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

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

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

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

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

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

Job Level - attributes supplied in the Print-Job, Print-URI, and Create-Job are referred to as being supplied at the **Job Level**. Attributes supplied at the **Job Level** are a mixture of **Job attributes** and **Document attributes**. **Job**

attributes apply to the Job as a whole, while **Document attributes** provide defaults for the **Document objects** in case the client does not supply a **Document attribute** at the **Document Level** for a **Document object**. Put another way, **Document objects** *inherit* **Document attributes** from the **Job object** which are used if the client didn't supply a corresponding attribute for the **Document object**.

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

Table 2 shows this terminology as applied to the six operations. Note that Print-Job and Print-URI are both Job Creation operations and Document Creation operations, though they only create single Document jobs. In other words, for Print-Job and Print-URI, there is only one document per job, so whether the attributes are considered to be submitted at the Job Level and then inherited by the Document object, is moot, since these operations do not have a separate Document group in which the client can supply Document attributes. Note also that for the "Level" concept, no operation supplies attributes at more than one level.⁶

Table 2 - Job Creation and Document Creation operations

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

3 Document Operations

The Document object semantics are as parallel to the Job object semantics as possible. Therefore, most of the Job operations have analogous Document operations as shown in Table 18 in section "Appendix A: Document operations compared to Job operations". Operations that can apply only to an entire job, have no analogous document operation as indicated. This extension adds 8 new Document operations that operate on the Document object once

⁶ The PWG Semantic Model [pwg-sm] calls the Operation attributes supplied by the client: Job Description attributes or Document Description attributes for the Job Creation and Document Creation operations, respectively. The [pwg-sm] also calls Job Template attributes and Document Template attributes: Job Processing and Document Processing attributes, respectively. Each Processing attribute is defined to be a Job Processing or a Document Processing attribute, but is not both. The client can supply both Job Processing and Document Processing attributes in a Job Creation operation, in which case the Document Processing attributes server as defaults for the Document objects. The Printer copies all of these client's supplied attributes to the Job or Document object. Read-only Job and Document attributes that the system sets are called Job Status and Document Status attributes (instead of Description attributes).

it is created by the new Create-Document operation or either of the existing two operations: Send-Document and Send-URI operations.

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

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

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

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

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

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

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

3.1 Create-Document Operation

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

The client can supply multiple documents for a single Job using pairs of Create-Document and Send-~~Document~~-Data operations. The order of the corresponding Send-~~Document~~-Data operations is not important, so that the client can send pairs of Create-Document and Send-~~Document~~-Data operations or can send a number of Create-Document

operations followed by the corresponding Send-~~Document~~-Data operations⁷. The latter approach is useful if the client wants to make sure that all Documents will be accepted by the Printer before sending any of the Document data to the Printer.

If a Printer supports the Document object, the Printer:

1. MUST also support the Create-Document and Send-~~Document~~-Data operations
2. MUST support the "multiple-operation-time-out" Printer Description attribute (see [rfc2911] section 4.4.31).
3. MUST support the "multiple-document-jobs-supported" Printer Description attribute (see [rfc2911] section 4.4.16) with a 'true' value, that is the Printer MUST support multiple document jobs.
4. MUST support the "multiple-document-handling" Job Template job attribute with at least one value (see [rfc2911] section 4.2.4) and the associated "multiple-document-handling-default" and "multiple-document-handling-supported" Job Template Printer attributes (see [rfc2911] section 4.2).
5. MUST support the Attribute Precedence semantics specified in section 5 for the levels that the Printer supports.

The Printer sets the value of the Document's "document-state" Document Description attribute to 'pending', if the Printer accepts the Create-Document request. A Printer MAY set the 'job-data-insufficient' value of the Document's "document-state-reason" Document Description attribute to indicate that processing cannot begin until sufficient data has arrived and set the "document-state" to 'pending'. A non-spooling printer that doesn't implement the 'pending' document state may even set the "document-state" to 'processing', even though there is not yet any data to process. See sections 8.2.20 and 8.2.22.

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

3.1.1 Create-Document Request

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

Group 1: Operation Attributes

Natural Language and Character Set:

First, the client MUST supply the "attributes-charset" and "attributes-natural-language" Operation attributes as described in [rfc2911] section 3.1.4.1. The Printer object MUST copy these values to the corresponding Job Description attributes described in [rfc2911] sections 4.3.19 and 4.3.20.

Target:

Next, the client MUST supply either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s) which define the target Job object for this operation as described in [rfc2911] section 3.1.5. The client MAY supply the remaining Operation attributes in any order following:

⁷ The concept of an "input-document-number" operation attribute is not defined for Create-Document operations and will be deleted from the next version of the [pwg5100.4] for Send-Document and Send-Data operations. Therefore, the client must use the "document-numbers" returned by the Printer which the Printer assigns monotonically increasing from 1 for each Document in a multi-document Job. Overlapping sending data for a multi-document job, while possible, is unlikely to improve throughput, since it is the bandwidth of the network that is more likely to be the limiting factor, not the processing on the Printer.

Requesting User Name:

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

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

~~ISSUE 00: Or should we just delete "input-document-number" when we republish pwg5100.4 without "document-overrides?"~~

~~The "input-document-number" operation attribute ([pwg5100.4] section 9.2.1) is DEPRECATED. A client MUST NOT supply the "input-document-number" operation attribute. Clients that want to submit multiple (large) document data in parallel MUST create each Document object separately in the order desired. Then the client MAY send the data in parallel with separate Send-Document operations (see section 3.2). If the client does supply the DEPRECATED "input-document-number" operation attribute, the Printer MUST ignore the value and assign the "document-number" Document Description attribute monotonically increasing starting with 1 for each job (see below).~~

3.1.1.1 last-document (boolean)

The client MUST supply this attribute (as in the Send-Document and Send-URI operation requests). The Printer object MUST support this attribute. This attribute is a boolean flag that the client supplies with a 'true' value if this is the last document for the Job, 'false' otherwise. Note: The client MAY indicate the last document using the Close-Job operation (see section).

3.1.1.2 document-message (text(MAX))

The client MAY supply this Operation attribute. If the Printer supports this attribute, the Printer MUST also support the corresponding "document-message" (text(MAX)) Document Description attribute (see section 8.2.16) and copy this value to the "document-message" Document Description attribute. The end user can use this Document Description attribute as a message to the operator and the operator can use it as a message to the user. The Printer MAY print this message on a document start sheet for this document, if any.

3.1.1.3 Additional Operation attributes:

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

3.1.1.4 Ignoring unsupported or improper Operation attributes:

The Printer MUST ignore any Operation attributes which are unsupported or are not defined for use with the Create-Document operation, such as "ipp-attribute-fidelity" (see section 4.4.1) and "job-mandatory-attributes" (see section 4.4.2) which are defined for use in Job Creation operations only.

Group 2: Document Template Attributes**Any Document Template attributes in any order:**

The client OPTIONALLY supplies a set of Document Template attributes, that is, any attributes indicated in Table 9 in the "Defined for use" column labeled with a "y" in the "D" column. These Document Template

attributes are said to be supplied at the Document Level and apply to the Document object, overriding any Document Template attributes supplied at the Job Level. For example, if "media" = 'na-letter-white' at the Job Level and "media" = 'na-letter-transparency' in this Create-Documents request, this Document will be 'na-letter-transparency'. If the next Create-Documents operation for this Job omits the "media" Operation attribute, that Document will be 'na-letter-white' which it inherits from the Job.

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

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

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

In addition to the MANDATORY parameters required for every operation request (see [rfc2911]), the simplest Create-Documents request consists of just the "attributes-charset" and "attributes-natural-language" Operation attributes; either (1) the "printer-uri" target Operation attribute and the "job-id" or (2) the "job-uri" and nothing else. In this simple case, the Printer object:

- creates a new Document object and adds it to the specified Job object,
- assigns the lowest document number not yet used by this Job, starting at 1. Copy the document number assigned to the Document object's "document-number" Document Description attribute.
- stores a generated Document name in the "document-name" Document Description attribute in the natural language and charset requested (see [rfc2911] section 3.1.4.1) (if those are supported, otherwise using the Printer object's default natural language and charset), and
- at job processing time, uses its corresponding default value attributes for the supported Document Template attributes that were (1) not supplied by the client as IPP attributes and (2) not embedded instructions in the document data.

3.1.2 Create-Documents Response

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

Group 1: Operation Attributes

Status Message:

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

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

(1) the "ipp-attribute-fidelity" Operation attribute (see section 4.4.1) with a 'true' value and the client supplies any unsupported and/or conflicting Job Template or Document Template attributes in this Document Creation request OR

(2) the "ipp-attribute-fidelity" Operation attribute (section 4.4.1) was omitted or was supplied with a 'false' value ~~or had omitted it~~ and the client had supplied keyword values of the "job-mandatory-attributes" Operation attribute (see sections 4.4.2 and 6.1.2) ~~(in the original Job Creation operation)~~

that identified attributes supplied in this [Create-Document](#) request that are unsupported and/or conflicting.

Otherwise, the Printer MUST accept the operation and ignore or substitute unsupported and/or conflicting attribute values supplied by the client. See the Implementer's Guide [rfc3196] for a complete description of the suggested steps for processing the attributes in a create request.

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

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

Group 3: Job Object Attributes

In addition, the Printer MUST return the same Job status attributes that [rfc2911] REQUIRES for the Send-Document and Send-URI operation responses (which are the same as for the Print-Job response - [rfc2911] section 3.2.1.2):

"job-uri" (uri) - see [rfc2911] section 4.3.1

"job-id" (integer(1:MAX)) - see [rfc2911] section 4.3.2

"job-state" (type1 enum) - see [rfc2911] section 4.3.7

"job-state-reasons" (1setOf type2 keyword) - see [rfc2911] section 4.3.8

The Printer MAY return:

"job-state-message" (text(MAX)) - see [rfc2911] section 4.3.9

"number-of-intervening-jobs" (integer(0:MAX)) - see [rfc2911] section 4.3.15

Group 4: Document Object Attributes

3.1.2.1 document-number (integer(1:MAX))

The Printer MUST return the document number of this Document object that was ~~either~~ assigned by the Printer starting with 1 for each Job ~~(see section 3.1.1) or supplied by the client (see section 1.1.1.1).~~

3.1.2.2 document-id-uri (uri)

The Printer MUST return the document id of this Document object as a URI as assigned by the Printer (see section 8.2.12).

3.1.2.3 document-state (type1 enum)

The Printer MUST return the state of this Document object (see section 8.2.20).

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

The Printer MUST return the associated state reasons for this Document (see section 8.2.22).

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

The Printer MAY return the localized description of the "document-state" and "document-state-reasons" values for this Document (see section 8.2.21).

3.2 Send-Document-Data Operation

~~ISSUE 01: OK: OK to rename Send-Data to Send-Document-Data to reflect the object on which it operates?~~

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

Since the Create-Document and the Send-Document-Data operation that follows could occur over an arbitrarily long period of time for a particular Document, a client MUST send the Send-Document-Data operation within an IPP Printer defined minimum time interval after the receipt of the previous request for the job. If a Printer object supports the Document object, the Printer object MUST support the "multiple-operation-time-out" attribute (see [rfc2911] section 4.4.31). This attribute indicates the minimum number of seconds the Printer object will wait for the next send operation before taking some recovery action. See the description under Send-Document in [rfc2911] section 3.3.1, for the possible Printer actions, if the client does not supply a Send-Document-Data request in time.

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

3.2.1 Send-Document-Data request

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

Group 1: Operation Attributes**Natural Language and Character Set:**

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

Target:

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

Requesting User Name:

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

Group 2: Document Content

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

3.2.2 Send-Document-Data Response

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

Group 1: Operation Attributes

Status Message:

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

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

Group 3: Job Object Attributes

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

Group 4: Document Object Attributes

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

3.3 Send-Document Operation

This REQUIRED⁸ operation allows a client to submit multiple documents in a single Job by making a Send-Document request for each Document. In this specification, the Send-Document creates a Document object ([rfc2911] did not have a Document object). A Printer MUST support this operation with the semantics specified in [rfc2911] and with the extension defined in this specification, since this specification REQUIRES the Printer to support multiple document jobs.

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

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

3.3.1 Send-Document Request

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

⁸ The Send-Document operation is REQUIRED in this specification while it was OPTIONAL in [rfc2911]. This difference is because this specification REQUIRES Printer support of multiple document jobs, while [rfc2911] did not.

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

As specified in [rfc2911] section 3.3.1 Send-Document request, plus any extensions indicated in Table 6. For example, "compression", "document-format", and "document-name". So this group is the same as for Create-Document (see section 3.1.1).

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

The client OPTIONALLY supplies a set of Document Template attributes as listed in Table 9. For example, "media" and "number-up". If the client is not supplying any Document Template attributes in the request, the client SHOULD omit Group 2 rather than sending an empty group. However, a Printer object MUST be able to accept an empty group.

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

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

3.3.2 Send-Document Response

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

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

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

Natural Language and Character Set:

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

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

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

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

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

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

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

3.4 Send-URI Operation

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

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

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

3.5 Get-Document-Attributes Operation

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

The Printer MUST return the attributes that a client supplied in the Create-Document, Send-Document, or Send-URI operations, plus any Document Description attributes that the Printer has generated. The Printer MUST NOT return any Job Level attributes that the Document object inherits and MUST NOT factor out common Document object attributes and return them as Job object attributes. Thus the Get-Document-Attributes returns to clients the attributes that clients submitted with the Job object and with the Document object.

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

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

- 'document-template': the subset of the Document Template attributes that apply to a Document object (the "D" column in Table 9) that the implementation supports for Document objects.

- 'document-description': the subset of the Document Description attributes specified in the "Doc" column of Table 10 that the implementation supports for Document objects.

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

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

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

3.5.1 Get-Document-Attributes Request

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

Group 1: Operation Attributes

Natural Language and Character Set:

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

Target:

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

Requesting User Name:

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

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

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

3.5.2 Get-Document-Attributes Response

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

Group 1: Operation Attributes

Status Message:

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

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

The response ~~NEED NOT~~ MAY contain ~~or MAY omit~~ the "requested-attributes" Operation attribute with any supplied values (attribute keywords) that were requested by the client but are not supported by the Printer. If the Printer object does return unsupported attributes referenced in the "requested-attributes" Operation

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

Group 3: Document Object Attributes

This is the set of requested attributes and their current values. The Printer ignores (does not respond with) any requested attribute or value which is not supported. Furthermore, the Printer MUST NOT return Document Template attributes that were not supplied by a client in a Create-Document, Send-Document, or Send-URI request or set by a Set-Document-Attributes request. So the response reflects what was submitted. The Printer MAY omit returning attributes that are restricted by the Printer's security policy in force, including whether the requesting user is the user that submitted the job (job originating user) or not (see [rfc2911] section 8). However, the Printer MUST respond with the 'unknown' value for any supported attribute (including all REQUIRED attributes) for which the Printer does not know the value, unless it would violate the security policy. See the description of the "out-of-band" values in the beginning of [rfc2911] Section 4.1.

3.6 Get-Documents Operation

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

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

3.6.1 Get-Documents Request

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

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

Group 1: Operation Attributes

Natural Language and Character Set:

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

Target:

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

Requesting User Name:

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

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

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

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

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

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

'document-number' (see section 8.2.19)

'document-id-uri' (see section 8.2.12).

3.6.2 Get-Documents Response

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

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

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

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

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

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

Groups 3 to N: Document Object Attributes

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

which is restricted by the security policy in force, including whether the requesting user is the user that submitted the job (job originating user) or not (see [rfc2911] section 8). However, the Printer object MUST respond with the 'unknown' value for any supported attribute (including all REQUIRED attributes) for which the Printer object does not know the value, unless it would violate the security policy. See the description of the "out-of-band" values in the beginning of [rfc2911] section 4.1.

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

3.7 Set-Document-Attributes Operation

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

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

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

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

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

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

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

Table 5 - Document State Table for the Set-Document-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'

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

3.7.1 Settable and READ-ONLY Document Description attributes

If the Printer supports the Set-Document-Attributes operation, then it SHOULD support setting of:
all Document Template document ("xxx") attributes
that the implementation supports (see the column labeled "D" in Table 9).

Almost all Document Description attributes (see [rfc2911] section 4.3) MUST NOT be settable, i.e., they are defined to be READ-ONLY. Only Document Description attributes marked with "(r/w)" in Table 9 MAY be settable using Set-Document-Attributes. The Printer MUST reject a Set-Document-Attributes request that attempts to set any attributes in Table 10 that is not marked "(r/w)".

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

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

3.7.2 Set-Document-Attributes Request

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

927 Group 1: Operation Attributes

928 Natural Language and Character Set:

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

930 Target:

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

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

944 Requesting User Name:

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

947 Group 2: Document Attributes

948 The client MUST supply a set of Document Template attributes with one or more values (including explicitly
 949 allowed out-of-band values) as listed in column labeled "D" in Table 9 - Job Template and Document
 950 Template attributes and Document Description attributes flagged with "(r/w)" and listed in the column labeled
 951 "Doc" in Table 10 - Job and Document Description attributes, and any attribute extensions supported by the
 952 Printer. The value(s) of each Document attribute supplied in Group 2 replaces the value(s) of the
 953 corresponding Document attribute on the target Document object. For attributes that can have multiple
 954 values (1setOf), all values supplied by the client replace all values of the corresponding Document object
 955 attribute.

956 In order to set the Document's "document-message" Document Description attribute (see section 8.2.16), the
 957 client MUST supply the attribute in Group 2, rather than supplying a "document-message" Operation attribute
 958 in Group 1.

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

961 3.7.3 Set-Document-Attributes Response

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

963 Group 1: Operation Attributes

964 Status Message:

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

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

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

1. The number of attributes supplied by the client exceeds the maximum number that the Printer supports in a Set-Printer-Attributes request: return the 'client-error-request-entity-too-large' (see [rfc2911] section 13.1.4.9).
2. The Printer doesn't support the attribute: return the attribute with the 'unsupported' out-of-band attribute value (see [rfc2911] section 3.1.7 and [rfc2910]) and the 'client-error-attributes-or-values-not-supported' (see [rfc2911] section 13.1.4.12).
3. The attribute is READ-ONLY (in its definition) or is not-settable in this implementation: return the attribute with the 'not-settable' out-of-band attribute value (see [rfc3380] section 8.1) and the 'client-error-attributes-not-settable' status code (see [rfc3380] section 7.1).
4. The Printer doesn't support the value: if the attribute in the operation has a single value return it. If the attribute in the operation is multi-valued, return only those values in a 1setOf that are not supported. Return the 'client-error-attributes-or-values-not-supported' status code (see [rfc2911] section 13.1.4.12).
5. The values of some of the supplied attributes conflict with one another and/or other Document attribute values not being set: if the conflicting attribute in the operation has a single value return the attribute and the value. If the attribute in the operation is multi-valued, return only the attribute and those values in a 1setOf that are conflicting with other attributes. Return the 'client-error-conflicting-attributes' status code (see [rfc2911] section 13.1.4.15).

3.8 Cancel-Document Operation

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

The Cancel-Document operation does not remove the Document from the Job and Printer, but only sets the specified Document's "document-state" Document Description attribute to 'canceled' and the Document's "document-state-reasons" Document Description attribute to 'canceled-by-user' or 'cancel-by-operator'. If the Job object is printed again using operations such as the Reprocess-Job operation (see [adm-ops] section 4.1) or the Restart-Job operation (see [rfc2911] section 3.3.7), any canceled Documents are also printed again. Thus Cancel-Document has the same semantics as Cancel-Job (see [rfc2911] section 3.3.3), which only cancels the processing of the job, and doesn't delete the Job object itself. See the Delete-Document operation (section 3.9) to remove the Document object itself immediately from the Job and Printer.

The Cancel-Document operation does not affect the states of any of the other Document objects in the job. If the Job was processing and there are more Documents to be processed, the Printer does so. If there are no further

Documents to process, the Job moves to the 'completed' state as usual whenever there is no more processing to be done.

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

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

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

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

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

3.8.1 Cancel-Document Request

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

Group 1: Operation Attributes

Natural Language and Character Set:

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

Target:

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

Requesting User Name:

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

3.8.1.1 document-message (text(MAX))**Operation attribute**

The client MAY supply this Operation attribute. If the Printer supports this attribute, the Printer MUST also support the corresponding "document-message" (text(MAX)) Document Description attribute (see section 8.2.16) and copy this value to the "document-message" Document Description attribute. The end user can use this Document Description attribute as a message to the operator and the operator can use it as a message to the user. The Printer MAY print this message on a document start sheet for this document, if any.

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

3.8.2 Cancel-Document Response

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

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

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

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

Once a successful response has been sent, the implementation guarantees that the Document will eventually end up in the 'canceled' state. Between the time of the Cancel-Document operation is accepted and when the document enters the 'canceled' document-state (see section 8.2.20), the "document-state-reasons" attribute (see section 8.2.22) SHOULD contain the 'processing-to-stop-point' value which indicates to later queries that although the Document might still be 'processing', it will eventually end up in the 'canceled' state, not the 'completed' state.

