

Working Draft, 7 April 2003

Maturity Level: Development - 4 ISSUES are highlighted like this.

Changes are highlighted like this for easier proof reading of the version without revision marks.

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-Data operation.

This specification defines or extends RFC2911 operations as follows::

- 1 REQUIRED Job operation: Close-Job
- 2 REQUIRED Document creation operations: Create-Document, Send-Document (RFC 2911), Send-Data
- 1 OPTIONAL Document creation operation: Send-URI (RFC 2911)
- 3 REQUIRED Document operations: Cancel-Document, Get-Document-Attributes, Get-Documents
- 2 OPTIONAL Document operations: Delete-Document, Set-Document-Attributes.

This specification defines some new Operation attributes that describe the contents of the Document and permit the Printer to reject requests that it cannot process correctly. The Printer copies these Operation attributes to the corresponding Document Description attributes which client may query.

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, 7 April 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-ippdoc20030407.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/>.

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

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

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

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

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

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

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

71 ieee-isto@ieee.org.

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

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

77

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

117			
118	1	Introduction and Summary	11
119	1.1	Scope	12
120	2	Terminology	13
121	2.1	Conformance Terminology	13
122	2.2	Other Terminology	14
123	3	Document Operations	15
124	3.1	Create-Document Operation	16
125	3.1.1	Create-Document Request	17
126	3.1.1.1	last-document (boolean)	18
127	3.1.1.2	document-message (text(MAX))	18
128	3.1.1.3	Additional Operation attributes:	18
129	3.1.1.4	Ignoring unsupported or improper Operation attributes:	18
130	3.1.2	Create-Document Response	19
131	3.1.2.1	document-number (integer(1:MAX))	20
132	3.1.2.2	document-state (type1 enum)	20
133	3.1.2.3	document-state-reasons (1setOf type2 keyword)	20
134	3.1.2.4	document-state-message (text(MAX))	20
135	3.2	Send-Data Operation	20
136	3.2.1	Send-Data request	21
137	3.2.2	Send-Data Response	21
138	3.3	Send-Document Operation	22
139	3.3.1	Send-Document Request	22
140	3.3.2	Send-Document Response	23
141	3.4	Send-URI Operation	23
142	3.5	Get-Document-Attributes Operation	23
143	3.5.1	Get-Document-Attributes Request	24
144	3.5.1.1	"requested-attributes" (1setOf keyword):	25
145	3.5.2	Get-Document-Attributes Response	25
146	3.6	Get-Documents Operation	25
147	3.6.1	Get-Documents Request	26
148	3.6.1.1	"limit" (integer(1:MAX)):	26
149	3.6.1.2	"requested-attributes" (1setOf type2 keyword):	26
150	3.6.2	Get-Documents Response	26
151	3.7	Set-Document-Attributes Operation	27
152	3.7.1	Settable and READ-ONLY Document Description attributes	29
153	3.7.2	Set-Document-Attributes Request	29
154	3.7.3	Set-Document-Attributes Response	30
155	3.8	Cancel-Document Operation	31
156	3.8.1	Cancel-Document Request	32
157	3.8.1.1	document-message (text(MAX)) Operation attribute	32
158	3.8.2	Cancel-Document Response	32
159	3.9	Delete-Document Operation	33
160	4	Semantic extensions to Job operations	33
161	4.1	Job Creation operations	33