3.9 Delete-Document Operation

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

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

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

4 Semantic extensions to Job operations

This section defines the new Close-Job operation and the effects that Job operations have on the Document object. Printer and Subscription object (Event Notification [ntfy]) operations MUST have no effect on the Document object and the Document object has no effect on the semantics of the Printer and Subscription operations. The Job operations that MUST NOT have any effect on the Document object because they are defined to affect the Job object as a whole are: **Get-Job-Attributes**⁹ ([rfc2911] section 3.3.4), **Get-Jobs**¹⁰ ([rfc2911] section 3.2.6), **Hold-Job** ([rfc2911] section 3.3.5), **Promote-Job** ([adm-ops] section 4.4.1), **Release-Held-New-Jobs** ([adm-ops] section 3.3.2), **Resume-Job** ([adm-ops] section 4.3.2), **Schedule-Job-After** ([adm-ops] section 4.4.2), **Set-Job-Attributes** ([rfc3380] section 4.2), and **Validate-Job** ([rfc2911] section 3.2.3).

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

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

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

4.2 Cancel-Job ([rfc2911] section 3.3.3)

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

4.3 Close-Job (new)

ISSUE 02: OK to add Close-Job and to REQUIRE a Printer to support it, since PSI is using it?

This REQUIRED operation closes the Job¹¹. The Printer MUST support this operation. The client MAY issue this operation to close the job, instead of supplying the “last-document” Operation attribute (see section 3.1.1.1) with a ‘true’ value in a Document Creation operation (or a Send-Documents operation - see [RFC2911,rfc2911] section 3.3.1). The Printer MUST support both means of closing jobs for backward compatibility with [rfc2911].

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

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

¹⁰ The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Documents, Send-Documents, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

¹¹ Close-Job is a new operation defined by this Document object specification and is not defined in [RFC2911].

4.3.1 Close-Job Request

The client supplies the following groups as part of the Close-Job Request:

Group 1: Operation Attributes

Natural Language and Character Set:

First, the client MUST supply the "attributes-charset" and "attributes-natural-language" Operation attributes as described in [rfc2911] section 3.1.4.1. The Printer object MUST copy these values to the corresponding Job Description attributes described in [rfc2911] sections 4.3.19 and 4.3.20.

Target:

Next, the client MUST supply either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s) which define the target Job object for this operation as described in [rfc2911] section 3.1.5. The client MAY supply the remaining Operation attributes in any order following:

Requesting User Name:

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

Group 2: Document Template Attributes: *MUST NOT be present.*

Group 3: Subscription Attributes (see [ntfy] section 11.1.3.1): *MUST NOT be present.*

4.3.2 Close-Job Response

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

Group 1: Operation Attributes

Status Message:

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

Natural Language and Character Set:

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

Group 2: Unsupported Attributes

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

Group 3: Job Object Attributes

In addition, the Printer MUST return the same Job status attributes that [rfc2911] REQUIRES for the Send-Document and Send-URI operation responses (which are the same as for the Print-Job response - [rfc2911] section 3.2.1.2):

"job-uri" (uri) - see [rfc2911] section 4.3.1

"job-id" (integer(1:MAX)) - see [rfc2911] section 4.3.2

"job-state" (type1 enum) - see [rfc2911] section 4.3.7

"job-state-reasons" (1setOf type2 keyword) - see [rfc2911] section 4.3.8

The Printer MAY return:

"job-state-message" (text(MAX)) - see [rfc2911] section 4.3.9

"number-of-intervening-jobs" (integer(0:MAX)) - see [rfc2911] section 4.3.15

4.4 Job Creation operations

This section defines the extensions to Job Creation operations.

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

4.4.1 ipp-attribute-fidelity (boolean) ([rfc2911] section 3.2.1 and 15)

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

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

Note: The inheritance of the effect of the "ipp-attribute-fidelity" Operation attribute by subsequent Document Creation operations is like the inheritance of other Operation attributes.

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

ISSUE 03: Should we make "job-mandatory-attributes" a REQUIRED attribute for a Printer to support (if it supports the Document object)? Otherwise, clients won't support it and will be stuck with the "ipp-attribute-fidelity" attribute?

This ~~OPTIONAL~~ **REQUIRED**¹² Operation attribute identifies which Job Template and Document Template attributes the Printer MUST ~~honor~~ **Honor** in this Job Creation request and all subsequent Document Creation requests for this job. The Printer MUST reject this Job Creation operation or any subsequent Document Creation operations for this job, if the client supplies an unsupported Job Template or Document Template attribute or value in the request that is also identified in this list. The client MAY supply this attribute in a Job Creation operation. If the Printer supports this Operation attribute, the Printer MUST support this attribute in Job Creation operations and Validate-Job with any values and MUST NOT support this attribute in any other operations.

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

If the Printer supports the "document-format-details" (1setOf collection) operation/Document Description attribute (see sections 6.1.2 and 8.2.9), the Printer MUST support any of the 'document-format-details.xxx' keywords¹³ that

¹² The "job-mandatory-attributes" operation attribute is REQUIRED for conformance to this Document Object specification. It is not REQUIRED for conformance to any other specification. See the definition of REQUIRED in section 2.1.

¹³ The "job-mandatory-attributes" operation attribute identify Job Template and Document Template attributes, so it is an exception for the "job-mandatory-attributes" operation attributes to identify "document-format-details" member attributes, since "document-format-details" is an operation/Job Description attribute, not a Job Template or Document

identify a member attribute of the “document-format-details” Operation attribute so that the client can specify that the Printer MUST Honor a supplied version or other property of the supplied Document object.

The Printer MUST ignore ~~this the “job-mandatory-attributes” attribute~~ Operation attribute if the client supplies the “ipp-attribute-fidelity” Operation attribute (see section 4.4.1) with a ‘true’ value in this operation, since a ‘true’ value indicates that the Printer MUST ~~honor~~ Honor all supplied Job Template and Document Template attributes.

The Printer MUST copy this attribute to the corresponding “job-mandatory-attributes” Job Description attribute (see section 4.4.2) for auditing and trouble shooting purposes and use its value for validating subsequent Document Creation operations for this job.

~~If a~~ A client MUST NOT supply ~~ies~~ this “job-mandatory-attributes” Operation attribute in a Document Creation operation. ~~If a client does supply it,~~ the Printer MUST ignore ~~and only support the “job-mandatory-attributes” Operation attribute supplied at it; only~~ the Job level ~~attribute MUST have effect.~~ ~~Thus the “job-mandatory-attributes” Operation attribute controls all other attributes supplied at the Job Level and Document Level uniformly.~~ Note: The inheritance of the effect of “job-mandatory-attributes” Operation attribute supplied at the Job Level ~~by~~ subsequent Document Creation operations is like the inheritance of other operation and Job Template attributes.

4.4.3 Create-Job ([rfc2911] section 3.2.4)

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

[rfcA Printer that supports the Document object MUST support the Create-Job operation¹⁴ since the Create-Job operation is the only operation that creates a Job object so that subsequent Document objects can be created in the Job object.

4.4.4 Print-Job ([rfc2911] section 3.2.1)

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

4.4.5 Print-URI ([rfc2911] section 3.2.2)

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

Template attribute. The PWG Semantic Model will have an analogous extension, where the JobMandatoryElements element usually contains Processing element names, but in this case can contain Document Description element names.

¹⁴ In [rfc2911] the Create-Job operation is OPTIONAL for a Printer to support.

1218 **4.5 Purge-Jobs ([rfc2911] section 3.2.9)**

1219 The Printer removes all Job and all of their contained Document objects.

1220 **4.6 Release-Job ([rfc2911] section 3.3.6)**

1221 The Printer moves the job to the 'pending' state, if there are no other "job-state-reasons" to hold the job. The values
1222 of the "document-state-reasons" attributes MUST NOT affect job scheduling (see Table 12), only the Job's "job-state-
1223 reasons" values.

1224 **4.7 Reprocess-Job ([adm-ops] section 4.1)**

1225 The Printer processes the Job again by processing *all* Documents in the Job, including ones that have been
1226 canceled by a previous Cancel-Document operation. Therefore, the Printer removes any 'canceled-by-xxx' values
1227 from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attributes.

1228 **4.8 Restart-Job ([rfc2911] section 3.3.7)**

1229 The Printer starts the Job over again by processing *all* Documents in the Job, including ones that have been
1230 canceled by a previous Cancel-Document operation. Therefore, the Printer removes any 'canceled-by-xxx' values
1231 from any of the "document-state-reasons" attributes and the Job's "job-state-reasons" attributes and

1232 **4.9 Send-Document ([rfc2911] section 3.3.1)**

1233 The Printer accepts a new Document Attributes group (Group 4) that the client can supply Document Template
1234 attribute and creates a Document object (see section 3.3).

1235 **4.10 Send-URI ([rfc2911] section 3.3.2)**

1236 The Printer accepts a new Document Attributes group (Group 4) that the client can supply Document Template
1237 attribute and creates a Document object (see section 3.4).

1238 **4.11 Suspend-Current-Job ([adm-ops] section 4.3.1)**

1239 The Printer suspends the current job and sets the Job's "job-state" Job Description attribute to 'processing-stopped'
1240 and "job-state-reasons" to 'job-suspended-by-xxx', where 'xxx' is 'user' or 'operator'. The Documents' "document-
1241 state" and "document-state-reasons" Document Description attributes are unaffected (but the Documents are not
1242 processed any further, since the Job is stopped).

1243 **5 Attribute Precedence during job processing**

1244 This section defines the Attribute Precedence rules that the Printer MUST follow when processing jobs, including
1245 instructions in the PDL data. These rules cover Queue Override attributes, Page Override attributes, Document
1246 Object attributes, Document Override attributes, Job Object attributes, PDL instructions, PDL Interpreter initialization
1247 files, and Printer object defaults. Since each attribute can be specified for all of these levels, it is important to define
1248 which level takes precedence when the same attribute occurs at different levels with differing values.

1249 The attribute precedence model has the following features:

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

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

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

Note: The **queue override** level is only available for Printers that support the 'guaranteed' value for its "pdl-override-supported" attribute (see [ippsave] section 8.1). All other levels are available for all Printers independent of the "pdl-override-supported" value.

2. **Document Level - page override programming** - The special "page-overrides" collection Document Template attribute (see [pwg5100.4]) supplied at the Document Level, that is, in a Create-Documents, Send-Documents, or Send-URI operation, that contains the attributes that are to have the page override status for the specified ranges of pages in the Input-Documents or the Output-Documents. Supplied by the client when submitting a Document object, or set by the user or operator after the Document has been accepted either using the Set-Documents-Attributes operation, or by the operator using means local to the Printer. Example: "page-overrides" = {"input-documents" = '1:1'; "pages" = '1:1'; "media" = 'letterhead'}
3. **Job Level - page override programming** - The special "page-overrides" collection Job Template attribute (see [pwg5100.4]) supplied at the Job Level, that is, in a Job Creation operation, that contains the attributes that are to have the page override status for the specified ranges of pages in the Input-Documents or the Output-Documents. Supplied by the client when submitting a job either in the protocol, or set by the user or operator after the job has been accepted either using the Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "page-overrides" = {"input-documents" = '1:1'; "pages" = '1:1'; "media" = 'letterhead'}
4. **Document Level - Document object attributes** - The Document attributes supplied at the Document Level, that is, in a Create-Documents, Send-Documents, or Send-URI operation to apply to the Input Document. Supplied by the client when submitting a Document object, or set by the user or operator after the Document has been accepted either using the Set-Job-Attributes operation, or by the operator using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
5. **Document Level - document override programming** - The special "document-overrides" collection Operation attribute (see [pwg5100.4]) supplied by the client in the Send-Documents or Send-URI request.

The collection contains the member attributes that are to override attributes specified at lower precedence for the specified range of documents, including the current Document and subsequently created Documents. Clients that support the Document object SHOULD supply the attributes as Document Template attributes directly when creating the Document, instead of using the Operation attribute mechanism. Example: "document-overrides" = {"input-documents" = '5:5'; "media" = 'transparency'}

6. **Job Level - document override programming** - The special "document-overrides" collection Job Template attribute (see [pwg5100.4]) that contains the attributes that are to have the document override status for the specified Input-Documents or Output-Documents. Supplied by the client when submitting a job either in the protocol, or set by the user or operator after the job has been accepted either using the Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "document-overrides" = {"input-documents" = '5:5'; "media" = 'transparency'}
7. **Job Level - Job object and Document object attributes** - The Job attributes and Document attributes supplied at the Job Level, i.e., with a Create-Job, Print-Job, or Print-URI operation. Supplied by the client when submitting a Job in the protocol, or set by the user or operator after the job has been accepted either using the Set-Job-Attributes operation, or by the operator using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
8. **PDL document data** - an instruction in the PDL document data. Supplied by the application or print driver that created the PDL. Example: PostScript setPageDevice specifying na-letter media. Whether PDL document data is actually lower precedence than the preceding levels depends on the implementation as expressed in the "pdl-override-supported" Printer Description attribute (see [rfc2911] section 4.4.28 and [ippsave] section 8.1).

Job Template and Document Template attributes of the form "xxx-requested", such as "orientation-requested" (see [rfc2911] section 4.2.10) have a lower priority than the PDL. If the PDL contains a corresponding instruction, that PDL instruction will be used instead of the supplied "xxx-requested" attribute. For example, PostScript PDL data always has a well-defined orientation, so that "orientation-requested" never affects the result. On the other hand, PDLs such as text/plain never has orientation and PCL ~~NEED NOT MAY omit have~~ orientation, in which case, "orientation-requested" takes affect.
9. **PDL Init File data** - a file that the Printer uses to initialize the PDL Interpreter before it starts interpreting each document in a Job. See description of "pdl-init-file" Job Template attribute in [ippsave] Section 5.8. It is immaterial how this file is specified, whether it be by a queue override, job object attribute or printer default – the precedence of the contents of this file is at this level.
10. **printer default** - a Printer "xxx-default" attribute that is applied by the Printer provided that none of the higher levels have supplied a value. The Printer implementation MUST supply values for all of the Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For example, if the output device will use media from the large-capacity input tray if not directed otherwise, the implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity' keyword value without requiring the administrator to configure that value. The implementation MUST allow the administrator to configure the Printer's "xxx-default" attributes to other values, if other value are supported by the implementation. Example: The administrator changes the Printer's "media-default" from 'large-capacity' to 'na-letter'.

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

6 Operation Attributes for the Job and Document Creation operations

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

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

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

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

Legend:

- [job-]** indicates an attribute that shouldn't have had a “job-” prefix in its name in [rfc2911], so that the same attribute name could also be used for the Document object as a Document Description attribute. Note: For the PWG Semantic Model, the “job-” prefix is dropped.
- “-” indicates that the Job or Document Operation attribute is *not* defined.
- *
- For most of these Operation attributes the Printer **MUST** copy these Operation attributes to the corresponding Job Description or Document Description attributes. The * in the Job and Doc column indicate that there is *no* corresponding Job Description or Document Description attribute, respectively. See Table 10 for the corresponding Job and Document Description attributes.
- ** these Operation attributes are defined for *all* operations, not just Job Creation and Document Creation operations

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

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
attributes-charset **	charset	y	y	MUST	MUST	[rfc2911] §3.1.4
attributes-natural-language **	naturalLanguage	y	y	MUST	MUST	[rfc2911] §3.1.4
compression	type3 keyword	y *	y	MAY	MUST	[rfc2911] §3.2.1.1
document-format-detailscontainer-summary*	1setOf collection	-	y	MAY	MAY ¹⁵	§6.1.2
document-creator-application-name*	name(MAX)	-	y	MAY	MAY	§6.1.2.1
document-creator-application-version*	text(127)	-	y	MAY	MAY	§6.1.2.2
document-creator-os-name*	name(40)	-	y	MAY	MAY	§6.1.2.3
document-creator-os-version*	text(40)	-	y	MAY	MAY	§6.1.2.4
document-format	mimeMediaType	y *	y	MAY	MUST	§6.1.2.5

¹⁵ The “document-container-summary” Document Description attribute **MUST** be supported by a Printer that supports a container MIME type document format, such as ‘application/zip’ or ‘multipart/related’.

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
document-format-device-id*	text(127)	-	y	MAY	MAY	§6.1.2.6
document-format-version*	text(127)	-	y	SHOULD	MUST	§6.1.2.7
document-natural-language	naturalLanguage	y *	y	MAY	MAY	§6.1.2.8
document-format	mimeMediaType	y *	y	MAY	MUST	[rfc2911] §3.2.1.1
document-message **	text(MAX)	-	y	MAY	MAY	§8.2.16
document-name	name(MAX)	y *	y	MAY	MUST	[rfc2911] §3.2.1.1
document-natural-language	naturalLanguage	y *	y	MAY	MAY	[rfc2911] §3.2.1.1
document-overrides¹⁶	1setOf collection	-	y	MAY	MAY	[pwg5100.4] §5.1, §9.2.2
<i>See “document-overrides” in Table 9 for the list of member attributes</i>						
document-uri	uri	y *	y	CMUST ¹⁷	MAY	[rfc2911] §3.2.2
input-document-number DEPRECATED TO BE DELETED in next version of [pwg5100.4]	integer(1:MAX)	-	y	MAY	MAY	§1.1.1.1, [pwg5100.4] §9.2
ipp-attribute-fidelity	boolean	y	-	MAY	MUST	§4.4.1, [rfc2911] §3.2.1.1
[job-]impressions	integer(0:MAX)	y	y	MAY	MAY	[rfc2911] §3.2.1.1
[job-]k-octets	integer(0:MAX)	y	y	MAY	MAY	[rfc2911] §3.2.1.1
job-mandatory-attributes	1setOf type2 keyword	y	-	MAY	MAY MUST¹⁸	§4.4.2
[job-]media-sheets	integer(0:MAX)	y	y	MAY	MAY	[rfc2911] §3.2.1.1
job-name	name(MAX)	y	-	MAY	MUST	[rfc2911] §4.3.5
job-password	octetString(255)	y	-	MAY	MAY	[ippsave] §4.1
job-password-encryption	type3 keyword name(MAX)	y	-	MAY	MAY	[ippsave] §4.2
last-document	boolean	-	y	MUST	MUST	[rfc2911] §3.3.1.1
operation-id **	integer(1:0x8FFF)	y *	y *	MUST	MUST	[rfc2911] §3.1.2
original-requesting-user-name	name(MAX)	y	y	MAY	MAY	[adm-ops] §11.7.2.2
page-overrides	1setOf collection	-	y	MAY	MAY	[pwg5100.4] §5.2, §9.2.3
<i>See “page-overrides” in Table 9 for the list of member attributes</i>						
printer-uri **	uri	y ¹⁹	y *	MUST	MUST	[rfc2911] §3.1.5

¹⁶ The “document-overrides” operation attribute is proposed to be removed from the next version of the PWG 5100.4 Candidate Standard in Send-Document and Send-URI operations.

¹⁷ 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.

¹⁸ ~~ISSUE 03 (repeat): Should we make “job-mandatory-attributes” a REQUIRED attribute for a Printer to support (if it supports the Document object)? Otherwise, clients won’t support it and will be stuck with the “ipp-attribute-fidelity” attribute?~~

¹⁹ The Printer copies the “printer-uri” operation attribute to the Job’s “job-printer-uri” Job Description attribute and Document’s “job-printer-uri” Document Description attribute.

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
request-id **	integer(1:MAX)	y *	y *	MUST	MUST	[rfc2911] §3.1.2
requesting-user-name **	name(MAX)	y *	y *	SHOULD	MUST	[rfc2911] §3.2.1.1
version-number **	X.Y	y *	y *	MUST	MUST	[rfc2911] §3.1.8

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

6.1.1 document-format (mimeMediaType)

This REQUIRED Operation attribute identifies the document format of the Document Object. The Printer MUST copy this Operation attribute to the corresponding Document Description attribute. See section 8.2.8 because the semantics of the “document-format” attribute are not duplicated in this section.

If a client supplies the “document-format” Operation attribute with a value that the Printer doesn’t support, the Printer MUST reject the job and return the status code: ‘client-error-document-format-not-supported’ (see [rfc2911] section 3.1.4.11). This behavior is independent of the value of the “ipp-attribute-fidelity” and “job-mandatory-attributes” Operation attribute that the client MAY supply.

6.1.2 document-format-details (1setOf collection)

This OPTIONAL Operation attribute supplied in Document Creation operations summarizes the details of the document content, including any files contained in the Document object. See Table 7 for a list of the member attributes along with the client and Printer conformance requirements. If a Printer supports a container MIME type, such as ‘multipart/related’ or ‘application/zip’, the Printer MUST support this “document-format-details” Operation attribute and the corresponding Document Description attribute (see section 8.2.9). If a Printer does not support a container MIME type, it MAY support the “document-format-details” Operation attribute and Document Description attribute. The Printer MUST copy this Operation attribute to the corresponding Document Description attribute (see section 8.2.9). The purpose of the “document-format-details” Operation attribute is to describe the details of the document format or formats in the supplied instance of the Document object, including the container format itself, so that the Printer knows what to expect.

However, For a container format, the “document-format-detailscontainer-summary” attribute does not provide means to associate each collection value with particular document in the archive file, so it does not provide a “manifest”²⁰ of the container. One of the container collection values MAY describe the container format itself, in which case that collection value MUST be the first collection value. The remaining collection values provides the summary of the details of the contained files in any order.

The member attributes defined for this collection are listed in Table 10 and are the same as those defined for the corresponding Document Description attributes themselves, i.e., a recursive definition. But there MUST NOT be any duplicate collection values, that is, no collection values with all the same member attribute values; its a set, not a sequence. So 100 PostScript files with the same details in a .zip file would MAY have one collection value with the “document-format” member attribute = ‘application/zip’ as the MIME type value and MAY have additional member attributes that give details about the .zip file itself for the top-level “document-format” Document Description attribute for the Document object and (2) a “document-container-summary” Document Description collection attribute with only one MUST have one more collection value containing a “document-format” member attribute with the = ‘application/postscript’ MIME type value and MAY have additional member attributes that give the details about the PostScript files.