162	4.1.1 ipp-attribute-fidelity (boolean) ([rfc2911] section 3.2.1 and 15).....	34
163	4.1.2 job-mandatory-attributes (1setOf type2 keyword) Operation attribute	34
164	4.1.3 Create-Job ([rfc2911] section 3.2.4).....	35
165	4.1.4 Print-Job ([rfc2911] section 3.2.1)	35
166	4.1.5 Print-URI ([rfc2911] section 3.2.2).....	35
167	4.2 Cancel-Current-Job ([adm-ops] section 4.2).....	36
168	4.3 Cancel-Job ([rfc2911] section 3.3.3).....	36
169	4.4 Close-Job	36
170	4.4.1 Close-Job Request	36
171	4.4.2 Close-Job Response	37
172	4.5 Purge-Jobs ([rfc2911] section 3.2.9).....	37
173	4.6 Release-Job ([rfc2911] section 3.3.6).....	37
174	4.7 Reprocess-Job ([adm-ops] section 4.1).....	38
175	4.8 Restart-Job ([rfc2911] section 3.3.7)	38
176	4.9 Send-Document ([rfc2911] section 3.3.1).....	38
177	4.10 Send-URI ([rfc2911] section 3.3.2)	38
178	4.11 Suspend-Current-Job ([adm-ops] section 4.3.1).....	38
179	5 Attribute Precedence during job processing	38
180	6 Operation Attributes for the Job and Document Creation operations	40
181	6.1 Operation Attributes <i>supplied</i> at the Job and Document Levels for Creation.....	40
182	6.1.1 document-charset (charset).....	45
183	6.1.2 document-digital-signature (type2 keyword)	45
184	6.1.3 document-format (mimeType)	46
185	6.1.4 document-format-details (1setOf collection).....	47
186	6.1.4.1 document-creator-application-name (name(MAX))	49
187	6.1.4.2 document-creator-application-version (text(127))	49
188	6.1.4.3 document-creator-os-name (name(40))	49
189	6.1.4.4 document-creator-os-version (text(40))	49
190	6.1.4.5 document-format (mimeType)	50
191	6.1.4.6 document-format-device-id (text(127))	50
192	6.1.4.7 document-format-version (text(127))	50
193	6.1.4.8 document-natural-language (1setOf naturalLanguage)	50
194	6.1.5 document-format-version (text(127))	50
195	6.1.6 document-natural-language (naturalLanguage)	52
196	6.2 Override Operation attributes in Send-Document and Send-URI.....	53
197	6.3 Operation Attributes <i>returned</i> in Job and Document Creation responses	53
198	7 Job Template and Document Template attributes	54
199	7.1 Job Template attributes defined for use with multi-document jobs.....	61
200	7.1.1 job-copies (integer(1:MAX)).....	61
201	7.1.2 job-cover-back (collection).....	61
202	7.1.3 job-cover-front (collection)	62
203	7.1.4 job-finishings (1setOf type2 enum).....	62
204	7.1.5 job-finishings-col (1setOf collection).....	62
205	7.1.6 media-size-name (type3 keyword name(MAX))	62
206	7.1.7 media-type (type3 keyword name(MAX)).....	62
207	7.2 Document Template attributes.....	62

208	8	Job Description and Document Description attributes	63
209	8.1	Job Description attributes	66
210	8.1.1	ipp-attribute-fidelity (boolean)	66
211	8.1.2	job-mandatory-attributes (1setOf type2 keyword)	66
212	8.2	Document Description attributes	67
213	8.2.1	attributes-charset (charset)	67
214	8.2.2	attributes-natural-language (naturalLanguage)	67
215	8.2.3	compression (type3 keyword)	67
216	8.2.4	current-page-order (type2 keyword)	67
217	8.2.5	date-time-at-completed (dateTime)	67
218	8.2.6	date-time-at-creation (dateTime)	67
219	8.2.7	date-time-at-processing (dateTime)	67
220	8.2.8	document-charset (charset)	68
221	8.2.9	document-digital-signature (type2 keyword)	68
222	8.2.10	document-format (mimeMediaType)	68
223	8.2.11	document-format-details (1setOf collection)	68
224	8.2.12	document-format-details-detected (1setOf collection)	68
225	8.2.13	document-format-detected (mimeMediaType)	69
226	8.2.14	document-format-version (text(127))	69
227	8.2.15	document-job-id (integer(1:MAX))	69
228	8.2.16	document-job-uri (uri)	69
229	8.2.17	document-message (text(MAX))	69
230	8.2.18	document-name (name(MAX))	69
231	8.2.19	document-natural-language (naturalLanguage)	69
232	8.2.20	document-number (integer(1:MAX))	70
233	8.2.21	document-printer-uri (uri)	70
234	8.2.22	document-state (type1 enum) and job-state (type1 enum)	70
235	8.2.22.1	The "job-state" Job Description attribute and the Job Life Cycle	72
236	8.2.22.2	The "document-state" Document Description attribute and the Document object life Cycle	72
237	8.2.22.3	Forwarding Servers	73
238	8.2.22.4	Partitioning of Job/Document States	73
239	8.2.23	document-state-message (text(MAX)) and job-state-message (text(MAX))	74
240	8.2.24	document-state-reasons (1setOf type2 keyword) and job-state-reasons(1setOf type2 keyword)	74
241	8.2.25	document-uri (uri)	80
242	8.2.26	impressions-completed-current-copy (integer(0:MAX))	80
243	8.2.27	[job-]detailed-status-message (1setOf text(MAX))	81
244	8.2.28	[job-]document-access-errors (1setOf text(MAX))	81
245	8.2.29	[job-]impressions (integer(0:MAX))	81
246	8.2.30	[job-]impressions-completed (integer(0:MAX))	81
247	8.2.31	[job-]k-octets (integer(0:MAX))	81
248	8.2.32	[job-]k-octets-processed (integer(0:MAX))	81
249	8.2.33	[job-]media-sheets (integer(0:MAX))	81
250	8.2.34	[job-]media-sheets-completed (integer(0:MAX))	81
251	8.2.35	[job-]more-info (uri)	81
252	8.2.36	[job-]printer-up-time (integer (1:MAX))	82
253	8.2.37	[job-]warnings-count (integer(0:MAX))	82
254	8.2.38	last-document (boolean)	82
255	8.2.39	output-device-assigned (name(127))	82
256	8.2.40	sheet-completed-copy-number (integer(0:MAX))	82
257	8.2.41	time-at-completed (integer (MIN:MAX))	82
258	8.2.42	time-at-creation (integer (MIN:MAX))	82
259	8.2.43	time-at-processing (integer (MIN:MAX))	82
260	9	Printer attributes	83

261	9.1	attributes-charset-supported (1setOf charset)	89
262	9.2	attributes-natural-language-supported (1setOf naturalLanguage)	89
263	9.3	document-charset-default (charset)	89
264	9.4	document-charset-supported (1setOf charset)	90
265	9.5	document-creation-attributes-supported (1setOf type2 keyword)	90
266	9.6	document-digital-signature-default (type2 keyword)	90
267	9.7	document-digital-signature-supported (1setOf type2 keyword)	90
268	9.8	document-format-details-default (collection)	90
269	9.9	document-format-details-supported (1setOf type2 keyword)	90
270	9.10	document-format-details-implemented (1setOf collection)	91
271	9.11	document-format-version-default (text(127))	91
272	9.12	document-format-version-supported (1setOf text(127))	92
273	9.13	document-natural-language-default (naturalLanguage)	92
274	9.14	document-natural-language-supported (1setOf naturalLanguage)	92
275	9.15	printer-state-reasons (1setOf type2 keyword)	92
276	10	New Values for Existing Printer Description Attributes	95
277	10.1	operations-supported (1setOf type2 enum)	95
278	11	Encodings of Additional Attribute Tags	96
279	12	Conformance Requirements	96
280	12.1	Printer conformance requirements	96
281	12.2	Client conformance requirements	97
282	13	Normative References	97
283	14	Informative References	99
284	15	IANA Considerations	100
285	15.1	Attribute Registrations	100
286	15.2	Keyword attribute values	105
287	15.3	Enum Attribute Values	105
288	15.4	Operations	105
289	15.5	Attribute Group tags	106
290	16	Internationalization Considerations	106
291	17	Security Considerations	106
292	18	Contributors	106
293	19	Acknowledgments	106
294	20	Author's Address	106
295	21	Appendix A: Document operations compared to Job operations	107
296	22	Annex B: Change Log (informative)	108

297

298 **Table of Tables**

299	Table 1 - Summary of operations	12
300	Table 2 - Summary of New Operation/Description attributes	13
301	Table 3 - Job Creation and Document Creation operations	15
302	Table 4 - Client-supplied Document Creation and Validation Request Signatures	16
303	Table 5 - Printer-returned Document Creation and Validation Response Signatures	16
304	Table 6 - Document State Table for the Set-Documents-Attributes operation	28
305	Table 7 - Operation Attributes supplied at the Job and Document Levels in Job and Document Creation Requests ..	42
306	Table 8 - "document-format-details" member Operation attributes	48
307	Table 9 - Operation attributes <i>returned</i> in Job and Document Creation operation <i>responses</i>	53
308	Table 10 - Job Template and Document Template attributes	55
309	Table 11 - Job and Document Description attributes	63
310	Table 12 - "job-state" and "document-state" attribute values	70
311	Figure 1 - The "job-state" Job Description attribute and the Job object life cycle	72
312	Figure 2 - The "document-state" Document Description attribute and the Document object life Cycle	73
313	Table 13 - "job-state-reasons" and "document-state-reasons" attribute values	75
314	Table 14 - Printer attributes (Job Template and Printer Description)	84
315	Table 15 - Keyword values of "document-format-details-supported Printer attribute	90
316	Table 16 - Member attributes of the "document-format-details-implemented" Printer attribute	91
317	Table 17 - Values of the "printer-state-reasons" Printer attribute	92
318	Table 18 - Operation-id assignments	96
319	Table 19 - Document operations compared to Job operations	107
320		

321 **Table of Figures**

322	Figure 1 - The "job-state" Job Description attribute and the Job object life cycle	72
323	Figure 2 - The "document-state" Document Description attribute and the Document object life Cycle	73
324		