²⁰ If the client wants to achieve a “manifest”, that is a complete list of each file in a container, then the client needs to extract each file from the container and submit each one as a separate Document object. Note: that the client can re-compress each file before sending, so the compression isn’t lost.

If a file in a container file is itself a container file, the single “document-format-detailscontainer-summary” (1setOf collection) Operation attribute SHOULD contain the flattened distinct collection values for all files at all nested levels. The refore, the “document-format-detailscontainer-summary” collection attribute is not recursively defined and MUST NOT to contain the “document-format-details” attribute as a member attribute. ISSUE 06: OK that “document-container-summary” is only one level deep?

ISSUE 07: Is the description of “document-container-summary” attribute OK?

Table 7 - “document-format-detailscontainer-summary” member Operation attributes

Member Attribute Name	Attribute Syntax	<u>PresentClient supplies</u>	Printer Support	Section
document-creator-application-name	name(MAX)	MAY	MAY	6.1.2.1
document-creator-application-version	text(127)	MAY	MAY	6.1.2.2
document-creator-os-name	name(40)	MAY	MAY	6.1.2.3
document-creator-os-version	text(40)	MAY	MAY	6.1.2.4
document-format	mimeMediaType	MUST	MUST	6.1.2.5
document-format-device-id	text(127)	MAY	MAY	6.1.2.6
document-format-version	text(127)	SHOULD	MUST	6.1.2.7
document-natural-language	naturalLanguage	MAY	MAY	6.1.2.8

ISSUE 08: Are the conformance requirements for the “document-container-summary” attributes OK?

ISSUE: 09: How can a Printer indicate which combinations of document-creator-application-name (name(MAX)), document-creator-application-version (text(127)), document-creator-os-name (name(40)), document-creator-os-version (text(40)), document-format-device-id (text(127)), document-format-version (text(127)), document-format (mimeMediaType) and “document-natural-language (naturalLanguage) are supported?

If a client supplies the “document-format-details” Operation attribute with member attributes and/or values that the Printer doesn’t support, the Printer MUST ignore them, except for the “document-format” member attribute. The Printer MUST reject the request if the “document-format” member attribute is a value that is not supported, same as for the “document-format” Operation attribute (see section 6.1.1). However, if the client had supplied the “ipp-attribute-fidelity” or “job-mandatory-attributes” Operation attribute in the original Job Creation operation²¹, the Printer MUST check for complete support as follows.

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

(1) the “ipp-attribute-fidelity” Operation attribute (see section 4.4.1) with a ‘true’ value and the client supplies any unsupported “document-format-details” member attributes in this Document Creation request OR

(2) the “ipp-attribute-fidelity” Operation attribute (section 4.4.1) was omitted or was supplied with a ‘false’ value and the client had supplied keyword values of the “job-mandatory-attributes” Operation attribute that identified the “document-format-details” attribute itself (keyword = ‘document-format-details’) or has identified one or more of its member attributes (keyword = ‘document-format-details.xxx’) that are unsupported.

and return the unsupported attributes in the Unsupported Attributes Group in the Document Creation response along with the error status code: ‘client-error-document-format-not-supported’ (see [rfc2911]

²¹ Normally the “ipp-attribute-fidelity” and “job-mandatory-attributes” operation attributes apply only to Job Template and Document Template attributes. So having them also apply to the “document-format-details” operation attribute is an exception to the rule.

section 3.1.4.11). To perform the above checks, the Printer MUST compare the supplied "document-format-details" collection value supplied by the client with each of the collection values of the Printer's "document-format-details-implemented" attribute (see section 9.3). The Printer supports the supplied document details if the supplied collection value is a subset of one of the Printer's collection values.

The client can determine which member attributes of the "document-format-details" are supported by querying the Printer's "document-format-details-supported" attribute (see section 9.2). The client can determine a supported set of document details by querying the Printer's "document-format-details-implemented" attribute (see section 9.3).

6.1.2.1 document-creator-application-name (name(MAX))

This OPTIONAL ~~Document Description member~~ Operation attribute identifies the application that created the document. The version number MUST NOT be included (see the "document-creator-application-version" attribute). Examples: "Photoshop", "Microsoft Word".

6.1.2.2 document-creator-application-version (text(127))

~~The This~~ OPTIONAL ~~Document Description member~~ Operation attribute identifies the version number of the application that created the document. ~~The intent of this attribute is for display to a human being, rather than being parsed by the Printer for purpose of affecting the interpreting by the Printer and so may also include the name of the application, as well as build or service pack numbers. The version number MUST NOT include the application name. See "document-creator-application-name" attribute.~~ Examples:

"Winzip® 8.1 (4331)", "Acrobat 5.0.5 10/26/2001", "Microsoft® Word 2000 (9.0.4119 SR-1)" ~~V3.0', 'V6.0'~~

ISSUE: OK that the purpose is human consumption, instead of program consumption and that it be the same as the application shows in its help message?

6.1.2.3 document-creator-os-name (name(40))

This OPTIONAL ~~Document Description member~~ Operation attribute identifies the name of the operating system on which the document was generated. Valid values are the operating system names defined in the IANA Operating System name registry [os-names] with the version number portion removed (see the "document-creator-os-version" attribute). IANA Operating System Names are consist of up to 40 *uppercase* US-ASCII letters, hyphen ("-"), period ("."), and slash ("/") characters. The zero length string represents unknown (rather than the UNKNOWN value in the IANA OS Registry, since clients are not expected to localize names).

Example IANA OS Registry values: 'AIX', 'DOS', 'LINUX', 'MACOS', 'MSDOS', 'MVS', 'NETWARE', 'OS/2', 'SUN', 'SUN-OS', 'UNIX', 'VMS', 'WINDOWS'.

6.1.2.4 document-creator-os-version (text(40))

This OPTIONAL ~~Document Description member~~ Operation attribute identifies the version of the operating system on which the document was generated. Valid values include the version portion of any of the operating system names defined in the IANA Registry [os-names]. The value MUST NOT include the name portion of the registered OS name (see "document-creator-os-name" attribute). The zero length string represents unknown (rather than the UNKNOWN value in the IANA OS Registry, since clients are not expected to localize names).

Example values for the indicated "document-creator-os-name" value:

For 'AIX': '370', 'PS/2'

For 'LINUX': '1.0', '1.2', '2.0', '2.2', '2.4'

For 'MVS': 'SP'

For 'NETWARE': '3', '3.11', '4.0', '4.1', '5.0'

For 'SUN-OS': '3.5', '4.0'

For 'UNIX': 'BSD', 'V', 'V.1', 'V.2', 'V.3', 'PC'

For 'WINDOWS': '95', '98', 'CE', 'NT', 'NT-2', 'NT-3', 'NT-3.5', 'NT-3.51', 'NT-4', 'NT-5', '2000', 'XP' [not registered yet]

6.1.2.5 document-format (mimeMediaType)

This REQUIRED member Operation attribute specifies the document format (see [rfc2911] §3.2.1.1) of the collection value of which it is a member. The client MUST supply and the Printer MUST support this member attribute in each collection value. The values for this member attribute are Internet Media types (sometimes called MIME types) and have the same values and semantics as for the "document-format" operation/Document Description attribute (see section 8.2.8). For further details see the description of the 'mimeMediaType' attribute syntax in [rfc2911] section 4.1.9.

6.1.2.6 document-format-device-id (text(127))

This OPTIONAL Document Description member Operation attribute identifies the type of device for which the document was formatted, including manufacturer and model. This attribute is intended to identify document formats that are not portable, e.g., PDLs that are device dependent. The value of this variable MUST exactly match the IEEE 1284-2000 Device ID string (see [IEEE1284] clause 6), except the length field MUST not be specified. See the Microsoft Universal Plug and Play [upnp] section 2.2.6 DeviceId parameter for details and examples. Here is an example showing only the required fields for a PostScript document:

```
MANUFACTURER:ACME Co.;COMMAND SET:PS;MODEL:LaserBeam 9;
```

6.1.2.7 document-format-version (text(127))

This REQUIRED Document Description member Operation attribute contains the level or version of the document format identified by the "document-format" member attribute. The client MAY supply and the Printer MUST support this member attribute. Possible values are the same as the Printer MIB [rfc1759] prtInterpreterLangLevel (not prtInterpreterLangVersion), such as:

'3': For Postscript level 3 [rfc1759].

'5e': For PCL 5e [rfc1759].

For those document formats that are defined in standards, the "document-format-version" may contain the official designation of that standard.

ISSUE 10: OK that "document-format-version" is REQUIRED for a Printer to support?

ISSUE 11: The problem with separating "document-format" and "document-format-version" is how can a Printer describe what versions are supported, since the versions have to be associated with the document format.

Standard: Other example values are for those document formats that have well-defined version identification, either in the specification or as an actual field in the document content, such as: text values are:

'PDF/X-1:2001': For PDF/X-1 From the ISO standard that specifies PDF/X [iso15930]. ISSUE 12: Or should the official ISO standard number, part number and date, be used instead, e.g., "ISO nnnnn.n-2001"?

'PDF/X-1:2001': For PDF/X-1a [iso15930]

'TIFF/IT-FP:1998' ISO 12639-1:1996: TIFF/IT [iso12639] - Full Page - baseline From the ISO standard that specified TIFF/IT Profile 1.

'TIFF/IT-CT:1998': TIFF/IT [iso12639] - Continuous Tone picture data - baseline

'TIFF/IT-FP/P1:1998': TIFF/IT [iso12639] - Full Page - profile 1

'TIFF/IT-CT/P1:1998': TIFF/IT [iso12639] - Continuous Tone picture data - profile 1

6.1.2.8 document-natural-language (naturalLanguage)

This OPTIONAL member Operation attribute specifies the natural language of the collection value of which it is a member. The values for this attribute are natural language codes (with optional country codes) and have the same

values and semantics as for the “document-natural-language” operation/Document Description attribute (see section 8.2.18) which is not duplicated here.

6.2 Override Operation attributes in Send-Document and Send-URI

With the introduction of the Document Object, there is no longer a need for the “document-overrides” (1setOf collection) attribute [pwg5100.4] as an Operation attribute or a Document Template attribute. Also we are unaware of any implementations of the “document-overrides” attribute. Therefore, the intent is to republish the Overrides document [pwg5100.4] with only the “page-overrides” attribute. With the introduction of the Document object, the client simply supplies the Document Template attributes (see Table 9) for each Document Creation request (in a new Document Template attribute group) without needing a collection (and without needing the “document-overrides” attribute).

The “document-overrides” attribute is also useful in combination with the “pages-per-subset” (1setOf integer) Job Template attribute (see [pwg5100.4]) which divides up the Input Page stream concatenated across the Input Documents into separate Output Documents. For example, making every 10 Input Pages be a separate Output Document but the client only wants to staple the first Output Document, so the client supplies a single “document-overrides” Job Template attribute with “finishings” that affects Output-Document 1 only. With the removal of the “document-overrides” attribute, the client uses the “page-overrides” Job Template attribute to affect the stapling of pages 1:10 only. ISSUE 04: But what about Subset Finishing? Can we it be done without “document-overrides”?

Similarly, according to [pwg5100.4], the “page-overrides” (collection) attribute MAY be supplied by the client in a Send-Document or Send-URI request as an Operation attribute to apply page overrides to this and/or subsequent documents in the job (by supplying either the “input-documents” (1setOf rangeOfInteger (1:MAX)) or the “output-documents” (1setOf rangeOfInteger) member attribute). See the “page-overrides” Job Template attribute in Table 9 for the listing of the member attributes. However, with the introduction of the Document object, the “page-overrides” (collection) attribute MUST be supplied as a Document Template attribute in the Create-Document operation and SHOULD be more simply supplied as one of the Document Template attributes for the document being created in the Send-Document or Send-URI operation and for this Document only. However, if a Printer supports the “page-overrides” attribute as a Document Template attribute (in any Document Creation operations), a Printer MUST also support the “page-overrides” attribute as an Operation attribute in the Send-Document and Send-URI operations according to [pwg5100.4] for backward compatibility with clients that do not support the Document object.

ISSUE 05: OK that when a Printer supports Page Overrides, that we REQUIRE the Printer to continue to support the “page-overrides” as an operation attribute in Send-Document and Send-URI as well as a Document Template attribute?

6.3 Operation Attributes returned in Job and Document Creation responses

Table 8 lists the Operation attributes that Printers return in Job Creation operation *responses*: Print-Job, Print-URI, and Create-Job and in Document Creation operation *responses*: Send-Document and Send-URI. The column labeled “Conformance” indicates the conformance for what the Printer returns and what the Printer supports. The Reference and Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

Table 8 - Operation attributes returned in Job and Document Creation operation responses

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
attributes-charset *	charset	MUST	MUST	[rfc2911] §3.1.4
	‘utf-8’	MAY	MUST	[rfc2911] §4.1.7
	‘us-ascii’	MAY	MAY	[rfc2911] §4.1.7

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
	'iso-8859-1'	MAY	MAY	[rfc2911] §4.1.7
	'iso-10646-ucs-2'	MAY	MAY	[rfc2911] §4.1.7
attributes-natural-language *	naturalLanguage	MUST	MUST	[rfc2911] §3.1.4
	'en-US'	MAY	MAY	[rfc2911] §4.1.8
detailed-status-message *	text	MAY	MAY	[rfc2911] §3.1.6.3
document-access-error	text	MAY	MAY	[rfc2911] §3.1.6.4
document-id-uri	uri	MUST	MUST	§8.2.12
document-number	integer(1:MAX)	MUST	MUST	§8.2.19
job-id	integer(1:MAX)	MUST	MUST	[rfc2911] §4.3.2
job-uri	uri	MUST	MUST	[rfc2911] §4.3.1
redirect-uri (uri) ²²	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

7 Job Template and Document Template attributes

Table 9 lists *all* of the Job Template attributes defined in other IPP specifications and lists their corresponding Document Template attributes defined in this IPP specification. The Job Template attributes can be supplied in the Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

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

These Document Template attributes can also be supplied as Document Overrides using the “document-overrides” Job Template attribute (see [pwg5100.4]).

A subset of the Document Template attributes that apply to pages (e.g., “media”, but not “document-format” or “job-priority”) can also be supplied as Page Overrides using the “page-overrides” Job Template collection attribute (see [pwg5100.4]) or as a Document Template attribute.

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

²² 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.

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

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

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

If a Job Template collection attribute is supported (see [rfc3382]), then there are conformance requirements for which member attributes MUST be supported and which member attributes a client MUST supply as indicated in the Conformance column for each collection member attribute in Table 9.

Table 9 - 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 ²³	y	n	MAY	MAY	[rfc2911] §4.2.5

²³ The IPP “copies” attribute is an *extensive* attribute, so its effect when supplied at the job level is not always inherited by the documents in a multi-document job. Instead, its effect depends on the value of the “multiple-document-handling” Job Template attribute. The ‘single-document’ and ‘single-document-new-sheet’ values produce copies of the job as a whole with the multiple input documents concatenated into a single output document for each job copy. The ‘separate-document-uncollated-copies’ value produce N copies of the first input document followed by N copies of the second input document, etc. The ‘separate-document-collated-copies’ produce N successive job copies, each job copy consisting of 1 copy of the first document followed by 1 copy of the second document, etc.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
cover-back	collection	y	y	n	MAY	MAY	[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
document-overrides To be removed from the next version of [pwg5100.4]	collection	y	y	n	MAY	MAY	[pwg5100.4] §5.1
input-documents ²⁴	1setOf rangeOfInteger(MAX)				MUST be one or the other, but NOT both	MUST	[pwg5100.4] §5.1.1
output-documents	1setOf rangeOfInteger(MAX)					MUST	[pwg5100.4] §5.1.2
document-copies	1setOf rangeOfInteger(MAX)				MAY	MAY	[pwg5100.4] §5.1.3
document-format	mimeMediaType				MAY	MUST	[pwg5100.4] §5.1.4
document-name	name (MAX)				MAY	MUST	[pwg5100.4] §5.1.5
compression	type3 keyword				MAY	MUST	[pwg5100.4] §5.1.6
document-natural- language	naturalLanguage				MAY	MAY	[pwg5100.4] §5.1.7
page-ranges	1setOf rangeOfInteger (1:MAX)				MAY	MAY	[pwg5100.4] §5.1.8
any other Job Template attributes that affect documents, such as “media” or “media-col”					MAY	MAY	
feed-orientation	type3 keyword	y	y	n	MAY	MAY	[ippsave] §5.1
finishings	1setOf type2 enum	y ²⁵	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 ²⁶	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
font-name-requested	name(MAX)	y	y	y	MAY	MAY	[ippsave] §5.2
font-size-requested	integer (1:MAX)	y	y	y	MAY	MAY	[ippsave] §5.3

²⁴ The Printer MUST support “document-format”, “document-name”, “compression”, “document-natural-language”, and “page-ranges” with the “input-documents” member attribute, but not with the “output-documents” member attribute.

²⁵ The IPP “finishings” and “finishings-col” attributes are *extensive* attributes, so their effect when supplied at the Job Level is not always inherited by the documents in a multi-document job. Instead, their effect depends on the value of the “multiple-document-handling” Job Template attribute. The ‘single-document’ and ‘single-document-new-sheet’ cause the finishing to be applied to each job copy as a whole. The ‘separate-documents-collated-copies’ and ‘separate-document-uncollated-copies’ values cause the finishing to be applied to each document.

²⁶ See the footnote on the “finishings” attribute.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
force-front-side	1setOf integer(1:MAX)	y ²⁷	y	y	MAY	MAY	[pwg5100.3] §3.3
imposition-template	type2 keyword name(MAX)	y	y	y	MAY	MAY	[pwg5100.3] §3.4
insert-sheet	1setOf collection	y ²⁸	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
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 ²⁹	n	MAY	MAY	§7.1.1

²⁷ 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.

²⁸ See the footnote on “force-front-side”.

²⁹ 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’.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
job-cover-back	collection	y	n ³⁰	n	MAY	MAY	§7.1.2
same as cover-back	see cover-back						
job-cover-front	collection	y	n ³¹	n	MAY	MAY	§7.1.3
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 ³²	n	MAY	MAY	§7.1.4
job-finishings-col	collection	y	n ³³	n	MAY	MAY	§7.1.5
same as finishings-col	see finishings-col						
job-hold-until	type3 keyword name(MAX)	y	n	n	MAY	MAY	[rfc2911] §4.2.2
job-hold-until-time	dateTime	y	n	n	MAY	MAY	[ippsave] §5.4
job-message-to-operator	text(MAX)	y	n ³⁴	n	MAY	MAY	[pwg5100.3] §3.10
job-phone-number	text(127)	y	n	n	MAY	MAY	[ippsave] §5.5
job-priority	integer(1:100)	y	n	n	MAY	MAY	[rfc2911] §4.2.1
job-recipient-name **	name(MAX)	y	n	n	MAY	MAY	[ippsave] §5.6
job-save-disposition	collection	y	n	n	MAY	MAY	[ippsave] §5.7
save-disposition	type3 keyword	y	n	n	MAY	MAY	[ippsave] §5.7.1.1
save-info	1setOf collection	y	n	n	MAY	MAY	[ippsave] §5.7.1.2
save-location	uri	y	n	n	MAY	MAY	[ippsave] §5.7.1.2.3.1
save-name	name(MAX)	y	n	n	MAY	MAY	[ippsave] §5.7.1.2.3.2
save-document-format	mimeMediaType	y	n	n	MAY	MAY	[ippsave] §5.7.1.2.3.3
job-sheet-message	text(MAX)	y	n	n	MAY	MAY	[pwg5100.3] §3.12

³⁰ 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’.

³¹ 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’.

³² 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’.

³³ 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’.

³⁴ The “job-message-to-operator” Job Template attribute has no corresponding Document Template attribute. Instead, the user and operator communicate with each other using the same “document-message” operation attribute which the Printer copies to the “document-message” Document Description attribute.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
job-sheets	type3 keyword name(MAX)	y	n	n	MAY be neither or one of, but NOT both	MAY, MUST if "job-sheets- col" supported	[rfc2911] §4.2.3
job-sheets-col	collection	y	n	n		MAY	[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-grain	type3 keyword name(MAX)				MAY	MAY	[ippsave] §8.4.2
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-material	type3 keyword name(MAX)				MAY	MAY	[ippsave] §8.4.3
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-size-name	type3 keyword name(MAX)				MAY	MAY	§7.1.6
media-thickness	integer(1:MAX)				MAY	MAY	[ippsave] §8.4.4
media-tooth	type3 keyword name(MAX)				MAY	MAY	[ippsave] §8.4.1
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-size-name ³⁵	type3 keyword name(MAX)	y	y	y	MAY	MAY	§7.1.6, [upnp]
media-type ³⁶	type3 keyword name(MAX)	y	y	y	MAY	MAY	[upnp], [pwg5100.3] §3.13.2

³⁵ UPnPv1 and UPnPv2 define a separate MediaSizeName Job Template attribute with values from PWG 5101.1.

³⁶ UPnPv1 and UPnPv2 define a separate MediaType Job Template attribute with the same values as the "media-type" member attribute of "media-col".