325

326

1 Introduction and Summary

327 This IPP specification extends the IPP Model and Semantics [rfc2911] object model by defining a Document object.
 328 The [rfc2911] Job object is extended to contain one or more Document objects which are passive objects operated
 329 on by the Job. The Job object is created by the REQUIRED¹ Create-Job (see [rfc2911] section 3.2.4) operation and
 330 is closed by the Close-Job operation (new - defined in section 4.4). The Document object is created by the
 331 REQUIRED² Send-Document (see [rfc2911] section 3.3.1) and OPTIONAL Send-URI (see [rfc2911] section 3.3.2)
 332 operations and represents an Input Document to the Job. This specification also adds a Document Attributes group
 333 (and tag) to these Send-Document and Send-URI requests. The Document Attributes group contains any Document
 334 Template attributes to be applied to this Document object being created, overriding any corresponding Job Template
 335 attribute supplied at the job level. A new REQUIRED Create-Document operation allows a client to supply the
 336 Document Attributes without the data (like Create-Job does for a Job object). Then the client sends the data content
 337 for that Document object using the new REQUIRED Send-Data operation.

338 This specification defines one new operation for Job objects, five new operations for Document objects once they
 339 have been created, and extends RFC 2911 operations as follows:

- 340 1 REQUIRED Job operation: Close-Job
- 341 2 REQUIRED Document creation operations: Create-Document, Send-Document (RFC 2911), Send-Data
- 342 1 OPTIONAL Document creation operation: Send-URI (RFC 2911)
- 343 3 REQUIRED Document operations: Cancel-Document, Get-Document-Attributes, Get-Documents
- 344 2 OPTIONAL Document operations: Delete-Document, Set-Document-Attributes.

345 This specification defines some new Operation attributes that describe the contents of the Document and permit the
 346 Printer to reject requests that it cannot process correctly. The Printer copies these Operation attributes to the
 347 corresponding Document Description attributes which client may query.

348 This specification also lists all of the attributes defined in other IPP specifications³ to show their relationship to
 349 corresponding attributes defined in this IPP specification for use with the Document object. The full semantics of the
 350 "document-state", "document-state-reasons", and "document-state-message" Document Description attributes are
 351 given along side of the corresponding [rfc2911] "job-state", "job-state-reasons", and "job-state-message" Job
 352 Description attributes. Finally, the analogous Document Descriptions attributes that correspond to the Job
 353 Description attributes are defined.

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

358 This specification also defines "media-size-name" and "media-type" as Job Template and Document Template
 359 attributes to provide a detailed specification for reference from the PWG Semantic Model.

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.

1.1 Scope

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

The Document object is a passive 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 - Summary of operations

Operation Name	Printer support	Brief Description
Print-Job [RFC2911]	REQUIRED	Creates a Job as in [RFC2911] which contains a single Document object with pushed data in-line. Some additional Operation attributes are defined in this spec for use.
Print-URI [RFC2911]	OPTIONAL	Creates a Job as in [RFC2911] which contains a single Document object with a reference to the document data. Some additional Operation attributes are defined in this spec for use.
Create-Job [RFC2911]	REQUIRED	Creates the Job object as defined in [RFC2911] with Job Attributes. Job Template attributes that affect individual documents, such as “media”, are inherited by the Document objects.
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-Data	REQUIRED	Sends data to the Document object created by Create-Document.
Send-Document [RFC2911]	REQUIRED	Creates a Document object with Document attributes and data. Some additional Operation attributes are defined in this spec for use, along with a new Document attributes group to pass Document Template attributes.
Send-URI [RFC2911]	OPTIONAL	Creates a Document object with Document attributes and a URL reference to the data (print-by-reference). Some additional Operation attributes are defined in this spec for use, along with a new Document attributes group to pass Document Template attributes.
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.

This specification defines new Operation attributes that allow the client to provide hints⁶ or requirements to the Printer about individual Document Object contents at request time as summarized in Table 2. The Printer copies these

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. **ISSUE: What is the correct mapping to PSI?**

375 Operation attributes supplied by the client in the request to the corresponding Job or Document Description
 376 attributes.