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
multiple-document-handling	type2 keyword	y	n	n	MAY	MUST if multiple document jobs supported	[rfc2911] §4.2.4
number-up	integer(1:MAX)	y	y	y	MAY	MAY	[rfc2911] §4.2.9
orientation-requested	type2 enum	y	y	y	MAY	MAY	[rfc2911] §4.2.10
output-bin	type2 keyword name(MAX)	y	n	n	MAY	MAY	[pwg5100.2] §2.1
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-overrides	1setOf collection	y ³⁷	y	n	MAY	MAY	[pwg5100.4] §5.2
input-documents	1setOf rangeOfInteger(1:MAX)				MUST be one or the other, but NOT both	MUST	[pwg5100.4] §5.2.1
output-documents	1setOf rangeOfInteger(1:MAX)					MUST	[pwg5100.4] §5.2.2
document-copies	1setOf rangeOfInteger(1:MAX)				MAY	MAY	[pwg5100.4] §5.2.3
pages	1setOf rangeOfInteger(1:MAX)				MUST	MUST	[pwg5100.4] §5.2.4
<i>any other Job Template attributes that affect pages, such as "media" or "media-col"</i>					MAY	MAY	
page-ranges	1setOf rangeOfInteger(1:MAX)	y	y	n	MAY	MAY	[rfc2911] §4.2.7
pages-per-subset	1setOf integer(1:MAX)	y ³⁸	n	n	MAY	MAY	[pwg5100.3] §5.3
pdl-init-file	1setOf collection	y	y	n	MAY	MAY	[ippsave] §5.8
pdl-init-file-location	uri				MAY	MAY	[ippsave] §5.8.1.1
pdl-init-file-name	name(MAX)				MAY	MAY	[ippsave] §5.8.1.2
pdl-init-file-entry	name(MAX)				MAY	MAY	[ippsave] §5.8.1.3
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
proof-print	collection	y	n	n	MAY	MAY	[ippsave] §5.9
proof-print-copies	integer (0:MAX)	y	n	n	MAY	MAY	[ippsave] §5.9.1.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[ippsave] §5.8.1.2
media-col	collection					MAY	[ippsave] §5.8.1.2

³⁷ The effect of the IPP "page-overrides" Job Template attribute when supplied at the job level of a multi-document job depends on the value of the "multiple-document-handling" Job Template attribute. For the 'single-document' and 'single-document-new-sheet' values, the pages are numbered as a single set from 1 to n for the job as a whole. For the 'separate-documents-collated-copies' and 'separate-document-uncollated-copies' values, the pages are numbered from 1 to n for each document separately.

³⁸ The IPP "pages-per-subset" Job Template attribute MUST be supplied at the Job Level and can only be used when the "multiple-document-handling" Job Template attribute is 'separate-documents-collated-copies' or 'separate-documents-uncollated-copies', since the purpose of the "pages-per-subset" attribute is to produce separate output documents for each subset. Otherwise, the Printer MUST ignore the "pages-per-subset" attribute.

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

*** - These 4 attributes are Job Description attributes, not Job Processing attributes in the PWG Semantic Model - see Legend before the Table.

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

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

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

This attribute specifies the number of job copies, i.e., with all of the Document objects taken together. Its interpretation is independent of the value of the “multiple-document-handling” Job Template attribute. See the “copies” Job Template attribute defined in [rfc2911] section 4.2.5 which switches between job copies and document copies depending on the value of the “multiple-document-handling” Job Template attribute.

7.1.2 job-cover-back (collection)

This attribute specifies the cover for the back of the job, i.e., with all of the Document objects taken together and is independent of the value of the “multiple-document-handling” Job Template attribute. The member attributes are the same as “cover-back” (see [pwg5100.3] section 3.1). However, the “cover-back” Job Template attribute switches between a job back cover and a document back cover depending on the value of the “multiple-document-handling” Job Template attribute.

7.1.3 job-cover-front (collection)

This attribute specifies the cover for the front of the job, i.e., with all of the Document objects taken together and is independent of the value of the “multiple-document-handling” Job Template attribute. The member attributes are the same as the “cover-front” Job Template attribute (see [pwg5100.3] section 3.2). However, the “cover-front” Job Template attribute switches between a job front cover and a document front cover depending on the value of the “multiple-document-handling” Job Template attribute.

7.1.4 job-finishings (1setOf type2 enum)

This attribute specifies the job finishings, i.e., with all of the Document objects taken together. Its interpretation is independent of the value of the “multiple-document-handling” Job Template attribute. See the “finishings” Job Template attribute defined in [rfc2911] section 4.2.6 which switches between job finishings and document finishings depending on the value of the “multiple-document-handling” Job Template attribute.

7.1.5 job-finishings-col (1setOf collection)

This attribute specifies the job finishings collection, i.e., with all of the Document objects taken together. Its interpretation is independent of the value of the “multiple-document-handling” Job Template attribute. See the “finishings” Job Template attribute defined in [rfc2911] section 4.2.6 which switches between job finishings collection and document finishings collection depending on the value of the “multiple-document-handling” Job Template attribute.

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

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

The “media-size-name” attribute is also defined as a member attribute of the “media-col” Job Template (see [pwg5100.3] section 3.13) and Document Template attribute. Examples:

‘na_letter_8.5x11in’ - The letter size (8.5 inches by 11 inches) used in North America.

‘iso_a4_210x297mm’ - The iso A4 size (210 mm by 297 mm) used in metric countries.

7.1.7 media-type (type3 keyword | name(MAX))

This Job Template and Document Template attribute specifies the type of media. The values are defined in [pwg5101.1] and [pwg5100.3] section 3.13.2. The attribute is used in [upnp] as a Job Template attribute.

The “media-type” attribute is also defined as a member attribute of the “media-col” Job Template (see [pwg5100.3] section 3.13.2) and Document Template attribute. Examples:

‘stationery’ - Separately cut sheets of an opaque material.

‘transparency’ - Separately cut sheets of a transparent material

7.2 Document Template attributes

Most Job Template attributes can be used as Document Template attributes for use in Document Creation operations to apply to the Document object. However, the Job Template attributes that have the “job-” prefix MUST NOT be used as Document Template attributes, since they are defined to apply to the job as a whole. Table 9 shows lists all of the Document Template attributes for use with the Document Creation operations and the Document object. All of the definitions of the Document Template attributes are done by reference to the corresponding Job Template attributes in other specifications. However, the semantics of each Document Template attribute only applies to the Document object with which the attribute is associated either by being supplied by the client in the

Document Creation operation or supplied by the Printer as a default because the client did not (and the PDL did not have any corresponding instruction). See section 5 for defaulting semantics.

8 Job Description and Document Description attributes

Table 10 lists all the Job Description defined in other IPP specifications and the corresponding Document Description attributes defined in this IPP specification. Job Description and Document Description attributes are Job object and Document object attributes, respectively, that are filled in by the Printer. Some Job/Document Description attribute values are supplied by the client in the Job/Document Creation operation using corresponding Operation attributes as flagged with “”. Unless specified otherwise herein, the Printer MUST NOT support modification of Job Description and Document Descriptions attributes.

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

Each of the Document Description attributes have a sub-section in section 8.2. The column labeled References column contains references to the sub-section in this document if there is significant information there. Those subsections that are only references to other specifications contain only that reference in the Reference column. Those attributes that are only Job Description attributes with no subsection in this specification have a “n/a” in the “Doc Desc” column.

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

Legend:

[job-] indicates an attribute that shouldn’t have had a “job-” prefix in its name in [rfc2911], so that the same attribute name could also be used for the Document object as a Document Description attribute. Note: For the PWG Semantic Model, the “job-” prefix is dropped.

“-” indicates that the Job or Document attribute is *not* defined.

“*” indicates a Job and/or Document Description attribute that the client MAY supply the values for in a corresponding Operation attribute³⁹ in a Job or Document Creation operation. See Table 6 for the corresponding Operation attribute.

(r/w) indicates that the Job Description or Document Description attribute is read/write, so that the client can changes its value using the Set-Job-Attributes or Set-Document-Attributes operation (see section 3.7).

Table 10 - Job and Document Description attributes

IPP 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	§8.2.1
attributes-natural-language *	naturalLanguage	y	y	MUST	[rfc2911] §4.3.20	§8.2.2
compression *	type3 keyword	-	y	MUST	[rfc2911] §3.2.1.1	§8.2.3
current-page-order	type2 keyword	y	y	MAY	[pwg5100.3] §4.1	§8.2.4
date-time-at-completed	dateTime	y	y	MAY	[rfc2911] §4.3.14.7	§8.2.5
date-time-at-creation	dateTime	y	y	MAY	[rfc2911] §4.3.14.5	§8.2.6

³⁹ 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.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform- ance	Reference Job Description Attr	Doc Desc.
date-time-at-processing	dateTime	y	y	MAY	[rfc2911] §4.3.14.6	§8.2.7
document-format *	mimeMediaType	-	y	MUST	[rfc2911] §3.2.1.1	§8.2.8
document-format- detailscontainer-summary *	1setOf collection	-	y	MAY ⁴⁰	(new)	§8.2.9
document-creator- application-name *	name(MAX)	-	y	MAY	(new)	§6.1.2.1
document-creator- application-version *	text(127)	-	y	MAY	(new)	§6.1.2.2
document-creator-os-name *	name(40)	-	y	MAY	(new)	§6.1.2.3
document-creator-os- version *	text(40)	-	y	MAY	(new)	§6.1.2.4
document-format *	mimeMediaType	-	y	MUST	(new)	§6.1.2.5
document-format-device-id *	text(127)	-	y	MUST	(new)	§6.1.2.6
document-format-version *	text(127)	-	y	MAY	(new)	§6.1.2.7
document-natural- language *	naturalLanguage	-	y	MAY	(new)	§6.1.2.8
document-format-details- detected	1setOf collection	-	y	MAY	(new)	§8.2.10
document-format-detected	mimeMediaType	-	y	MAY	(new)	§8.2.11
document-id-uri	uri	-	y	MUST	(new)	§8.2.12
document-job-id	integer(1:MAX)	-	y	MUST	(new)	§8.2.13
document-job-printer-uri	uri	-	y	MUST	(new)	§8.2.14
document-job-uri	uri	-	y	MUST	(new)	§8.2.15
document-message *(r/w)	text(MAX)	- ⁴¹	y	MAY	(new)	§8.2.16
document-name *(r/w)	name(MAX)	-	y	MUST	[rfc2911] §3.2.1.1	§8.2.17
document-natural-language *	naturalLanguage	-	y	MAY	[rfc2911] §3.2.1.1	§8.2.18
document-number	integer(0:MAX)	-	y	MUST	(new)	§8.2.19
document-state	type1 enum	-	y	MUST	(new)	§8.2.20
document-state-message	text(MAX)	-	y	MAY	(new)	§8.2.21
document-state-reasons	1setOf type2 keyword	-	y	MUST	(new)	§8.2.22
document-uri *	uri	-	y	MAY	(new)	§8.2.23
impressions-completed- current-copy	integer(0:MAX)	y	y	MAY	[rfc3381] §4.4	§8.2.24
ipp-attribute-fidelity *	boolean	y	-	MUST	[rfc2911] §3.2.1.1	§8.1.1
job-collation-type	type2 enum	y	-	MAY	[rfc3381] §4.1	n/a
[job-]detailed-status-message	1setOf text (MAX)	y	y	MAY	[rfc2911] §4.3.10	§8.2.25
[job-]document-access-errors	1setOf text(MAX)	y	y	MAY	[rfc2911] §4.3.11	§8.2.26
[job-]impressions *	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.17.2	§8.2.27
[job-]impressions-completed	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.2	§8.2.28

⁴⁰ The “document-container-summary” Document Description attribute MUST be supported by a Printer that supports a container MIME type document format, such as ‘application/zip’ or ‘multipart/related’.

⁴¹ The “document-message” (text(127)) Document Description attribute has a corresponding “job-message-from-operator” (text(127)) Job Description attribute (see [rfc2911] section 4.3.16) which handles operator to user communication only and a “job-message-to-operator” (text(MAX)) Job Template attribute (see [pwg5100.3] section 3.10) for user to operator communication.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conformance	Reference Job Description Attr	Doc Desc.
[job-]k-octets *	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.17.1	§8.2.29
[job-]k-octets-processed	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.1	§8.2.30
job-mandatory-attributes *	1setOf type2 keyword	y	-	MAY MUST ⁴²	(new)	§8.1.2
[job-]media-sheets *	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.17.3	§8.2.31
[job-]media-sheets-completed	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.3	§8.2.32
job-message-from-operator	text(127)	y	- ⁴³	MAY	[rfc2911] §4.3.16	n/a
[job-]more-info	uri	y	y	MAY	[rfc2911] §4.3.4	§8.2.33
job-name *(r/w)	name(MAX)	y	- ⁴⁴	MUST	[rfc2911] §4.3.5	n/a
job-originating-user-name	name (MAX)	y	-	MUST	[rfc2911] §4.3.6	n/a
job-password *	octetString(255)	y	-	MAY	[ippsave] §4.1	n/a
job-password-encryption *	type3 keyword name(MAX)	y	-	MAY	[ippsave] §4.2	n/a
job-printer-make-and-model	text(127)	y	-	CMUST ⁴⁵	[rfc2911] §4.3.14.4	n/a
[job-]printer-up-time	integer (1:MAX)	y	y	MUST	[rfc2911] §4.3.14.4	§8.2.34
job-state	type1 enum	y	- ⁴⁶	MUST	[rfc2911] §4.3.7	§8.2.20
job-state-message	text(MAX)	y	- ⁴⁷	MAY	[rfc2911] §4.3.9	§8.2.21
job-state-reasons	1setOf type2 keyword	y	- ⁴⁸	MUST	[rfc2911] §4.3.8	§8.2.22
[job-]warnings-count	integer(0:MAX)	y	y	MAY	[pwg5100.4] §6.1	§8.2.35
last-document *	boolean	-	y	MAY	[rfc2911] §4.3.12	§8.2.36
number-of-documents	integer(0:MAX)	y	-	MAY	[rfc2911] §4.3.15	n/a
number-of-intervening-jobs	integer(0:MAX)	y	-	MAY	[rfc2911] §4.3.13	n/a
output-device-assigned	name(127)	y	y	MAY	[rfc2911] §4.3.7.2	§8.2.37
sheet-completed-copy-number	integer(0:MAX)	y	y	MAY	[rfc3381] §4.2	§8.2.38
sheet-completed-document-number	integer(0:MAX)	y	-	MAY	[rfc3381] §4.3	n/a
time-at-completed	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.3	§8.2.39
time-at-creation	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.1	§8.2.40
time-at-processing	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.2	§8.2.41

⁴² **ISSUE 03 (repeat):** Should we make “job-mandatory-attributes” a REQUIRED attribute for a Printer to support (if it supports the Document object)? Otherwise, clients won’t support it and will be stuck with the “ipp attribute fidelity” attribute?

⁴³ The “job-message-from-operator” Job Description attribute has no corresponding “document-message-from-operator” (text(127)) Document Description attribute. Instead, both the user and the operator use the “document-message” (text(127)) operation/Document Description attribute (see section 8.2.16) to communicate with each other.

⁴⁴ The Document Description attribute that corresponds to the “job-name” Job Description attribute is the (existing) “document-name” attribute defined in [rfc2911].

⁴⁵ The “job-printer-make-and-model” Job Description attribute MUST be supported if the “job-save-disposition” Job Template attribute is supported.

⁴⁶ The Document Description attribute that corresponds to the “job-state” Job Description attribute is the (new) “document-state” attribute.

⁴⁷ The Document Description attribute that corresponds to the “job-state-message” Job Description attribute is the (new) “document-state-message” attribute.

⁴⁸ The Document Description attribute that corresponds to the “job-state-reasons” Job Description attribute is the (new) “document-state-reasons” attribute.

See the description in the Legend before the table.

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

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

8.1 Job Description attributes

This sub-section contains ~~only~~ the Job Description attributes that ~~are defined in this specification and~~ are not defined in any other specification.

8.1.1 ipp-attribute-fidelity (boolean)

This REQUIRED Job Description attribute indicates the value of the corresponding “ipp-attribute-fidelity” Operation attribute ([rfc2911] section 3.2.1.1)⁴⁹ that the client supplied in the Job Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation and Document Creation operations have been accepted. However, this attribute does provide an audit capability to the user and service desk for comparing unexpected printed results with what was submitted.

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

~~ISSUE 03 repeat: Should we make “job-mandatory-attributes” a REQUIRED attribute for a Printer to support (if it supports the Document object)? Otherwise, clients won’t support it and will be stuck with the “ipp-attribute-fidelity” attribute?~~

This ~~OPTIONAL~~ **REQUIRED**⁵⁰ Job Description attribute indicates which Job Template and Document Template attributes ~~that~~ the client required that the Printer ~~honor~~ **Honor** in order to accept the Job Creation and subsequent Document Creation requests. The Printer populates this attribute with the value of the corresponding “job-mandatory-attributes” Operation attribute (see section 4.4.2) supplied by the client in the Job Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation and Document Creation operations have been accepted. However, this **Document Description** attribute does provide an audit capability of the Job object in the Job History (see [rfc2911] section 4.3.7.2) to the user and service desk for comparing unexpected printed results with what was submitted. See section 4.4.2 for additional details of the semantics of the “job-mandatory-attributes” operation/Document Description attribute that are not repeated here.

⁴⁹ The “ipp-attribute-fidelity” attribute is defined as an operation attribute only in [RFC2911]. This specification is defining it as a Document Description attribute which the Printer MUST support.

⁵⁰ The “job-mandatory-attributes” Job Description attribute is REQUIRED for conformance to this Document Object specification. It is not REQUIRED for conformance to any other specification. See the definition of REQUIRED in section 2.1.

8.2 Document Description attributes

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

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

8.2.1 attributes-charset (charset)

This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description attribute (see [rfc2911] §4.3.19) applied to the Document object. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.2 attributes-natural-language (naturalLanguage)

This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description attribute (see [rfc2911] §4.3.20) applied to the Document object. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.3 compression (type3 keyword)

This REQUIRED Document Description attribute specifies the compression used to represent this document (see [rfc2911] §3.2.1.1). The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.4 current-page-order (type2 keyword)

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

8.2.5 date-time-at-completed (dateTime)

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

8.2.6 date-time-at-creation (dateTime)

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

8.2.7 date-time-at-processing (dateTime)

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

8.2.8 document-format (mimeMediaType)

This REQUIRED Document Description attribute is a copy of the corresponding “document-format” Operation attribute (see section 6.1.1) that the client supplied in the Document Creation operation. This attribute specifies the document format (see [rfc2911] §3.2.1.1) for the Document object. The standard values for this attribute are Internet Media types (sometimes called MIME types). For further details see the description of the ‘mimeMediaType’ attribute syntax in [rfc2911] section 4.1.9. If it is a MIME Media Type, such as ‘multipart/related’ or ‘application/zip’, that is a container format that contains document parts, the “document-format-details-container-summary” attribute summarizes the content (see section 8.2.9) whether the “document-format” is a single document format or a container document format, such as “multipart/related” or “application/zip”. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.9 document-format-details-container-summary (1setOf collection)

This OPTIONAL Document Description attribute is a copy of the summarizes the corresponding “document-format-details” Operation attribute (see section 6.1.2) that the client supplied in the Document Creation operation. See section 6.1.2 for the full semantics of the attribute (and its member attributes) which are not duplicated here. document format content of the body parts, if the document’s document format is a container type, such as ‘multipart/related’ or ‘application/zip’. If a Printer supports the “document-format-details” Operation attributes such a container MIME type, the Printer MUST support this “document-format-details-container-summary” Document Description attribute and all the member attributes in Table 10 that the Printer supports as top-level Document Description attributes. The purpose of the “document-format-details-container-summary” Document Description attribute is to allow a receiving Printer to determine whether or not it supports all of record the exact expected document format or formats and its details in the supplied instance of the container Document object, including the container format itself.

8.2.10 document-format-details-detected (1setOf collection)

This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format details of the Document object. Before the document format details are known, the Printer populates this attribute member attributes that each contain a zero length string. As the Printer processes the Document object, the Printer populates this attribute with the actual values detected⁵¹ whether or not the client supplied a “document-format-details” Operation attribute in the Document Creation operation. This value will differ from the value submitted by the client, if the Printer automatically senses the document format details by examining the document content, such as when the “document-format” attribute has the value: ‘application/octet-stream’ (see [rfc2911] section 4.1.9.1).

8.2.11 document-format-detected (mimeMediaType)

This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format of the Document object. This value will differ from the value submitted by the client or defaulted by the Printer, if the Printer automatically senses the document format by examining the document content, such as when the “document-format” attribute has the value: ‘application/octet-stream’ (see [rfc2911] section 4.1.9.1). Before the document format is known, the Printer populates this attribute with a zero length string.

8.2.12 document-id-uri (uri)

This REQUIRED Document Description attribute is generated by the Printer as a unique URI to identify a Document object, in the same way that the “job-uri” (uri) Job Description attribute uniquely identifies a Job object. Unlike the “job-uri” (uri) (see [rfc2911] section 4.3.1) attribute and “document-job-uri” (uri) (see §8.2.15), the client cannot supply this attribute as a target of any operation. Example: `ipp://www.company.com/printers/myprinter/jobs/22/doc3`.

⁵¹ The “document-format-details-detected” is not named “document-format-details-actual”, since it is tracking an operation attribute, not a Job or Document Template attribute (same as “document-format-detected”).

8.2.13 document-job-id (integer(1:MAX))

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

8.2.14 document-job-printer-uri (uri)

This REQUIRED Document Description attribute is a *copy* of the Job's "job-printer-uri" Job Description attribute (see [rfc2911] §4.3.3), i.e., the URI of the Printer containing the Job which contains this Document. Example:
ipp://www.company.com/printers/myprinter.

8.2.15 document-job-uri (uri)

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

8.2.16 document-message (text(MAX))

This OPTIONAL Document Description contains a message from either (1) the user to the operator about the Document or (2) from the operator, system administrator, or "intelligent" process to indicate to the end user the reasons for modification or other management action taken on the Document. The Printer populates this Document Description attribute from the "document-message" (text(MAX)) Operation attribute value supplied by the client in any of the Document Creation operations (see section 3.1.1) or in a Cancel-Document operation (see section 3.8).

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

8.2.17 document-name (name(MAX))

This REQUIRED Document Description attribute specifies the name of the document (see [rfc2911] §3.2.1.1). The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

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

8.2.18 document-natural-language (naturalLanguage)

This OPTIONAL Document Description attribute specifies the natural language of the document (see [rfc2911] §3.2.1.1 and [pwg5100.4] §5.1.7). If the document contains more than one language, the value is the first or primary language of the document. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1). The Printer MAY use this value to select fonts or other Globalization processing.

ISSUE 13: The definition in [rfc2911] §3.2.1.1 and [pwg5100.4] §5.1.7 is single-valued. OK that this document attribute isn't 1setOf? Or should we extend "document-natural-language" to 1setOf naturalLanguage and keep the same name? Or change the name to "document-natural-languages"?

8.2.19 document-number (integer(1:MAX))

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

8.2.20 document-state (type1 enum) and job-state (type1 enum)

The REQUIRED "job-state" and the REQUIRED "document-state" Document Description attributes identify the current state of the job and document, respectively. Even though IPP defines seven values for job/document states (plus the out-of-band 'unknown' value - see [rfc2911] section 4.1), implementations only need to support those states which are appropriate for the particular implementation. In other words, an IPP Printer object implementation supports only those job/document states implemented by the output device and available to the IPP Printer object implementation.

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

Table 11 - "job-state" and "document-state" attribute values

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

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

Value	Symbolic Name and Description
'3'	'pending' (JD): The job is a candidate to start processing, but is not yet processing. The document has not started to be processed at all.
'4'	'pending-held' (J): The job is not a candidate for processing for any number of reasons but will return to the 'pending' state as soon as the reasons are no longer present. The job's "job-state-reason" attribute MUST indicate why the job is no longer a candidate for processing. The 'pending-held' state does not apply to the Document object's "document-state" attribute.
'5'	'processing' (JD): One or more of: <ol style="list-style-type: none">1. The job is using, or is attempting to use, one or more purely software processes that are analyzing, creating, or interpreting a PDL, etc.,2. The job is using, or is attempting to use, one or more hardware devices that are interpreting a PDL, making marks on a medium, and/or performing finishing, such as stapling, etc.,3. The Printer object has made the job ready for printing, but the output device is not yet printing it, either because the job hasn't reached the output device or because the job is queued in the output device or some other spooler, awaiting the output device to print it.

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

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

Value	Symbolic Name and Description
'6'	<p>Implementations MAY, though they NEED NOT, include additional values in the job's/document's "job-state-reasons"/"document-state-reasons" attribute to indicate the progress of the job/document, such as adding the 'job-printing'/ 'printing' value to indicate when the output device is actually making marks on paper and/or the 'processing-to-stop-point' value to indicate that the Printer is in the process of canceling or aborting the job/document. Most implementations won't bother with this nuance.</p> <p>'processing-stopped' (J): The job has stopped while processing for any number of reasons and will return to the 'processing' state as soon as the reasons are no longer present.</p> <p>The job's "job-state-reason" attribute MAY indicate why the job has stopped processing. For example, if the output device is stopped, the 'printer-stopped' value MAY be included in the job's "job-state-reasons" attribute.</p> <p>Note: When an output device is stopped, the device usually indicates its condition in human readable form locally at the device. A client can obtain more complete device status remotely by querying the Printer object's "printer-state", "printer-state-reasons" and "printer-state-message" attributes.</p> <p>The 'processing-stopped' state does not apply to the Document object's "document-state" attribute.</p>
'7'	<p>'canceled' (JD): The job/document has been canceled by a Cancel-Job/Cancel-Document operation and the Printer object has completed canceling the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is canceling the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' value and one of the 'canceled-by-user', 'canceled-by-operator', or 'canceled-at-device' value. When the job/document moves to the 'canceled' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'canceled-by-xxx', if present, MUST remain.</p>
'8'	<p>'aborted' (JD): The job/document has been aborted by the system, usually while the job/document was in the 'processing' or 'processing-stopped' state and the Printer has completed aborting the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is aborting the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' and 'aborted-by-system' values. When the job/document moves to the 'aborted' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'aborted-by-system' value, if present, MUST remain.</p>
'9'	<p>'completed' (JD): The job/document has completed successfully or with warnings or errors after processing and all of the job/document media sheets have been successfully stacked in the appropriate output bin(s) and all job/document status attributes have reached their final values for the job/document. The job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain one of: 'completed-successfully', 'completed-with-warnings', or 'completed-with-errors' values.</p>

1824 The final value for this attribute MUST be one of: 'completed', 'canceled', or 'aborted' before the Printer removes the
1825 job/document altogether. The length of time that jobs/document remain in the 'canceled', 'aborted', and 'completed'
1826 states depends on implementation.

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

8.2.20.1 The “job-state” Job Description attribute and the Job Life Cycle

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

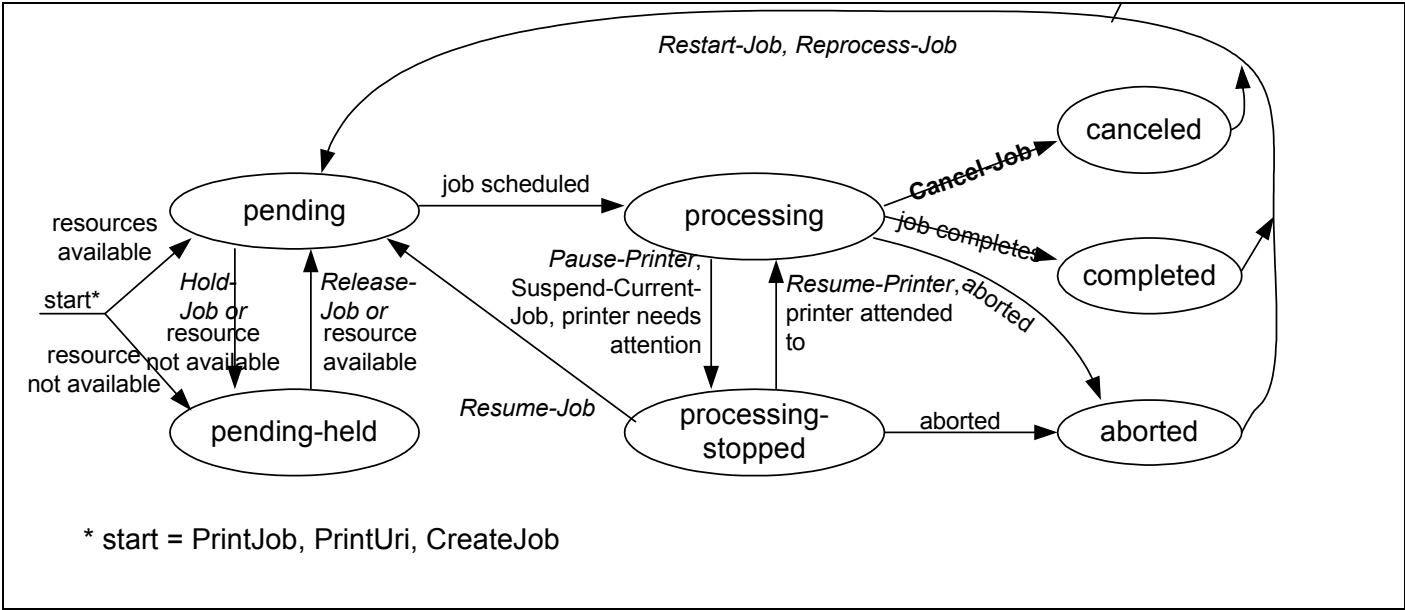


Figure 1 - The “job-state” Job Description attribute and the Job object life cycle

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

8.2.20.2 The “document-state” Document Description attribute and the Document object life Cycle

The “document-state” attribute is one of the most important Document Description attributes. Figure 2 shows the values of the “document-state” attribute and the Document object life cycle as affected by actions on the Job, Document, Printer, and job processing. Documents are not active objects and their life cycle is closely tied to the lifecycle of a Job⁵². Documents basically have three states. The first is waiting to be processed by a Job (i.e. pending). The second state is from the time the Job first starts processing the Document (i.e., processing) and until it reaches one of its terminal states. The third state for a Document is one of its terminal states (i.e., completed, canceled, or aborted).

⁵² 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.

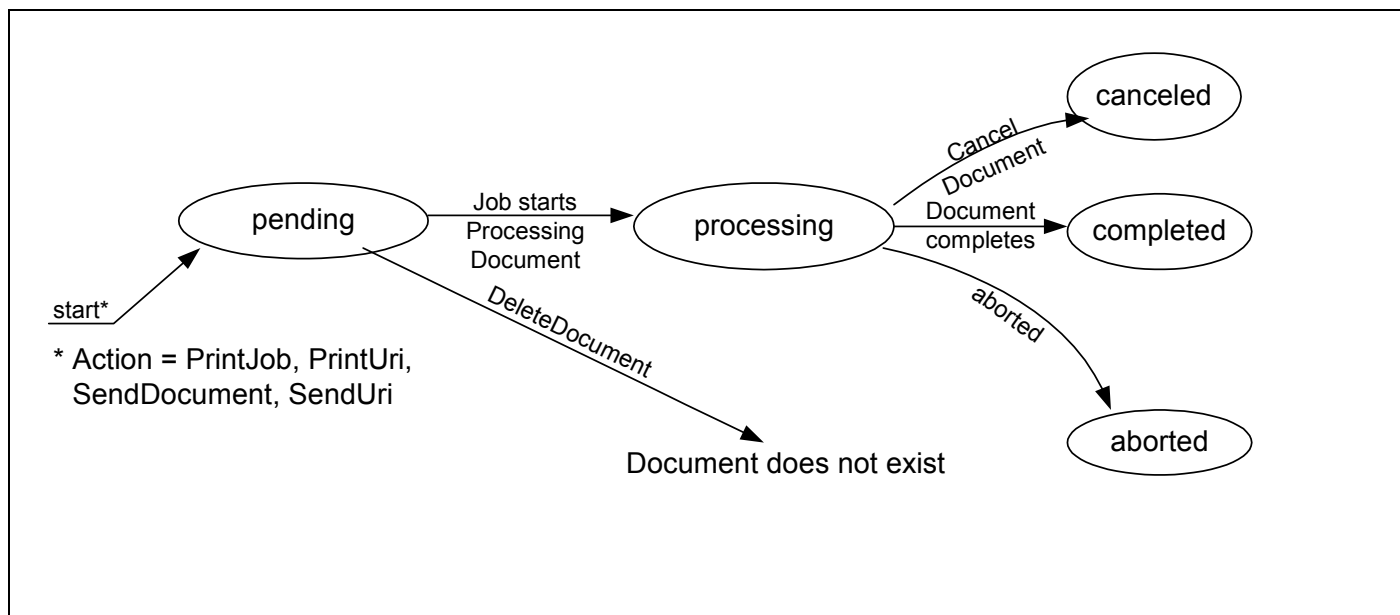


Figure 2 - The “document-state” Document Description attribute and the Document object life Cycle

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

8.2.20.3 Forwarding Servers

As with all other IPP attributes, if the implementation can not determine the correct value for this attribute, it SHOULD respond with the out-of-band value 'unknown' (see [rfc2911] Section 4.1) rather than try to guess at some possibly incorrect value and give the end user the wrong impression about the state of the Job/Document object. For example, if the implementation is just a gateway into some printing system from which it can normally get status, but temporarily is unable, then the implementation should return the 'unknown' value. However, if the implementation is a gateway to a printing system that never provides detailed status about the print job/document, the implementation MAY set the IPP Job/Document object's state to 'completed', provided that it also sets the 'queued-in-device' value in the job's/document's "job-state-reasons"/"document-state-reasons" attribute (see "job-state-reasons"/"document-state-reasons" attribute below).

8.2.20.4 Partitioning of Job/Document States

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

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

Job Retention: When a job enters one of the three terminal job states: 'completed', 'canceled', or 'aborted', the IPP Printer object MAY "retain" the job in a restartable condition for an implementation-defined time period. This time period MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention. While in the Job Retention phase, the job's document data is retained and a client may restart the job using the Restart-Job operation. If the Printer supports the Restart-Job operation, then it SHOULD indicate that the job is restartable by adding the 'job-restartable' value to the job's "job-state-reasons" attribute (see section 8.2.22) during the Job Retention phase. If the Printer supports the Document object, then the Get-Document-Attributes and Get-Documents operations MUST be supported while the job is in the Job Retention phase.

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

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

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

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

8.2.21 document-state-message (text(MAX)) and job-state-message (text(MAX))

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

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

8.2.22 document-state-reasons (1setOf type2 keyword) and job-state-reasons(1setOf type2 keyword)

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

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

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

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

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

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

Notation:

[job-] indicates a state reason keyword value that has the 'job-' prefix when it is a value of the "job-state-reasons" attribute, but does not have the 'job-' prefix when it is a value of the "document-state-reasons" attribute⁵³.

For purposes of sorting in Table 12, the "[job-]" prefix is observed, since this is an IPP specification.

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

Table 12 - "job-state-reasons" and "document-state-reasons" attribute values

IPP Job Description / Document Description attribute name	IPP Attribute Syntax plus Values	Job	Doc	Printer conformance	Reference
job-state-reasons	1setOf type2 keyword	y	- ⁵⁴	MUST	[rfc2911] §4.3.8
document-state-reasons	1setOf type2 keyword	-	y	MUST	8.2.22
	aborted-by-system	y	y	MAY	[rfc2911] §4.3.8
	compression-error	y	y	MAY	[rfc2911] §4.3.8
	document-access-error	y	y	MAY	[rfc2911] §4.3.8
	document-format-error	y	y	MAY	[rfc2911] §4.3.8
	[job-]canceled-at-device	y	y	MAY	[rfc2911] §4.3.8
	[job-]canceled-by-operator	y	y	MAY	[rfc2911] §4.3.8
	[job-]canceled-by-user	y	y	MAY	[rfc2911] §4.3.8
	[job-]completed-successfully	y	y	MAY	[rfc2911] §4.3.8
	[job-]completed-with-errors	y	y	MAY	[rfc2911] §4.3.8
	[job-]completed-with-warnings	y	y	MAY	[rfc2911] §4.3.8
	job-data-insufficient	y	-	MAY	[rfc2911] §4.3.8
	job-hold-until-specified	y	-	MAY	[rfc2911] §4.3.8
	[job-]incoming	y	y	MAY	[rfc2911] §4.3.8
	[job-]interpreting	y	y	MAY	[rfc2911] §4.3.8
	[job-]outgoing	y	y	MAY	[rfc2911] §4.3.8
	job-password-wait	y	-	MAY	[ippsave] §8.3.1
	[job-]printing	y	y	MAY	[rfc2911] §4.3.8
	[job-]queued	y	y	MAY	[rfc2911] §4.3.8
	[job-]queued-for-marker	y	y	MAY	[rfc2911] §4.3.8

⁵³ 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.

⁵⁴ The Document Description attribute that corresponds to the "job-state-reasons" Job Description attribute is the (new) "document-state-reasons" attribute.

IPP Job Description / Document Description attribute name	IPP Attribute Syntax plus Values	Job	Doc	Printer conformance	Reference
	job-restartable	y	-	MAY	[rfc2911] §4.3.8
	job-resuming	y	-	MAY	[ippsave] §8.3.1
	job-saved-successfully	y	-	MAY	[ippsave] §8.3.1
	job-save-error	y	-	MAY	[ippsave] §8.3.1
	job-saving	y	-	MAY	[ippsave] §8.3.1
	job-scheduling	y	-	MAY	[ippsave] §8.3.1
	[job-]spooling	y	y	MAY	[ippsave] §8.3.1
	[job-]streaming	y	y	MAY	[ippsave] §8.3.1
	job-suspended	y	-	MAY	[adm-ops] §9.1
	job-suspended-by-operator	y	-	MAY	[ippsave] §8.3.1
	job-suspended-by-system	y	-	MAY	[ippsave] §8.3.1
	job-suspended-by-user	y	-	MAY	[ippsave] §8.3.1
	job-suspending	y	-	MAY	[ippsave] §8.3.1
	[job-]transforming	y	y	MAY	[rfc2911] §4.3.8
	[job-]warnings-detected	y	y	MAY	[pwg5100.4] §7.1
	none	y	y	MUST	[rfc2911] §4.3.8
	printer-stopped	y	-	MAY	[rfc2911] §4.3.8
	printer-stopped-partly	y	-	MAY	[rfc2911] §4.3.8
	processing-to-stop-point	y	-	MAY	[rfc2911] §4.3.8
	proof-print-wait	y	-	MAY	[ippsave] §8.3.1
	queued-in-device	y	y	MAY	[rfc2911] §4.3.8
	resources-are-not-ready	y	-	MAY	[rfc2911] §4.3.8
	resources-are-not-supported	y	y	MAY	[pwg5100.3] §6.1
	service-off-line	y	-	MAY	[rfc2911] §4.3.8
	submission-interrupted	y	y	MAY	[rfc2911] §4.3.8
	unsupported-compression	y	y	MUST	[rfc2911] §4.3.8
	unsupported-document-format	y	y	MUST	[rfc2911] §4.3.8

For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely to occur (if implemented), starting with the 'none' value. Note: The order is improved over that in [rfc2911]. The (JD), (J), and (D) notation is identical to the "Job" and "Doc" columns in Table 12 indicating whether the keyword is defined for the "job-state-reasons" and/or "document-state-reasons" attributes:

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

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

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

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

- 'resources-are-not-supported' (JD):** At least one of the resources needed by the job/document, such as media, fonts, resource objects, etc., is not supported on any of the physical printers for which the job/document is a candidate. This condition MAY be detected when the job/document is accepted, or subsequently while the job/document is pending or processing, depending on implementation. The job/document may (1) remain in its current state, (2) be moved to the 'pending-held' state, depending on implementation and/or job scheduling policy, or (3) scheduled normally, but the Printer is put into the 'stopped' state when the job/document is attempted to be processed on the Printer. This value is intended for use with an implementation that supports the "user-defined-values-supported" Printer attribute (see [pwg5100.3] section 6.1) which allows a job to be accepted with an unsupported 'name' value.
- 'resources-are-not-ready' (JD):** At least one of the resources needed by the job/document, such as media, fonts, resource objects, etc., is not ready on any of the physical printer's for which the job/document is a candidate. This condition MAY be detected when the job/document is accepted, or subsequently while the job/document is pending or processing, depending on implementation. The job/document may remain in its current state or be moved to the 'pending-held' state, depending on implementation and/or job/document scheduling policy.
- '[job]-incoming' (JD):** Either (1) the Printer has accepted the Create-Job operation and is expecting additional Send-Document and/or Send-URI operations or (2) the Printer is retrieving/accepting document data as a result of a Print-Job, Print-URI, Send-Document or Send-URI operation.
- '[job]-spooling' (JD):** Same as 'job-incoming' with the specialization that the Printer is spooling the Job/Document data before processing it. This value corresponds to the 'spool' or 'automatic' value of the "job-spooling-supported" Printer Description attribute.
- '[job]-streaming' (JD):** Same as 'job-incoming' with the specialization that the Printer is processing the Job/Document data as it is being received (that is, the document is not being spooled, but rather is being processed in chunks by the output device and is being imaged during reception). This value corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer Description attribute.
- 'job-data-insufficient' (J):** The Create-Job operation has been accepted by the Printer, but the Printer is expecting additional document data before it can move the job into the 'processing' state. If a Printer starts processing before it has received all data, the Printer removes the 'job-data-insufficient' reason, but the 'job-incoming' remains. If a Printer starts processing after it has received all data, the Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at the same time.
- 'unsupported-compression' (JD):** The job/document was aborted by the system because the Printer determined while attempting to decompress the document-data's that the compression is actually not among those supported by the Printer. This value MUST be supported, since "compressions is a REQUIRED Operation attribute.
- 'compression-error' (JD):** The job/document was aborted by the system because the Printer encountered an error in the document-data while decompressing it. If the Printer posts this reason, the document-data has already passed any tests that would have led to the 'unsupported-compression' job-state-reason/document-state-reason.
- 'document-access-error' (JD):** After accepting a Print-URI or Send-URI request, the Printer could not access one or more documents passed by reference. This reason is intended to cover any file access problem, including file does not exist and access denied because of an access control problem. The Printer MAY also indicate the document access error using the "job-document-access-errors" Job Description attribute (see the description of "job-document-access-errors" above). Whether the Printer aborts the job/document and moves the job/document to the 'aborted' job state or prints all documents that are accessible and moves the job/document to the 'completed' job/document state and adds the 'completed-with-errors' value in the job's "job-state-reasons" or document's "document-state-reasons" attribute depends on implementation and/or site policy. This value SHOULD be supported if the Print-URI or Send-URI operations are supported.