377 **Table 2 - Summary of New Operation/Description attributes**

Operation attribute	Creation operation	Printer support	Description
ipp-attribute-fidelity (boolean) *	Job	MUST	Allows the client to indicate whether or not the Printer MUST support all Job Template and Document Template attributes.
job-mandatory-attributes (1setOf type2 keyword)	Job	MUST	Allows the client to list which Job Template, Document Template and Operation attributes MUST be supported.
document-charset (charset)	Document	CMUST ⁷	The charset of the Document Object content
document-digital-signature (type2 keyword)	Document	MAY	Hint - the type of digital signature, if any used in the Document Object content.
document-format (mimeMediaType) *	Document	MUST	The document format of the Document Object content
document-format-details (1setOf collection)	Document	CMUST ⁸	Hint - the details of the Document Object content, including when its package of files (zip, multipart/related), such as application and operating system that created the document, the intended device type (when the format is device-dependent), the natural languages of the document.
document-format-version (text(127))	Document	MAY	Hint - the version of the document format.
document-natural-language (naturalLanguage) *	Document	MAY	Hint - the primary language of the Document Object content.

378 * - indicates Operation attributes defined in [RFC2911] that are extended to apply to the Document Creation
 379 operations defined in this specification.

380 2 Terminology

381 This section defines terminology used throughout this document.

382 2.1 Conformance Terminology

383 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, and **OPTIONAL**, have
 384 special meaning relating to conformance as defined in RFC 2119 [rfc2119]. If an implementation supports the
 385 extension defined in this document, then these terms apply; otherwise, they do not. These terms define
 386 conformance to *this document (and [rfc2911]) only*; they do not affect conformance to other documents, unless

⁶ A hint is an attribute supplied by the client that the Printer can safely not support and still process the document meaningfully. An attribute like "document-format" or "compression" is not a hint, since the Printer will not be able to interpret the Document object content if the Printer doesn't support the supplied value.

⁷ The Printer MUST support the "document-charset" operation/Document Description attributes if the Printer supports a document-format in which the charset may be ambiguous in the Document content, such as 'application/vnd.hp-PCL' where the charset escape sequence MAY be omitted from the data (see section 6.1.1).

⁸ The Printer MUST support the "document-format-details" operation/Document Description attributes, if the Printer supports a packaging document format, such as 'application/zip' or 'multipart/related'

387 explicitly stated otherwise. For example, the term REQUIRED in this document means “REQUIRED if this
388 OPTIONAL Document Object specification is implemented”.

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

391 2.2 Other Terminology

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

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

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

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

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

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

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

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

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

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

422 **Job Level** - attributes supplied in the Print-Job, Print-URI, and Create-Job are referred to as being supplied at the
423 **Job Level**. Attributes supplied at the **Job Level** are a mixture of **Job attributes** and **Document attributes**. **Job**
424 **attributes** apply to the Job as a whole, while **Document attributes** provide defaults for the **Document objects** in
425 case the client does not supply a **Document attribute** at the **Document Level** for a **Document object**. Put another
426 way, **Document objects inherit Document attributes** from the **Job object** which are used if the client didn't supply
427 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 attribute 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 3 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.⁹

Table 3 - Job Creation and Document Creation operations

Operation	Job Creation operation	Document Creation operation	Attribute Group in Request		Level
			Job Attributes	Document Attributes	
Create-Job	yes		Job attributes and Document attributes mixed together		Job Level
Print-Job	yes	yes	Job attributes and Document attributes mixed together		
Print-URI	yes	yes	Job attributes and Document attributes mixed together		
Create-Document		yes		Document attributes	Document Level
Send-Document		yes		Document attributes	
Send-URI		yes		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 19 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 it is created by the new Create-Document operation or either of the existing two operations: Send-Document and Send-URI operations.

⁹ 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 Printer sets are called Job Status and Document Status attributes (instead of Description attributes).

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

449 The signatures of the operation requests that create and/or validate Document objects are very similar as shown in
 450 Table 4 and defined in section 3.1 through section 3.4. The entries in the table show what a client MUST, MAY, or
 451 MUST NOT supply in the indicated operation requests.

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

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

453

454 The entries in Table 5 show what a Printer MUST, MAY, or MUST not support and return in the indicated operations
 455 responses.

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

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

457

458 3.1 Create-Document Operation

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

464 The client can supply multiple documents for a single Job using pairs of Create-Document and Send-Data
 465 operations. The order of the corresponding Send-Data operations is not important, so that the client can send pairs
 466 of Create-Document and Send-Data operations or can send a number of Create-Document operations followed by
 467 the corresponding Send-Data operations¹⁰. The latter approach is useful if the client wants to make sure that all
 468 Documents will be accepted by the Printer before sending any of the Document data to the Printer.

¹⁰ 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.

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

- 470 1. MUST also support the Create-Document and Send-Data operations
- 471 2. MUST support the "multiple-operation-time-out" Printer Description attribute (see [rfc2911] section 4.4.31).
- 472 3. MUST support the "multiple-document-jobs-supported" Printer Description attribute (see [rfc2911] section
473 4.4.16) with a 'true' value, that is the Printer MUST support multiple document jobs.
- 474 4. MUST support the "multiple-document-handling" Job Template job attribute with at least one value (see
475 [rfc2911] section 4.2.4) and the associated "multiple-document-handling-default" and "multiple-document-
476 handling-supported" Job Template Printer attributes (see [rfc2911] section 4.2).
- 477 5. MUST support the Attribute Precedence semantics specified in section 5 for the levels that the Printer
478 supports.

479 The Printer sets the value of the Document's "document-state" Document Description attribute to 'pending', if the
480 Printer accepts the Create-Document request. A Printer MAY set the 'job-data-insufficient' value of the Document's
481 "document-state-reason" Document Description attribute to indicate that processing cannot begin until sufficient data
482 has arrived and set the "document-state" to 'pending'. A non-spooling printer that doesn't implement the 'pending'
483 document state may even set the "document-state" to 'processing', even though there is not yet any data to process.
484 See sections 8.2.22 and 8.2.24.

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

489 3.1.1 Create-Document Request

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

491 Group 1: Operation Attributes

492 Natural Language and Character Set:

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

496 Target:

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

500 Requesting User Name:

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

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.

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 8.2.17) 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 7, such as "document-name", "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 4.1.1) and "job-mandatory-attributes" (see section 4.1.2) 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 10 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-Document request, this Document will be 'na-letter-transparency'. If the next Create-Document 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-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-Document request consists of just the "attributes-charset" and "attributes-natural-language" Operation attributes;

544 either (1) the "printer-uri" target Operation attribute and the "job-id" or (2) the "job-uri" and nothing else. In this simple
545 case, the Printer object:

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

555 3.1.2 Create-Document Response

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

557 Group 1: Operation Attributes

558 Status Message:

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

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

563 (1) the "ipp-attribute-fidelity" Operation attribute (see section 4.1.1) with a 'true' value and the client
564 supplies any unsupported and/or conflicting Job Template or Document Template attributes in this
565 Document Creation request OR

566 (2) keyword values of the "job-mandatory-attributes" Operation attribute (see sections 4.1.2 and
567 6.1.4) that identified attributes supplied in this Create-Document request that are unsupported and/or
568 conflicting.

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

572 Natural Language and Character Set:

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

574 Group 2: Unsupported Attributes

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

576 The value of the "ipp-attribute-fidelity" and the "job-mandatory-attributes" Operation attributes supplied by the
577 client in the original Job Creation request does not affect what attributes the Printer object returns in this
578 group. The values of these two Operation attributes in the original Job Creation request only affect whether
579 the Create-Document operation is accepted or rejected. If the request is accepted, the client MAY query the
580 Document object using the Get-Document-Attributes operation (see section 3.5) requesting the unsupported

581 attributes that were returned in the Document Creation response to see which attributes were ignored (not
582 stored on the Document object) and which attributes were stored with other (substituted) values.

583 **Group 3: Job Object Attributes**

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

587 "job-uri" (uri) - see [rfc2911] section 4.3.1
588 "job-id" (integer(1:MAX)) - see [rfc2911] section 4.3.2
589 "job-state" (type1 enum) - see [rfc2911] section 4.3.7
590 "job-state-reasons" (1setOf type2 keyword) - see [rfc2911] section 4.3.8
591

592 The Printer MAY return:

593 "job-state-message" (text(MAX)) - see [rfc2911] section 4.3.9
594 "number-of-intervening-jobs" (integer(0:MAX)) - see [rfc2911] section 4.3.15
595

596 **Group 4: Document Object Attributes**

597 **3.1.2.1 document-number (integer(1:MAX))**

598 The Printer MUST return the document number of this Document object that was assigned by the Printer
599 starting with 1 for each Job.

600 **3.1.2.2 document-state (type1 enum)**

601 The Printer MUST return the state of this Document object (see section 8.2.22).

602 **3.1.2.3 document-state-reasons (1setOf type2 keyword)**

603 The Printer MUST return the associated state reasons for this Document (see section 8.2.24).

604 **3.1.2.4 document-state-message (text(MAX))**

605 The Printer MAY return the localized description of the "document-state" and "document-state-reasons"
606 values for this Document (see section 8.2.23).