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

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

'submission-interrupted' (JD): The job or document was not completely submitted for some unforeseen reason, such as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or the document transfer method has crashed in some non-recoverable way before the document data was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-out period. See the description of the "multiple-operation-time-out" Printer attribute in [rfc2911] Section 4.4.31.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

'[job-]completed-with-warnings' (JD): The print part of the job/document completed with warnings (whether or not there were save errors). This value SHOULD be supported if the implementation detects warnings. [rfc2911]

'[job-]completed-with-errors' (JD): The print part of the job/document completed with errors (and possibly warnings too) (whether or not there were save errors). This value SHOULD be supported if the implementation detects errors. [rfc2911]

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

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

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

'job-restartable' (J): This job is retained (see the description of "job-state" above, specifically "Partitioning of Job States") and is currently able to be restarted using the Restart-Job operation (see [rfc2911] Section 3.3.7). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the Printer MUST accept a Restart-Job operation for that job. This value SHOULD be supported if the Restart-Job operation is supported.

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

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

8.2.23 document-uri (uri)

This Document Description attribute is the URI that the client supplied in the corresponding Operation attribute in a Send-URI operation (see [rfc2911] section 3.3.2). The Printer MUST support this attribute if the Printer supports the Send-URI operation (see section 3.4).

8.2.24 impressions-completed-current-copy (integer(0:MAX))

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

8.2.25 [job-]detailed-status-message (1setOf text(MAX))

This OPTIONAL "detailed-status-message" Document Description attribute has the same semantics as the corresponding "job-detailed-status-message" Job Description attribute (see [rfc2911] §4.3.10) applied to the Document object.

8.2.26 [job-]document-access-errors (1setOf text(MAX))

This OPTIONAL "document-access-errors" Document Description attribute has the same semantics as the corresponding "job-detailed-status-message" Job Description attribute (see [rfc2911] §4.3.11) applied to the Document object.

8.2.27 [job-]impressions (integer(0:MAX))

This OPTIONAL "impressions" Document Description attribute has the same semantics as the corresponding "job-impressions" Job Description attribute (see [rfc2911] §4.3.17.2) applied to the Document object. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.28 [job-]impressions-completed (integer(0:MAX))

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

8.2.29 [job-]k-octets (integer(0:MAX))

This OPTIONAL "k-octets" Document Description attribute has the same semantics as the corresponding "job-k-octets" Job Description attribute (see [rfc2911] §4.3.17.1) applied to the Document object. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.30 [job-]k-octets-processed (integer(0:MAX))

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

8.2.31 [job-]media-sheets (integer(0:MAX))

This OPTIONAL "media-sheets" Document Description attribute has the same semantics as the corresponding "job-media-sheets" Job Description attribute (see [rfc2911] §4.3.17.3) applied to the Document object. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1).

8.2.32 [job-]media-sheets-completed (integer(0:MAX))

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

8.2.33 [job-]more-info (uri)

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

8.2.34 [job-]printer-up-time (integer (1:MAX))

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

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

8.2.35 [job-]warnings-count (integer(0:MAX))

This OPTIONAL "warnings-count" Document Description attribute has the same semantics as the corresponding "job-warnings-count" Job Description attribute (see [pwg5100.4] §6.1.) applied to the Document object. See [pwg5100.4] §6.1.

8.2.36 last-document (boolean)

This OPTIONAL Document Description attribute indicates whether or not this Document is the last Document in the Job. See [rfc2911] §4.3.12. The Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in the Document Creation operation (see section 3.1). If the client issues the Close-Job operation (see section 4.3.1), the Printer sets the value of the “last-document” Document Description attribute of the last document in the Job to ‘true’.

8.2.37 output-device-assigned (name(127))

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

8.2.38 sheet-completed-copy-number (integer(0:MAX))

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

8.2.39 time-at-completed (integer (MIN:MAX))

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

8.2.40 time-at-creation (integer (MIN:MAX))

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

8.2.41 time-at-processing (integer (MIN:MAX))

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

9 Printer attributes

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

Job Template attributes (JT)	These Printer attributes are related directly to the “xxx” Job Template attributes that a client can supply in a Job Creation request as follows: <ol style="list-style-type: none">1. “xxx-supported” indicate the supported values2. “xxx-default” indicate the values that will be used if the client and the PDL omit the attribute.3. “xxx-ready” indicate the supported values that are available without human intervention, for those few attributes that require human intervention, such as “media” and possibly “job-finishing”. These Printer attributes are also returned in a Get-Printer-Attributes response when the client supplies: “requested-attributes” = ‘job-template’.
Document Template attributes (DT)	These Printer attributes are related directly to the “xxx” Document Template attributes that a client can supply in a Document Creation request as follows: <ol style="list-style-type: none">1. “xxx-supported” indicate the supported values2. “xxx-default” indicate the values that will be used if the client and the PDL

	omit the attribute. 3. “xxx-ready” indicate the supported values that are available without human intervention, for those few attributes that require human intervention, such as “media” and possibly “finishing”. These Printer attributes are also returned in a Get-Printer-Attributes response when the client supplies: “requested-attributes” = ‘document-template’.
Printer Description attributes (PD)	These Printer attributes describe the Printer, such as “printer-name” and “printer-location”. Some of them are “xxx-supported” and “xxx-default” for Operation attributes that the client can supply in a Job Creation request.
neither (-)	These Printer attributes describe supported and defaults for member attributes of collection Job Template attributes.

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

“**Attribute Syntax**” - indicates the attribute syntax (see [rfc2911] section 4.1). Many “xxx-default” and “xxx-supported” attributes have the ‘collection’ syntax which consists of a number of member attributes. These member attributes are not listed in this table when they are the same as the corresponding “xxx” attribute in Table 9. Only those few Printer attribute collection attributes that do not have a corresponding Job Template attributes show the member attributes in this table.

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

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

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

ISSUE 14- TBD ACTION (Tom) - Need to add the “xxx-default” and “xxx-supported” to Table 14 that go with the Document Template attributes.

Table 13 - Printer attributes (Job Template and Printer Description)

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
charset-configured	charset	PD	MUST	[rfc2911] §4.4.17
charset-supported	1setOf charset	PD	MUST	[rfc2911] §4.4.18
color-supported	boolean	PD	MAY	[rfc2911] §4.4.26
compression-supported	type3 keyword	PD	MUST	[rfc2911] §4.4.32
copies-default	integer(1:MAX)	JT	MAY	[rfc2911] §4.2.5
copies-supported	rangeOfInteger(1:MAX)	JT	MAY	[rfc2911] §4.2.5
cover-back-default	collection	JT	MAY	[pwg5100.3] §3.1.3
cover-back-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.1.4
cover-front-default	collection	JT	MAY	[pwg5100.3] §3.1.3
cover-front-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.1.4
cover-type-supported	1setOf type2 keyword	-	MAY	[pwg5100.3] §3.1.2.1
document-creation-attributes-supported	1setOf type2 keyword	PD	MAY MUST	[this-spec] §9.1

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
document-format-default	mimeMediaType	PD	MUST	[rfc2911] §4.4.21
<u>document-format-details-supported</u>	<u>1setOf type2 keyword</u>	<u>PD</u>	<u>CMUS</u> <u>T⁵⁵</u>	<u>§9.2</u>
<u>document-format-details-implemented</u>	<u>1setOf collection</u>	<u>PD</u>	<u>CMUS</u> <u>T⁵⁶</u>	<u>§9.3</u>
document-format-supported	1setOf mimeMediaType	PD	MUST	[rfc2911] §4.4.22
document-format-varying-attributes	1setOf type2 keyword	PD	MAY	[rfc3380] §6.3
document-overrides-supported	1setOf type2 keyword		MAY	[pwg5100.4] §5.1.14
finishings-col-default	collection	JT	MAY	[pwg5100.3] §3.2.3
finishings-col-ready	1setOf collection	JT	MAY	[pwg5100.3] §3.2.4
finishings-col-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.2.5
finishings-default	1setOf type2 enum	JT	MAY	[rfc2911] §4.2.6
finishings-ready	1setOf type2 enum	JT	MAY	[rfc2911] §4.2.6
finishings-supported	1setOf type2 enum	JT	MAY	[rfc2911] §4.2.6
finishing-template-supported	1setOf name(MAX)	-	MAY	[pwg5100.3] §3.2.1.1
force-front-side-default	1setOf integer(1:MAX)	JT	MAY	[pwg5100.3] §3.3
force-front-side-supported	rangeOfInteger(1:MAX)	JT	MAY	[pwg5100.3] §3.3
generated-natural-language-supported	1setOf naturalLanguage	PD	MUST	[rfc2911] §4.4.20
imposition-template-default	type3 keyword name(MAX)	-	MAY	[pwg5100.3] §3.4
imposition-template-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.4
insert-after-page-number-supported	rangeOfInteger(0:MAX)	-	MAY	[pwg5100.3] §3.5.1.1
insert-count-supported	rangeOfInteger(0:MAX)	-	MAY	[pwg5100.3] §3.5.2.1
insert-sheet-default	1setOf collection	JT	MAY	[pwg5100.3] §3.5.4
insert-sheet-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.5.5
ippget-event-life	integer(15:MAX)	PD	MAY	[get-method] §8.1
ipp-versions-supported	1setOf type2 keyword	PD	MUST	[rfc2911] §4.4.20
job-account-id-default	name(MAX)	JT	MAY	[pwg5100.3] §3.6
job-account-id-supported	boolean	JT	MAY	[pwg5100.3] §3.6
job-accounting-output-bin-default	type3 keyword name(MAX)	-	MAY	[pwg5100.3] §3.8.3.1
job-accounting-output-bin-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.8.3.2
job-accounting-sheets-default	collection	JT	MAY	[pwg5100.3] §3.8.4
job-accounting-sheets-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.8.5
job-accounting-sheets-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.8.1.1
job-accounting-user-id-default	name(MAX)	JT	MAY	[pwg5100.3] §3.7
job-accounting-user-id-supported	boolean	JT	MAY	[pwg5100.3] §3.7
job-creation-attributes-supported	1setOf type2 keyword	PD	MAY	[ippsave] §7.1
job-error-sheet-default	collection	JT	MAY	[pwg5100.3] §3.7
job-error-sheet-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.9.5
job-error-sheet-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.9.1.1
job-error-sheet-when-supported	1setOf type2 keyword	-	MAY	[pwg5100.3] §3.9.2.1

⁵⁵ The Printer MUST support "document-format-details-supported" if it supports a container document format, such as application/zip or multipart/related.

⁵⁶ The Printer MUST support "document-format-details-implemented" if it supports a container document format, such as application/zip or multipart/related.

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
job-hold-until-default	type3 keyword name(MAX)	JT	MAY	[rfc2911] §4.2.2
job-hold-until-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[rfc2911] §4.2.2
job-impressions-supported	rangeOfInteger(0:MAX)	PD	MAY	[rfc2911] §4.4.34
job-k-octets-supported	rangeOfInteger(0:MAX)	PD	MAY	[rfc2911] §4.4.33
job-media-sheets-supported	rangeOfInteger(0:MAX)	PD	MAY	[rfc2911] §4.4.35
job-message-to-operator-default	text(MAX)	JT	MAY	[pwg5100.3] §3.12
job-message-to-operator-supported	boolean	JT	MAY	[pwg5100.3] §3.12
job-password-supported	integer(0:127)	PD	MAY	[ippsave] §7.2
job-password-encryption-supported	1setOf (type3 keyword name(MAX))	PD	MAY	[ippsave] §7.3
job-priority-default	integer(1:100)	JT	MAY	[rfc2911] §4.2.1
job-priority-supported	1setOf integer(1:100)	JT	MAY	[rfc2911] §4.2.1
job-settable-attributes-supported	1setOf type2 keyword	PD	MAY	[rfc3380] §6.2
job-sheet-message-default	text(MAX)		MAY	[pwg5100.3] §3.12
job-sheet-message-supported	boolean		MAY	[pwg5100.3] §3.12
job-sheets-col-default	collection	JT	MAY	[pwg5100.3] §3.11.3
job-sheets-col-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.11.4
job-sheets-default	type3 keyword name(MAX)	JT	MAY	[rfc2911] §4.2.3
job-sheets-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[rfc2911] §4.2.3
job-spooling-supported	type2 keyword	PD	MAY	[ippsave] §7.4
max-save-info-supported	integer(1:MAX)	PD	MAY	[ippsave] §7.5
max-stitching-locations-supported	integer(1:MAX)	PD	MAY	[pwg5100.3] §5.2
media-back-coating-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.13.10.2
media-col-database	1setOf collection	- ⁵⁷	MAY	[ippsave] §7.6
<i>any "media-col" member attribute</i>				
media-col-default	collection	JT	MAY	[pwg5100.3] §3.13.12
<i>any "media-col" member attribute</i>				
media-color-supported	1setOf type2 keyword	-	MAY	[pwg5100.3] §3.13.4.1
media-col-ready	1setOf collection	JT	MAY	[pwg5100.3] §3.13.13
<i>any "media-col" member attribute</i>				
media-col-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.13.14
media-default	type3 keyword name(MAX)	JT	MAY	[rfc2911] §4.2.11
media-front-coating-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.13.10.1
media-hole-count-supported	1setOf rangeOfInteger(0:MAX)	-	MAY	[pwg5100.3] §3.13.6.1
media-info-supported	boolean	-	MAY	[pwg5100.3] §3.13.3.1
media-input-tray-check-default	type3 keyword name(MAX)	JT	MAY	[pwg5100.3] §3.14
media-input-tray-check-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[pwg5100.3] §3.14
media-key-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.13.1.1
media-order-count-supported	1setOf rangeOfInteger(1:MAX)	-	MAY	[pwg5100.3] §3.13.7.1
media-pre-printed-supported	1setOf (type3 keyword	-	MAY	[pwg5100.3] §3.13.5.1

⁵⁷ The "media-col-database" attribute is not returned when the client requests 'all' or 'printer-description' attribute group because there MAY be a large number of values. Instead the client MUST query "media-col-database" explicitly in a Get-Printer-Attributes request.

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
	name(MAX))			
media-ready	1setOf (type3 keyword name(MAX))	JT	MAY	[rfc2911] §4.2.11
media-recycled-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.13.11.1
media-size-supported	1setOf collection	-	MAY	[pwg5100.3] §3.13.8.3
media-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[rfc2911] §4.2.11
media-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.13.2.1
media-weight-metric-supported	1setOf rangeOfInteger(1:MAX)	-	MAY	[pwg5100.3] §3.13.9.1
multiple-document-handling-default	type2 keyword	JT	MAY	[rfc2911] §4.2.4
multiple-document-handling-supported	1setOf type2 keyword	JT	MAY	[rfc2911] §4.2.4
multiple-document-jobs-supported	boolean	PD	MAY	[rfc2911] §4.4.16
multiple-operation-time-out	integer(1:MAX)	PD	MAY	[rfc2911] §4.4.31
natural-language-configured	naturalLanguage	PD	MUST	[rfc2911] §4.4.19
notify-attributes-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.4
notify-events-default	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.3
notify-events-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.3
notify-lease-duration-default	integer(0:67108863)	PD	MAY	[ntfy] §5.3.8
notify-lease-duration-supported	1setOf (integer(0: 67108863) rangeOfInteger(0:67108863))	PD	MAY	[ntfy] §5.3.8
notify-lease-expiration-time	integer(0:MAX)	PD	MAY	[ntfy] §5.4.3
notify-max-events-supported	integer(2:MAX)	PD	MAY	[ntfy] §5.3.3
notify-pull-method-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.2
notify-schemes-supported	1setOf uriScheme	PD	MAY	[ntfy] §5.3.1
number-up-default	integer(1:MAX)	JT	MAY	[rfc2911] §4.2.9
number-up-supported	1setOf (integer(1:MAX) rangeOfInteger(1:MAX))	JT	MAY	[rfc2911] §4.2.9
operations-supported	1setOf type2 enum	PD	MUST	[rfc2911] §4.4.15
orientation-requested-default	type2 enum	JT	MAY	[rfc2911] §4.2.10
orientation-requested-supported	1setOf type2 enum	JT	MAY	[rfc2911] §4.2.10
output-bin-default	type2 keyword name(MAX)	JT	MAY	[pwg5100.2] §2.1
output-bin-supported	1setOf (type2 keyword name(MAX))	JT	MAY	[pwg5100.2] §2.1
page-delivery-default	type2 keyword	JT	MAY	[pwg5100.3] §3.15
page-delivery-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.15
page-order-received-default	type2 keyword	JT	MAY	[pwg5100.3] §3.16
page-order-received-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.16
page-overrides-supported	1setOf type2 keyword	PD	MAY	[pwg5100.4] §5.2.9
page-ranges-supported	boolean	JT	MAY	[rfc2911] §4.2.7
pages-per-minute	integer(0:MAX)	PD	MAY	[rfc2911] §4.4.36
pages-per-minute-color	integer(0:MAX)	PD	MAY	[rfc2911] §4.4.37
pages-per-subset-supported	boolean	PD	MAY	[pwg5100.4] §5.3.2
parent-printers-supported	1setOf uri	PD	MAY	[adm-ops] §7.2
pdl-override-supported	type2 keyword	PD	MUST	[rfc2911] §4.4.28 [ippsave] §8.1
presentation-direction-number-up-default	type2 keyword	JT	MAY	[pwg5100.3] §3.17

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
presentation-direction-number-up-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.17
printer-current-time	dateTime	PD	MAY	[rfc2911] §4.4.30
printer-detailed-status-messages	1setOf text(MAX)	PD	MAY	[ippsave] §7.7
printer-driver-installer	uri	PD	MAY	[rfc2911] §4.4.8
printer-info	text(127)	PD	MAY	[rfc2911] §4.4.6
printer-is-accepting-jobs	boolean	PD	MUST	[rfc2911] §4.4.23
printer-location	text(127)	PD	MAY	[rfc2911] §4.4.5
printer-make-and-model	text(127)	PD	MAY	[rfc2911] §4.4.9
printer-message-date-time	dateTime	PD	MAY	[rfc3380] §6.5
printer-message-from-operator	text(127)	PD	MAY	[rfc2911] §4.4.25
printer-message-time	integer(MIN:MAX)	PD	MAY	[rfc3380] §6.4
printer-more-info	uri	PD	MAY	[rfc2911] §4.4.7
printer-more-info-manufacturer	uri	PD	MAY	[rfc2911] §4.4.10
printer-name	name(127)	PD	MUST	[rfc2911] §4.4.4
printer-notify-server-uri	uri	PD	MAY	[not-srv] §4.1
printer-resolution-default	resolution	JT	MAY	[rfc2911] §4.2.12
printer-resolution-supported	1setOf resolution	JT	MAY	[rfc2911] §4.2.12
printer-settable-attributes-supported	1setOf type2 keyword	PD	MAY	[rfc3380] §6.1
printer-state	type1 enum	PD	MUST	[rfc2911] §4.4.11
printer-state-change-date-time	dateTime	PD	MAY	[ntfy] §6.2
printer-state-change-time	integer(1:MAX)	PD	MAY	[ntfy] §6.1
printer-state-message	text(MAX)	PD	MAY	[rfc2911] §4.4.13
printer-state-reasons	1setOf type2 keyword	PD	MUST	[rfc2911] §4.4.12
printer-up-time	integer(1:MAX))	PD	MUST	[rfc2911] §4.4.29
printer-uri-supported	1setOf uri	PD	MUST	[rfc2911] §4.4.1
printer-xri-supported	1setOf collection	PD	MAY	[rfc3380] §6.6
xri-uri	uri	PD	MUST	[rfc3380] §6.6
xri-authentication	1setOf type2 keyword	PD	MUST	[rfc3380] §6.6
xri-security	1setOf type2 keyword	PD	MUST	[rfc3380] §6.6
print-quality-default	type2 enum	JT	MAY	[rfc2911] §4.2.13
print-quality-supported	1setOf type2 enum	JT	MAY	[rfc2911] §4.2.13
queued-job-count	integer(0:MAX)	PD	MUST	[rfc2911] §4.4.24
reference-uri-schemes-supported	1setOf uriScheme	PD	MAY	[rfc2911] §4.4.27
separator-sheets-default	collection	JT	MAY	[pwg5100.3] §3.18.3
separator-sheets-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.18.4
separator-sheets-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.18.1.1
sheet-collate-default	type2 keyword	JT	MAY	[rfc3381] §3.1
sheet-collate-supported	1setOf type2 keyword	JT	MAY	[rfc3381] §3.1
sides-default	type2 keyword	JT	MAY	[rfc2911] §4.2.8
sides-supported	1setOf type2 keyword	JT	MAY	[rfc2911] §4.2.8
stitching-locations-supported	1setOf (integer(0:MAX) rangeOfInteger(0:MAX))	-	MAY	[pwg5100.3] §3.2.2.3.1
stitching-offset-supported	1setOf (integer (0:MAX) rangeOfInteger(0:MAX))	-	MAY	[pwg5100.3] §3.2.2.2.1
stitching-reference-edge-supported	1setOf type2 keyword		MAY	[pwg5100.3] §3.2.2.1.1
subordinate-printers-supported	1setOf uri	PD	MAY	[adm-ops] §7.1
uri-authentication-supported	1setOf type2 keyword	PD	MUST	[rfc2911] §4.4.2
uri-security-supported	1setOf type2 keyword	PD	MUST	[rfc2911] §4.4.3

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
user-defined-values-supported	1setOf type2 keyword	PD	MAY	[pwg5100.3] §5.1
which-jobs-supported	1setOf type2 keyword	PD	MAY	[ippsave] §7.8
x-image-position-default	type2 keyword	JT	MAY	[pwg5100.3] §3.19.2
x-image-position-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.19.2
x-image-shift-default	integer(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.3
x-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.3
xri-authentication-supported	1setOf type2 keyword	PD	MAY	[rfc3380] §6.8
xri-security-supported	1setOf type2 keyword	PD	MAY	[rfc3380] §6.9
xri-uri-scheme-supported	1setOf uriScheme	PD	MAY	[rfc3380] §6.7
x-side1-image-shift-default	integer(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.4
x-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.4
x-side2-image-shift-default	integer(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.5
x-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.5
y-image-position-default	type2 keyword	JT	MAY	[pwg5100.3] §3.19.6
y-image-position-supported	1setOf type2 keyword	JT	MAY	[pwg5100.3] §3.19.6
y-image-shift-default	integer(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.7
y-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.7
y-side1-image-shift-default	integer(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.8
y-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.8
y-side2-image-shift-default	integer(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.9
y-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[pwg5100.3] §3.19.9

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

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

9.2 document-format-details-supported (1setOf type2 keyword)

This **OPTIONAL** Printer Description attribute lists the type2 keyword names of the member attributes of "document-format-details" that the Printer supports. If the Printer supports the "document-format-details" (1setOf collection) Operation attribute, the Printer **MUST** support this "document-format-details" (1setOf type2 keyword). Table 14 lists the type2 keywords defined for use in the "document-format-details-supported" Printer attribute.