607 **3.2 Send-Data Operation**

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

611 Since the Create-Documents and the Send-Data operation that follows could occur over an arbitrarily long period of
612 time for a particular Document, a client MUST send the Send-Data operation within an IPP Printer defined minimum
613 time interval after the receipt of the previous request for the job. If a Printer object supports the Document object, the
614 Printer object MUST support the "multiple-operation-time-out" attribute (see [rfc2911] section 4.4.31). This attribute
615 indicates the minimum number of seconds the Printer object will wait for the next Document Creation or Close-Job
616 (see section 4.4) operation before taking some recovery action. See the description under Send-Document in
617 [rfc2911] section 3.3.1, for the possible Printer actions, if the client does not supply a Send-Data or Close-Job
618 request in time.

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

623 3.2.1 Send-Data request

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

625 Group 1: Operation Attributes

626 Natural Language and Character Set:

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

628 Target:

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

634 Requesting User Name:

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

637 Group 2: Document Content

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

640 3.2.2 Send-Data Response

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

642 Group 1: Operation Attributes

643 Status Message:

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

647 Natural Language and Character Set:

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

649 Group 2: Unsupported Attributes

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

651 Group 3: Job Object Attributes

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

654 **Group 4: Document Object Attributes**

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

657 **3.3 Send-Document Operation**

658 This REQUIRED¹¹ operation allows a client to submit multiple documents in a single Job by making a Send-
659 Document request for each Document. In this specification, the Send-Document creates a Document object
660 ([rfc2911] did not have a Document object). A Printer MUST support this operation with the semantics specified in
661 [rfc2911] and with the extension defined in this specification, since this specification REQUIRES the Printer to
662 support multiple document jobs.

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

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

668 **3.3.1 Send-Document Request**

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

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

671 As specified in [rfc2911] section 3.3.1 Send-Document request, plus any extensions indicated in Table 7.
672 For example, "compression", "document-format", and "document-name". So this group is the same as for
673 Create-Document (see section 3.1.1).

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

675 The client OPTIONALLY supplies a set of Document Template attributes as listed in Table 10. For example,
676 "media" and "number-up". If the client is not supplying any Document Template attributes in the request, the
677 client SHOULD omit Group 2 rather than sending an empty group. However, a Printer object MUST be able
678 to accept an empty group.

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

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

¹¹ This specification REQUIRES the Printer to support the Send-Document operation while [rfc2911] did not. This difference is because this specification REQUIRES the Printer to support multiple document jobs, while [rfc2911] did not.

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 10) that the implementation supports for Document objects.

- 'document-description': the subset of the Document Description attributes specified in the "Doc" column of Table 11 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 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 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-Document-Attributes 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 single value:

'document-number' (see section 8.2.20)

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'.

842 Group 1: Operation Attributes

843 Status Message:

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

847 Natural Language and Character Set:

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

849 Group 2: Unsupported Attributes

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

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

856 Groups 3 to N: Document Object Attributes

857 The Printer object responds with one set of Document Object Attributes for each returned Document object.
858 The Printer object ignores (does not respond with) any requested attribute or value which is not supported or
859 which is restricted by the security policy in force, including whether the requesting user is the user that
860 submitted the job (job originating user) or not (see [rfc2911] section 8). However, the Printer object MUST
861 respond with the 'unknown' value for any supported attribute (including all REQUIRED attributes) for which
862 the Printer object does not know the value, unless it would violate the security policy. See the description of
863 the "out-of-band" values in the beginning of [rfc2911] section 4.1.

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

866 3.7 Set-Document-Attributes Operation

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

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

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

881 If the client supplies a document attribute with the "out-of-band" value 'delete-attribute' (see [rfc3380] section 8.2),
882 then the Printer MUST remove the attribute and all of its values from the Document object, if present. The semantic

883 effect of the client supplying the 'delete-attribute' value in a Set-Documents-Attributes operation MUST be the same as
 884 if the attribute had not been supplied with the Document object in the Document Creation operation, i.e., the Printer
 885 applies its default attribute or behavior with lower precedence than the PDL (see the beginning of [rfc2911] section
 886 4.2 and [rfc2911] 3.2.1.1). Any subsequent query of the Document object using Get-Documents-Attributes or Get-
 887 Documents MUST NOT return any attribute that has been deleted using the 'delete-attribute' out-of-band value.
 888 However, a client can re-establish such a deleted Document attribute with any supported value(s) using a
 889 subsequent Set-Documents-Attributes operation.

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

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

904 The value of the "job-mandatory-attributes" Operation attribute supplied in either the original Job Creation request or
 905 the Set-Documents-Attributes request, if any, MUST have no effect on the behavior of the Set-Documents-Attributes
 906 operation, since the Set-Documents-Attributes request MUST behave as if "ipp-attribute-fidelity" = 'true'.