Table 14 - Keyword values of "document-format-details-supported" Printer attribute

Type2 keyword values	Printer conformance
document-creator-application-name	MAY
document-creator-application-version	MAY
document-creator-os-name	MAY
document-creator-os-version	MAY
document-format	MUST
document-format-device-id	MAY
document-format-version	MUST
document-natural-language	MAY

9.3 document-format-details-implemented (1setOf collection)

This OPTIONAL Printer Description attribute lists the combinations of the values of the member attributes of "document-format-details" that the Printer has implemented, that is, that the Printer will accept if the client supplies the "document-format-details" Document Creation Operation attribute in combination with the "ipp-attribute-fidelity" Job Creation Operation attribute with a 'true' value. If the Printer supports the "document-format-details" Operation attribute, the Printer MUST support this attribute with the same member attributes that it supports for the "document-format-details" as indicated in the Printer's "document-format-details-supported" attribute. Each "xxx-implemented" member attribute is multi-valued with the same attribute syntax as the corresponding "document-format-details" attribute.

Table 15 - Member attributes of the "document-format-details-implemented" Printer attribute

<u>"document-format-details-implemented" member attributes</u>	<u>Reference</u>
<u>document-creator-application-name-implemented (1setOf name(MAX))</u>	6.1.2.1
<u>document-creator-application-version-implemented (1setOf text(127))</u>	6.1.2.2
<u>document-creator-os-name-implemented (1setOf name(40))</u>	6.1.2.3
<u>document-creator-os-version-implemented (1setOf text(40))</u>	6.1.2.4
<u>document-format-implemented (1setOf mimeType)</u>	6.1.2.5
<u>document-format-device-id-implemented (1setOf text(127))</u>	6.1.2.6
<u>document-format-version-implemented (1setOf text(127))</u>	6.1.2.7
<u>document-natural-language-implemented (1setOf naturalLanguage)</u>	6.1.2.8

Typically, there will only be one value for each "document-format" member attribute in each collection value. However, there can be more than one occurrence of a collection value with the same "document-format" member attribute value. See the following example which has two PostScript collection values.

Example: Suppose that a Printer implements a PostScript™ Level 3 interpreter which also interprets Level 1 and Level 2 documents and a PCL interpreter that interprets '5' and '5e' variants. Suppose that the Printer only has fonts for French and German for level 3. The value of "document-format-details-implemented" would be the following three collection values:

```
{{"document-format-implemented" = 'application/postscript', "document-format-version-implemented" = '1', '2', '3'},
{"document-format-implemented" = 'application/postscript', "document-format-version-implemented" = '3',
 document-natural-language}=en, fr, de},
{"document-format-implemented" = 'application/vnd.hp-PCL', "document-format-version-implemented" = '5', '5e'}}
```

9.4 printer-state-reasons (1setOf type2 keyword)

This Printer Description attribute augments the "printer-state" of the Printer with additional information about the state of the Printer. Table 16 lists all of the values defined for the "printer-state-reasons" Printer Description attribute.

Table 16 - Values of the "printer-state-reasons" Printer attribute

IPP Printer Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
printer-state-reasons	1setOf type2 keyword	MUST	[rfc2911] §4.4.12
	other	MAY	[rfc2911] §4.4.12
	none	MUST	[rfc2911] §4.4.12

IPP Printer Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
	connecting-to-device	MAY	[rfc2911] §4.4.12
	cover-open	MAY	[rfc2911] §4.4.12
	deactivated	MAY	[adm-ops] §8.2
	developer-empty	MAY	[rfc2911] §4.4.12
	developer-low	MAY	[rfc2911] §4.4.12
	door-open	MAY	[rfc2911] §4.4.12
	fuser-over-temp	MAY	[rfc2911] §4.4.12
	fuser-under-temp	MAY	[rfc2911] §4.4.12
	hold-new-jobs	MAY	[adm-ops] §8.1
	input-tray-missing	MAY	[rfc2911] §4.4.12
	interlock-open	MAY	[rfc2911] §4.4.12
	interpreter-resource-unavailable	MAY	[rfc2911] §4.4.12
	marker-supply-empty	MAY	[rfc2911] §4.4.12
	marker-supply-low	MAY	[rfc2911] §4.4.12
	marker-waste-almost-full	MAY	[rfc2911] §4.4.12
	marker-waste-full	MAY	[rfc2911] §4.4.12
	media-empty	MAY	[rfc2911] §4.4.12
	media-jam	MAY	[rfc2911] §4.4.12
	media-low	MAY	[rfc2911] §4.4.12
	media-needed	MAY	[rfc2911] §4.4.12
	moving-to-paused	CMUST ⁵⁸	[rfc2911] §4.4.12
	opc-life-over	MAY	[rfc2911] §4.4.12
	opc-near-eol	MAY	[rfc2911] §4.4.12
	output-area-almost-full	MAY	[rfc2911] §4.4.12
	output-area-full	MAY	[rfc2911] §4.4.12
	output-tray-missing	MAY	[rfc2911] §4.4.12
	paused	CMUST ⁵⁹	[rfc2911] §4.4.12
	shutdown	MAY	[rfc2911] §4.4.12
	spool-area-full	SHOULD	[rfc2911] §4.4.12
	stopped-partly	MAY	[rfc2911] §4.4.12
	stopping	MAY	[rfc2911] §4.4.12
	timed-out	MAY	[rfc2911] §4.4.12
	toner-empty	MAY	[rfc2911] §4.4.12
	toner-low	MAY	[rfc2911] §4.4.12

2263

2264 This description is taken from [rfc2911] with additions from other IPP extension documents:

2265 This REQUIRED Printer attribute supplies additional detail about the device's state. Some of these value
 2266 definitions indicate conformance requirements; the rest are OPTIONAL.

2267 Each keyword value MAY have a suffix to indicate its level of severity. The three levels are: report (least severe),
 2268 warning, and error (most severe).

⁵⁸ The 'moving-to-paused' value MUST be supported if the Pause-Printer operation is supported and it takes significant time to move to paused.

⁵⁹ The 'paused' value MUST be supported if the Pause-Printer operation is supported.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- 2312 **'marker-supply-empty'**: The device is out of at least one marker supply. (e.g. toner, ink, ribbon)
- 2313 **'marker-supply-low'**: The device is low on at least one marker supply. (e.g. toner, ink, ribbon)
- 2314 **'marker-waste-almost-full'**: The device marker supply waste receptacle is almost full.
- 2315 **'marker-waste-full'**: The device marker supply waste receptacle is full.
- 2316 **'media-empty'**: At least one input tray is empty.
- 2317 **'media-jam'**: The device has a media jam.
- 2318 **'media-low'**: At least one input tray is low on media.
- 2319 **'media-needed'**: A tray has run out of media.
- 2320 **'moving-to-paused'**: Someone has paused the Printer object using the Pause-Printer operation (see
- 2321 [rfc2911] section 3.2.7) or other means, but the device(s) are taking an appreciable time to stop.
- 2322 Later, when all output has stopped, the "printer-state" becomes 'stopped', and the 'paused' value
- 2323 replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute. This value MUST be
- 2324 supported, if the Pause-Printer operation is supported and the implementation takes significant time
- 2325 to pause a device in certain circumstances.
- 2326 **'opc-life-over'**: The optical photo conductor is no longer functioning.
- 2327 **'opc-near-eol'**: The optical photo conductor is near end of life.
- 2328 **'output-area-almost-full'**: One or more output area is almost full (e.g. tray, stacker, collator).
- 2329 **'output-area-full'**: One or more output area is full. (e.g. tray, stacker, collator)
- 2330 **'output-tray-missing'**: One or more output trays are not in the device
- 2331 **'paused'**: Someone has paused the Printer object using the Pause-Printer operation (see [rfc2911] section
- 2332 3.2.7) or other means and the Printer object's "printer-state" is 'stopped'. In this state, a Printer
- 2333 MUST NOT produce printed output, but it MUST perform other operations requested by a client. If a
- 2334 Printer had been printing a job when the Printer was paused, the Printer MUST resume printing that
- 2335 job when the Printer is no longer paused and leave no evidence in the printed output of such a
- 2336 pause. This value MUST be supported, if the Pause-Printer operation is supported.
- 2337 **'shutdown'**: Someone has removed a Printer object from service, and the device may be powered down or
- 2338 physically removed. In this state, a Printer object MUST NOT produce printed output, and unless the
- 2339 Printer object is realized by a print server that is still active, the Printer object MUST perform no other
- 2340 operations requested by a client, including returning this value. If a Printer object had been printing a
- 2341 job when it was shutdown, the Printer ~~NEED NOT~~ MAY resume printing that job when the Printer is
- 2342 no longer shutdown. If the Printer resumes printing such a job, it ~~may~~ MAY leave evidence in the
- 2343 printed output of such a shutdown, e.g. the part printed before the shutdown ~~may~~ MAY be printed a
- 2344 second time after the shutdown.
- 2345 **'spool-area-full'**: The limit of persistent storage allocated for spooling has been reached. The Printer is
- 2346 temporarily unable to accept more jobs. The Printer will remove this value when it is able to accept
- 2347 more jobs. This value SHOULD be used by a non-spooling Printer that only accepts one or a small
- 2348 number jobs at a time or a spooling Printer that has filled the spool space.
- 2349 **'stopped-partly'**: When a Printer object controls more than one output device, this reason indicates that one
- 2350 or more output devices are stopped. If the reason is a report, fewer than half of the output devices
- 2351 are stopped. If the reason is a warning, fewer than all of the output devices are stopped.
- 2352 **'stopping'**: The Printer object is in the process of stopping the device and will be stopped in a while. When
- 2353 the device is stopped, the Printer object will change the Printer object's state to 'stopped'. The
- 2354 'stopping-warning' reason is never an error, even for a Printer with a single output device. When an
- 2355 output-device ceases accepting jobs, the Printer will have this reason while the output device
- 2356 completes printing.

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

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

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

10 New Values for Existing Printer Description Attributes

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

10.1 operations-supported (1setOf type2 enum)

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

Table 17 – Operation-id assignments

Value	Operation Name	Reference
0x000F	Close-Job	[this-spec] §4.3
0x0033	Cancel-Document	[this-spec] §3.8
0x0034	Get-Document-Attributes	[this-spec] §3.5
0x0035	Get-Documents	[this-spec] §3.6
0x0036	Delete-Document	[this-spec] §3.9
0x0037	Set-Document-Attributes	[this-spec] §3.7
0x0039	Create-Document	[this-spec] §3.1
0x003A	Send-Document-Data	[this-spec] §3.2

11 Encodings of Additional Attribute Tags

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

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

The following table specifies the values for the delimiter tag:

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

12 Conformance Requirements

This section specifies the conformance requirements for Printers and clients.

12.1 Printer conformance requirements

In order to conform to this specification, a Printer:

1. MUST meet the conformance requirements for Printers specified in [rfc2911].
2. MUST support the Create-Job operation as specified in [rfc2911], even though [rfc2911] does not REQUIRE a Printer ~~NEED NOT to~~ support the Create-Job operation in order to conform to [rfc2911].
3. MUST support the Document operations that section 3 REQUIRES a Printer to support.
4. MUST support the Close-Job Job operation as defined in section 4.3.
5. MUST support the Operation attributes in the Send-Document operation and, if supported, the Send-URI operation that section 6 REQUIRES a Printer to support.
6. MUST support the "document-format-details" Operation attribute (section 6.1.2) and the corresponding "document-format-details" Document Description attribute (section 8.2.9) along with the "document-format-details-supported" (section 9.2) and "document-format-details-implemented (section 9.3) Printer attributes, if the Printer supports a container document format, such as application/zip or multipart/related MIME types.
7. MAY support any of the Document Template attributes in Document Creation operations as indicated in section 7 and MUST NOT support them for contexts for where they are not defined as indicated in the Table 10 with an "n".
8. MUST support the Document Description attributes that section 8 REQUIRES a Printer to support.
9. MUST support the Printer attributes that section 8.2.1 REQUIRES a Printer to support.
10. MUST support the values of Printer Descriptions attribute that section 10 REQUIRES a Printer to support.

12.2 Client conformance requirements

In order to conform to this specification, a client:

1. MUST meet the conformance requirements for clients specified in [rfc2911]
2. MAY support any of the Document operations defined in section 3.
3. MUST supply the Operation attributes that section 6 REQUIRES a client to supply in operation requests.
4. MUST supply any Document Template attributes in the format that section 7 REQUIRES a client to supply in Document Creation operations and MUST NOT support them for contexts for where they are not defined as indicated in the Table 10 with an "n".
5. SHOULD support any of the Document Description attributes that section 8 REQUIRES a Printer to support.
6. MAY support any of the Printer attributes listed in section 8.2.1.
7. MAY support any of the values of the Printer Descriptions attributes in section 10.

13 Normative References

Note: The references in the body of this IEEE-ISTO document use the more reader-friendly mnemonic symbols below, rather than the RFC number (except for [rfc2910] and [rfc2911]). IETF RFCs and IANA registrations require using the RFC numbers in the body of the document for references.

[adm-ops]

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

[~~col~~rfc3382]

deBry, R., Hastings, T., Herriot, R., Ocke, K., and P. Zehler, "Internet Printing Protocol (IPP): The 'collection' attribute syntax", ~~<draft-ietf-ipp-collection-05.txt>, work in progress~~ RFC 3382, July 17, 2001 ~~September 2002~~.

[ippsave] Hastings, T., and D. Fullman, "Internet Printing Protocol (IPP): Production Printing Attributes - Set 2", to become a PWG IEEE-ISTO standard, work in progress, August 21, 2002, ftp://ftp.pwg.org/pub/pwg/ipp/new_PPE/pwg-ipp-pwg5100.3-set2-draft-v0_1-020821.pdf.

[pwg5100.1]

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

[get-method]

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

[rfc3381]

Hastings, T., Lewis, H., and R. Bergman, "Internet Printing Protocol (IPP): Job Progress Attributes", RFC3381, September 2002.

[pwg5101.1]

IEEE-ISTO PWG 5101.1-2002, "The Printer Working Group Standard for Media Standardized Names", 26 February 2002, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5101.1.pdf>, .doc, .rtf

[not-srv]

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

[ntfy]

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

[pwg5100.2]

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

- 2440 [pwg5100.4]
2441 Herriot, R., Ocke, K., "Internet Printing Protocol (IPP): Override Attributes for Documents and Pages", IEEE-
2442 ISTO 5100.4-2001, February 7, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.4.pdf>.
- 2443 [pwg5100.3]
2444 Ocke, K., Hastings, T., "Internet Printing Protocol (IPP): Production Printing Attributes - Set1", IEEE-ISTO
2445 5100.3-2001, February 12, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf>.
- 2446 [rfc2911]
2447 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.1: Model and
2448 Semantics", RFC 2911, September 2000.
- 2449 [rfc3380]
2450 Hastings, T., Herriot, R., Kugler, C., and H. Lewis, "Internet Printing Protocol (IPP): Job and Printer Set
2451 Operations", RFC 3380, September 2002.
- 2452 [upnp]
2453 Microsoft, "Basic *PrintBasic:1.0* Service Template Version 1.01 For Universal Plug and Play Version 1.0"

2454 14 Informative References

- 2455 [fsg-jt]
2456 Free Software Group, Open Printing Job Ticket API, Visit: <http://www.freestandards.org/openprinting/>
- 2457 [pwg-psi]
2458 "Print Service Interface (PSI)", work in progress to become a PWG IEEE-ISTO standard. Visit
2459 <http://www.pwg.org/>.
- 2460 [pwg-sm]
2461 Zehler, P., and S. Albright, "PWG Semantic Model", work in progress to become a PWG IEEE-ISTO standard,
2462 version 0.11, September 27, 2002. <ftp://ftp.pwg.org/pub/pwg/Semantic-Model/PWG-Semantic-Model.pdf>
- 2463 [rfc2565]
2464 Herriot, R., Butler, S., Moore, P., and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport",
2465 RFC 2565, April 1999.
- 2466 [rfc2566]
2467 R. deBry, T. Hastings, R. Herriot, S. Isaacson, and P. Powell, "Internet Printing Protocol/1.0: Model and
2468 Semantics", RFC 2566, April 1999.
- 2469 [rfc2567]
2470 Wright, D., "Design Goals for an Internet Printing Protocol", RFC 2567, April 1999.
- 2471 [rfc2568]
2472 Zilles, S., "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol", RFC 2568,
2473 April 1999.

- 2474 [rfc2569]
 2475 Herriot, R., Hastings, T., Jacobs, N., Martin, J., "Mapping between LPD and IPP Protocols", RFC 2569, April
 2476 1999.
- 2477 [rfc2616]
 2478 R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee, "Hypertext Transfer
 2479 Protocol - HTTP/1.1", RFC 2616, June 1999.
- 2480 [rfc3196]
 2481 Hastings, T., Manros, C., Zehler, P., Kugler, C., and H. Holst, "Internet Printing Protocol/1.1: Implementer's
 2482 Guide", RFC 3196, November 2001.
- 2483 [rfc3239]
 2484 Kugler, C., Lewis, H. and T. Hastings, "Internet Printing Protocol (IPP): Requirements for Job, Printer, and
 2485 Device Administrative Operations", RFC 3239, February 2002.

2486 15 IANA Considerations

2487 This section contains the registration information for IANA to add to the various IPP Registries according to the
 2488 procedures defined in RFC 2911 [rfc2911] section 6 to cover the definitions in this document. The resulting
 2489 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations> registry.

2490 *Note to the RFC Editor: Replace the References below to [this spec] with the RFC number for the appropriate*
 2491 *document, so that it accurately reflects the content of the information for the IANA Registry.*

2492 15.1 Attribute Registrations

2493 The following table lists all the attributes defined in this specification. These are to be registered according to the
 2494 procedures in RFC 2911 [rfc2911] section 6.2. If the attribute has a separate sub-section definition in this
 2495 specification, that sub-section is listed as the Reference. This specification lists most Job Template attributes as also
 2496 being Document Template attributes. However, the definitions of these Document Template attributes are not
 2497 duplicated in this specification. Instead, the Reference column in this sub-section indicates Section 7 which contains
 2498 a table of all Job Template and corresponding Document Template attributes (including dropping the "job-" prefix).
 2499 This table contains the reference in another specification that completely defines each attribute. These Document
 2500 Template attributes will also be added to the IANA IPP Registry under the Document Template attributes with a
 2501 reference to this specification and Section 7.

Attribute Name (attribute syntax)	Reference	Section
-----	-----	-----
Document Description attributes:		
attributes-charset (charset)	[this spec]	8.2.1
attributes-natural-language (naturalLanguage)	[this spec]	8.2.2
compression (type3 keyword)	[this spec]	8.2.3
current-page-order (type2 keyword)	[this spec]	8.2.4
date-time-at-completed (dateTime)	[this spec]	8.2.5
date-time-at-creation (dateTime)	[this spec]	8.2.6
date-time-at-processing (dateTime)	[this spec]	8.2.7
detailed-status-message (1setOf text (MAX))	[this spec]	8.2.25
document-access-errors (1setOf text (MAX))	[this spec]	8.2.26

2515	document-format (mimeType)	[this spec]	8.2.8
2516	document- format-details container-summary (collection)	[this spec]	8.2.9
2517			
2518	document-creator-application-name (name(MAX))	[this spec]	6.1.2.1
2519	document-creator-application-version (text(127))		
2520		[this spec]	6.1.2.2
2521	document-creator-os-name (name(40))	[this spec]	6.1.2.3
2522	document-creator-os-version (text(40))	[this spec]	6.1.2.4
2523	document-format (mimeType)	[this spec]	6.1.2.5
2524	document-format-device-id (text(127))	[this spec]	6.1.2.6
2525	document-format-version (text(127))	[this spec]	6.1.2.7
2526	document-natural-language (naturalLanguage)	[this spec]	6.1.2.8
2527	document-creator-application-name (name(MAX))	[this spec]	6.1.2.1
2528	document-creator-application-version (text(127))	[this spec]	6.1.2.2
2529	document-creator-os-name (name(40))	[this spec]	6.1.2.3
2530	document-creator-os-version (text(40))	[this spec]	6.1.2.4
2531	document-format-details-detected (1setOf collection)		
2532		[this spec]	8.2.10
2533	document-format-detected (mimeType)	[this spec]	8.2.11
2534	document-format-device-id (text(127))	[this spec]	6.1.2.6
2535	document-format-version (text(127))	[this spec]	6.1.2.7
2536	document-id-uri (uri)	[this spec]	8.2.12
2537	document-job-id (integer(1:MAX))	[this spec]	8.2.13
2538	document-job-printer-uri (uri)	[this spec]	8.2.14
2539	document-job-uri (uri)	[this spec]	8.2.15
2540	document-message (text(MAX))	[this spec]	8.2.16
2541	document-name (name(MAX))	[this spec]	8.2.17
2542	document-natural-language (naturalLanguage)	[this spec]	8.2.18
2543	document-number (integer(0:MAX))	[this spec]	8.2.19
2544	document-state (type1 enum)	[this spec]	8.2.20
2545	document-state-message (text(MAX))	[this spec]	8.2.21
2546	document-state-reasons (1setOf type2 keyword)	[this spec]	8.2.22
2547	document-uri (uri)	[this spec]	8.2.23
2548	impressions (integer(0:MAX))	[this spec]	8.2.27
2549	impressions-completed (integer(0:MAX))	[this spec]	8.2.28
2550	impressions-completed-current-copy (integer(0:MAX))		
2551		[this spec]	8.2.24
2552	k-octets (integer(0:MAX))	[this spec]	8.2.29
2553	k-octets-processed (integer(0:MAX))	[this spec]	8.2.30
2554	last-document (boolean)	[this spec]	8.2.36
2555	media-sheets (integer(0:MAX))	[this spec]	8.2.31
2556	media-sheets-completed (integer(0:MAX))	[this spec]	8.2.32
2557	more-info (uri)	[this spec]	8.2.33
2558	output-device-assigned (name(127))	[this spec]	8.2.37
2559	printer-up-time (integer(1:MAX))	[this spec]	8.2.34
2560	sheet-completed-copy-number (integer(0:MAX))	[this spec]	8.2.38

2561	time-at-completed (integer (MIN:MAX))	[this spec]	8.2.39
2562	time-at-creation (integer (MIN:MAX))	[this spec]	8.2.40
2563	time-at-processing (integer (MIN:MAX))	[this spec]	8.2.41
2564	warnings-count (integer(0:MAX))	[this spec]	8.2.35
2565			
2566			
2567	Document Templates attributes:		
2568	ISSUE 15: TBD ACTION (Tom) - Need to add the xxx-default and xxx-		
2569	supported for each.		
2570	copies (integer(1:MAX))	[this spec]	7
2571	cover-back (collection)	[this spec]	7
2572	cover-type (type2 keyword)	[this spec]	7
2573	media (type3 keyword name(MAX))	[this spec]	7
2574	media-col (collection)	[this spec]	7
2575	cover-front (collection)	[this spec]	7
2576	cover-type (type2 keyword)	[this spec]	7
2577	media (type3 keyword name(MAX))	[this spec]	7
2578	media-col (collection)	[this spec]	7
2579	feed-orientation (type3 keyword)	[this spec]	7
2580	finishings (1setOf type2 enum)	[this spec]	7
2581	finishings-col (collection)	[this spec]	7
2582	finishing-template (name(MAX))	[this spec]	7
2583	stitching (collection)	[this spec]	7
2584	stitching-locations (1setOf integer(0:MAX))	[this spec]	7
2585	stitching-offset (integer (0:MAX))	[this spec]	7
2586	stitching-reference-edge (type2 keyword)	[this spec]	7
2587	font-name-requested (name(MAX))	[this spec]	7
2588	font-size-requested (integer(1:MAX))	[this spec]	7
2589	force-front-side (1setOf integer(1:MAX))	[this spec]	7
2590	imposition-template (type2 keyword name(MAX))	[this spec]	7
2591	insert-sheet (1setOf collection)	[this spec]	7
2592	insert-after-page-number (integer(0:MAX))	[this spec]	7
2593	insert-count (integer(0:MAX))	[this spec]	7
2594	media (type3 keyword name(MAX))	[this spec]	7
2595	media-col (collection)	[this spec]	7
2596	media (type3 keyword name(MAX))	[this spec]	7
2597	media-col (collection)	[this spec]	7
2598	media-back-coating (type3 keyword name(MAX))	[this spec]	7
2599	media-color (type3 keyword name(MAX))	[this spec]	7
2600	media-front-coating (type3 keyword name(MAX))	[this spec]	7
2601	media-hole-count (integer(0:MAX))	[this spec]	7
2602	media-info (text(255))	[this spec]	7
2603	media-key (type3 keyword name(MAX))	[this spec]	7
2604	media-order-count (integer(1:MAX))	[this spec]	7
2605	media-preprinted (type3 keyword name(MAX))	[this spec]	7
2606	media-recycled (type3 keyword name(MAX))	[this spec]	7

2607	media-size (collection)	[this spec]	7
2608	x-dimension (integer(0:MAX))	[this spec]	7
2609	y-dimension (integer(0:MAX))	[this spec]	7
2610	media-type (type3 keyword name(MAX))	[this spec]	7
2611	media-weight-metric (integer(0:MAX))	[this spec]	7
2612	media-input-tray-check (type3 keyword name(MAX))		
2613		[this spec]	7
2614	number-up (integer(1:MAX))	[this spec]	7
2615	orientation-requested (type2 enum)	[this spec]	7
2616	output-bin (type2 keyword name(MAX))	[this spec]	7
2617	page-delivery (type2 keyword)	[this spec]	7
2618	page-order-received (type2 keyword)	[this spec]	7
2619	page-overrides (1setOf collection)	[this spec]	7
2620	document-copies (1setOf rangeOfInteger(MAX))	[this spec]	7
2621	input-documents (1setOf rangeOfInteger(MAX))	[this spec]	7
2622	output-documents (1setOf rangeOfInteger(MAX))	[this spec]	7
2623	pages (1setOf rangeOfInteger(MAX))	[this spec]	7
2624	<any other Job Template attributes that affect pages,		
2625	such as media or media-col>		
2626	page-ranges (1setOf rangeOfInteger(1:MAX))	[this spec]	7
2627	pages-per-subset (1setOf integer(1:MAX))	[this spec]	7
2628	presentation-direction-number-up (type2 keyword)	[this spec]	7
2629	print-quality (type2 enum)	[this spec]	7
2630	printer-resolution (resolution)	[this spec]	7
2631	separator-sheets (collection)	[this spec]	7
2632	media (type3 keyword name(MAX))	[this spec]	7
2633	media-col (collection)	[this spec]	7
2634	separator-sheets-type (type3 keyword name(MAX))		
2635		[this spec]	7
2636	sheet-collate (type2 keyword)	[this spec]	7
2637	sides (type2 keyword)	[this spec]	7
2638	x-image-position (type2 keyword)	[this spec]	7
2639	x-image-shift (integer(MIN:MAX))	[this spec]	7
2640	x-side1-image-shift (integer(MIN:MAX))	[this spec]	7
2641	x-side2-image-shift (integer(MIN:MAX))	[this spec]	7
2642	y-image-position (type2 keyword)	[this spec]	7
2643	y-image-shift (integer(MIN:MAX))	[this spec]	7
2644	y-side1-image-shift (integer(MIN:MAX))	[this spec]	7
2645	y-side2-image-shift (integer(MIN:MAX))	[this spec]	7
2646			
2647			
2648	Job Template attributes:		
2649	ISSUE 16: TBD ACTION (Tom) - Need to add the xxx-default and xxx-		
2650	supported.		
2651	job-copies (integer(1:MAX))	[this spec]	7.1.1
2652	job-cover-back (collection)	[this spec]	7.1.2

```

2653     <member attributes are the same as "cover-back">
2654 job-cover-front (collection) [this spec] 7.1.3
2655     <member attributes are the same as "cover-front">
2656 job-finishings (1setOf type2 enum) [this spec] 7.1.4
2657 job-finishings-col (1setOf collection) [this spec] 7.1.5
2658     <member attributes are the same as "finishings-col">
2659 media-size-name (type3 keyword | name(MAX)) [this spec] 7.1.6
2660 media-type (type3 keyword | name(MAX)) [this spec] 7.1.7
2661
2662
2663 Printer Description attributes:
2664 document-creation-attributes-supported (1setOf type2 keyword)
2665 [this spec] 9.1
2666
2667
2668 Operation attributes:
2669 document-message (text(MAX)) [this spec] 3.8.1.1
2670 job-mandatory-attributes (1setOf type2 keyword) [this spec] 4.4.2
2671 last-document (boolean) [this spec] 3.1.1.1+
2672

```

15.2 Keyword attribute values

ISSUE 17: TBD - ACTION (Tom) - Need to list the keyword attribute values. Do so by reference to the values registered for corresponding attributes.

15.3 Enum Attribute Values

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

Value	Name	Reference	Section:
-----	-----	-----	-----
document-state (type1 enum)		[this spec]	8.2.20
3 pending		[this spec]	8.2.20
5 processing		[this spec]	8.2.20
7 canceled		[this spec]	8.2.20
8 aborted		[this spec]	8.2.20
9 completed		[this spec]	8.2.20
job-finishings (1setOf type2 enum)		[this spec]	7.1.4
<enum values are the same as "finishings">			
operations-supported (type2 enum)		[rfc2911]	4.4.15
0x000F Close-Job		[this spec]	4.3
0x0033 Cancel-Document		[this spec]	3.8
0x0034 Get-Document-Attributes		[this spec]	3.5

2696	0x0035	Get-Documents	[this spec]	3.6
2697	0x0036	Delete-Document	[this spec]	3.9
2698	0x0037	Set-Document-Attributes	[this spec]	3.7
2699	0x0039	Create-Document	[this spec]	3.1
2700	0x003A	Send- Document -Data	<u> </u>	[this spec]
2701	3.2			
2702				

2703 **15.4 Operations**

2704 The following table lists all of the operations defined in this document. These are to be registered according to the
2705 procedures in RFC 2911 [rfc2911] section 6.4.

2706				
2707	Operations		Reference	Section
2708	-----		-----	-----
2709	Cancel-Document		[this spec]	3.8
2710	Close-Job		[this spec]	4.3
2711	Create-Document		[this spec]	3.1
2712	Delete-Document		[this spec]	3.9
2713	Get-Document-Attributes		[this spec]	3.5
2714	Get-Documents		[this spec]	3.6
2715	Send- Document -Data		<u> </u>	[this spec]
2716	3.2			
2717	Set-Document-Attributes		[this spec]	3.7
2718				

2719 **15.5 Attribute Group tags**

2720 The following table lists all the attribute group tags defined in this document. These are to be registered according to
2721 the procedures in RFC 2911 [rfc2911] section 6.5.

2722	Value	Name		Reference	Section
2723	-----	-----		-----	-----
2724	0x09	document-attributes-tag		[this spec]	11
2725					

2726 **16 Internationalization Considerations**

2727 The internationalization considerations for this extension for handling the Document object are the same as for
2728 handling the Job object in [rfc2911].

2729 **17 Security Considerations**

2730 The Document object should provide no more increased security considerations than the Job object. The Printer
2731 MUST provide the same access control for Document objects as for Job objects.

18 Contributors

Don Fullman, Xerox
Ira McDonald, High North

19 Acknowledgments

20 Author's Address

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

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

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

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

21 Appendix A: Document operations compared to Job operations

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

Table 18 compares the Job and Document operations. The two Conf. columns indicate the conformance requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ" in the Document Conformance column means if the Document object is supported. Whether a Document operation is a method on the Job object or the Document object depends on the modeling regime and is not an essential part of the semantics described here, since these semantics are intended to apply to both to object-oriented and object-based protocols, APIs, and implementations.

Table 18 - Document operations compared to Job operations

Job operations	Job Conf.	Document operations	Doc Conf
Cancel-Current-Job	OPT	<i>N/A, can only cancel a document explicitly by document number and explicit job id.</i>	OPT
Cancel-Job	REQ	Cancel-Document	REQ
Create-Job	OPT	Create-Document	REQ
Get-Job-Attributes	REQ	Get-Document-Attributes	REQ
Get-Jobs	REQ	Get-Documents	REQ
Hold-Job		<i>N/A, can only hold an entire job.</i>	

Job operations	Job Conf.	Document operations	Doc Conf
Print-Job	REQ	Send-Document (existing operation - see [rfc2911] with an additional Document attributes group defined in section 3.3)	REQ ⁶⁰
Print-URI	OPT	Send-URI (existing operation - see [rfc2911] with an additional Document attributes group defined in section 3.4)	OPT
N/A		Send-Document-Data	REQ
Promote-Job	OPT	N/A, can only promote an entire job	
Purge-Jobs	OPT	Delete-Document	OPT
Release-Held-New-Jobs	OPT	N/A, can only release entire jobs	
Release-Job	OPT	N/A, can only release an entire job	
Reprocess-Job	OPT	N/A, can only reprocess an entire job	
Restart-Job	OPT	N/A, can only restart an entire job	
Resume-Job	OPT	N/A, can only resume an entire job	
Schedule-Job-After	OPT	N/A, can only schedule an entire job	
Set-Job-Attributes	OPT	Set-Document-Attributes	OPT
Suspend-Current-Job	OPT	N/A, can only suspend an entire job in order to run another one	
Validate-Job	REQ	N/A, use Validate-Job to validate a single document or use Create-Job with "ipp-attribute-fidelity" = 'true' and Create-Document request to validate a multi-document job.	REQ

22 Annex B: Change Log (informative)

The following summaries of the changes in chronological order:

Version 0.3, 9 September 2002:

1. Reformatted as an IEEE-ISTO standard and added the usual sections for a standard.
2. Added "original-requesting-user-name" Operation attribute to Table 6.
3. Added "y" to "output-bin" in Table 9 so it MAY be a Document Template attribute.
4. Clarified the * and in Table 10 - Job and Document Description attributes.
5. Added section 8.2.1 all of the Printer attributes defined In any IPP standard.
6. Allocated operation-id enums in section 10 to the 7 Document operations.
7. Added the conformance section 12
8. Completed the IANA Considerations section 15.

Version 0.4, 14 October 2002:

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

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

⁶⁰ The Send-Document operation is OPTIONAL for a Printer to conform to [rfc2911], but is REQUIRED for a Printer to conform to this Document object specification.

1. Fixed the title to say "Proposed Standard" and removed the 5100.n number until the document is approved by the PWG Last Call to progress as a Draft Standard.
2. Changed Cancel-Document from OPTIONAL to REQUIRED.
3. Added Table 3 and Table 4 to show the request and response signatures of the Document Creation and Validation operations.
4. Renamed the "document-number" Operation attribute to "input-document-number", to agree with [pwg5100.4] and because the Document object is really the Input Document (as opposed to the Output Document). The Printer copies this value to the Document's "document-number" Document Description attribute.
5. Clarified that the Printer MUST reject a Create-Document request if the "document-number" already exists.
6. Clarified that the client cannot supply Subscription attributes in any Document Creation requests.
7. Added "document-message" (text(127)) Operation attribute to the Document Creation requests to go with the "document-message" agreement (see point #15).
8. Fixed Create-Document response to return Job status attributes in Group 3 and Document status attributes in Group 4.
9. Required the Printer to return just the "document-number" and "document-id-uri" (uri) Document Description attribute in a Document Creation response.
10. Added the "document-mandatory-attributes" Operation attribute.
11. Separated the returned Job status attributes and the Document status attributes into two groups, one Job Attributes and the other Document attributes.
12. Allowed the client to supply or omit the "document-uri" Operation attribute in a Validate-Job request.
13. Clarified that the "document-number" Operation attribute MUST follow the Printer and Job Target in Group 1.
14. Changed the Get-Documents response when there is no "requested-attributes" to simply "document-number" and "document-id-uri" to be parallel with the Get-Jobs operation.
15. Changed the "message" Operation attribute in Cancel-Document and Cancel-Current-Document to "document-message" Operation attribute which the Printer copies to the "document-message" Document Description attribute for use both by the user and the operator.
16. Clarified that the "document-state-reasons" values never affect Job scheduling.
17. Made Job Level - page override programming higher precedence than Document level Document object attributes.
18. Clarified PDL document data precedence and its relationship to Job Template attributes ending with "-requested".
19. In Table 6, flagged the Operation attributes that the Printer copies to the corresponding Job and Document Description attributes in Document Creations operations.
20. Fixed "job-mandatory-attributes" Operation attribute so its only supplied at Job level, now that we have "document-mandatory-attributes" Operation attribute.
21. Clarified that "ipp-attribute-fidelity" can be supplied at both the Job and Document Levels and how it interacts with "job-mandatory-attributes" and "document-mandatory-attributes" Operation attributes.
22. Disallowed "output-bin" at the Document Level (and Page Level). It subsets the single stream of Input-Pages across Input-Documents.
23. Disallowed "page-ranges" at the Page Level.
24. Disallowed "pages-per-subset" at the Document level (and Page Level).
25. Disallowed "separator-sheets" at the Page Level.
26. Added "document-printer-up-time" Document Description attribute for Get-Documents and Get-Documents-Attributes responses that the Printer MUST support, just like "job-printer-up-time" Operation attribute for Get-Jobs and Get-Job-Attributes.

Version 0.6, 13 January 2003, agreements from New Orleans October PWG meeting and subsequent telecons:

1. Deleted the Cancel-Current-Document and Validate-Documents operations.
2. Deprecated the "input-document-number" Operation attribute from the Document Creation operations.
3. Deleted the "document-mandatory-attributes" Operation attribute to align with the PWG Semantic model. So both specifications have only the "job-mandatory-attributes" Operation attribute. The client can only supply at the Job Level. The Document Level inherits from the Job Level.
4. Increased "document-message" Operation attribute length from 127 to MAX (1023) octets.
5. Clarified that "ipp-attribute-fidelity" and "job-mandatory-attributes" can only be supplied at the Job Level; the Document level inherits their values.

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

Version 0.76, 14 March 2003, agreements from the Maui January PWG meeting and subsequent telecons:

1. Fixed up the file naming and numbering to agree with the latest PWG process agreements.
2. Updated the Abstract and Introduction to reflect the additions.
3. Fixed cross references to use the standard numbers as agreed, rather than mnemonic references.
4. Deprecated the "input-document-number" Operation attribute ([pwg5100.4] section 9.2.1 in the Create-Document Requests
5. Renamed Send-Data to Send-Document-Data to more clearly reflect the scope of the operation.
6. Added the REQUIRED Close-Job operation to close a job that contains Document objects. Using "last-document" still works too and the Printer MUST support both ways.
7. Retained the idea that the Printer MUST NOT copy down any attributes supplied in the Job Creation operation to the Document object as observable in Document object query responses. Document objects inherit that effect from the Job object.
8. Added the following operation and Document Description attributes: document-container-summary (collection), document-creator-application-name (name(MAX)), document-creator-application-version (text(127)), document-creator-os-name (name(40)), document-creator-os-version (text(40)), document-format-device-id (text(127)), document-format-version (text(127)). The "document-container-summary" collection attribute may contain them, plus "document-format" and "document-natural-language".
9. REQUIRED Printers to support "document-format-version" Document Description.
10. Deprecated "document-overrides" and indicated that the agreement is to re-issue [pwg5100.4] without "document-overrides".
11. Prefixed the following three Document Description attributes that are copies of Job Description attributes with "document-" so that no Document attribute has a "job-" prefix: "job-printer-uri" becomes "document-job-printer-uri", "job-uri" becomes "document-job-uri", and "job-id" becomes "document-job-id".
12. Added the encoding for the "document-attributes-tag" as 0x09.
13. Updated the IANA Registration section, but still needs more work.

Version 0.8, 20 March 2003, agreements from the March 20 telecon:

1. Changed the name of the Send-Document-Data back to Send-Data to keep the name short. There wasn't support for keeping the name of the object affected in the name of the operation.
2. Changed "job-mandatory-attributes" operation/Job Description attribute so that a Printer MUST support it.
3. Clarified that with the removal of "document-overrides", that the client can achieve subset finishing using "pages-per-subset" and "page-overrides".
4. Clarified that a Printer that supports "page-overrides" Document Template attribute MUST also support it as an Operation attribute in Send-Document and Send-URI, but not Create-Document, for backward compatibility.
5. Clarified that containers may contain containers, but that the "document-format-details" MUST be flattened, if present.
6. Clarified that the collection values MAY describe the container format itself, in which case, it must be the first collection value.
7. Added "document-format-details-detected (1setOf collection) Document Description attribute.
8. Clarified that "document-natural-language" identifies the primary or first language if a Document contains more than one language.

9. Added document-format-details-supported (1setOf type2 keyword) Printer Description attribute.
10. Added document-format-details-implemented (1setOf collection) Printer Description attribute.
11. Clarified that a Printer MUST support the "document-creation-attributes-supported" (1setOf type2 keywords) Printer Description attribute.