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

913 **Table 6 - Document State Table for the Set-Documents-Attributes operation**

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

914

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

918 3.7.1 Settable and READ-ONLY Document Description attributes

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

922 Almost all Document Description attributes (see [rfc2911] section 4.3) MUST NOT be settable, i.e., they are defined
923 to be READ-ONLY. Only Document Description attributes marked with "(r/w)" in Table 10 MAY be settable using Set-
924 Document-Attributes. The Printer MUST reject a Set-Document-Attributes request that attempts to set any attributes
925 in Table 11 that is not marked "(r/w)".

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

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

932 3.7.2 Set-Document-Attributes Request

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

934 Group 1: Operation Attributes

935 Natural Language and Character Set:

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

937 Target:

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

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

951 Requesting User Name:

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

954 Group 2: Document Attributes

955 The client MUST supply a set of Document Template attributes with one or more values (including explicitly
956 allowed out-of-band values) as listed in column labeled "D" in Table 10 - Job Template and Document
957 Template attributes and Document Description attributes flagged with "(r/w)" and listed in the column labeled
958 "Doc" in Table 11 - Job and Document Description attributes, and any attribute extensions supported by the
959 Printer. The value(s) of each Document attribute supplied in Group 2 replaces the value(s) of the
960 corresponding Document attribute on the target Document object. For attributes that can have multiple
961 values (1setOf), all values supplied by the client replace all values of the corresponding Document object
962 attribute.

963 In order to set the Document's "document-message" Document Description attribute (see section 8.2.17), the
964 client MUST supply the attribute in Group 2, rather than supplying a "document-message" Operation attribute
965 in Group 1.

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

968 3.7.3 Set-Document-Attributes Response

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

970 Group 1: Operation Attributes

971 Status Message:

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

975 Natural Language and Character Set:

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

977 Group 2: Unsupported Attributes

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

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

- 984 1. The number of attributes supplied by the client exceeds the maximum number that the Printer
985 supports in a Set-Printer-Attributes request: return the 'client-error-request-entity-too-large' (see
986 [rfc2911] section 13.1.4.9).
- 987 2. The Printer doesn't support the attribute: return the attribute with the 'unsupported' out-of-band
988 attribute value (see [rfc2911] section 3.1.7 and [rfc2910]) and the 'client-error-attributes-or-values-
989 not-supported' (see [rfc2911] section 13.1.4.12).
- 990 3. The attribute is READ-ONLY (in its definition) or is not-settable in this implementation: return the
991 attribute with the 'not-settable' out-of-band attribute value (see [rfc3380] section 8.1) and the
992 '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.

1028 *Access Rights*: The authenticated user (see [rfc2911] section 8.3) performing this operation must either be the job
1029 owner or an operator or administrator of the Printer object (see [rfc2911] sections 1 and 8.5). Otherwise, the Printer
1030 MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-
1031 authorized' as appropriate.

1032 3.8.1 Cancel-Document Request

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

1034 Group 1: Operation Attributes

1035 Natural Language and Character Set:

1036 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] section 3.1.4.1.

1037 Target:

1038 The client MUST supply the "document-number" (integer(1:MAX)) Operation attribute immediately after
1039 either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) Operation attribute(s)
1040 which define the target Document object for this operation as described in section [rfc2911] 3.1.5. If the
1041 client omits the "document-number" Operation attribute, the Printer MUST reject the request and return the
1042 'client-error-bad-request' status code.

1043 Requesting User Name:

1044 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
1045 [rfc2911] section 8.3.

1046 3.8.1.1 document-message (text(MAX))

Operation attribute

1047 The client MAY supply this Operation attribute. If the Printer supports this attribute, the Printer MUST also
1048 support the corresponding "document-message" (text(MAX)) Document Description attribute (see section
1049 8.2.17) and copy this value to the "document-message" Document Description attribute. The end user can
1050 use this Document Description attribute as a message to the operator and the operator can use it as a
1051 message to the user. The Printer MAY print this message on a document start sheet for this document, if
1052 any.

1053 The Printer MUST ignore the new "job-message-from-operator" Operation attribute (see [adm-ops] section 6)
1054 for this operation, since that is a job only attribute and Cancel-Document is a Document operation.

1055 3.8.2 Cancel-Document Response

1056 The following sets of attributes are part of the Cancel-Document Response:

1057 Group 1: Operation Attributes

1058 Status Message:

1059 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
1060 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) Operation attribute as
1061 described in [rfc2911] sections 13 and 3.1.6.

1062 Natural Language and Character Set:

1063 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] section 3.1.4.2.

1064 Group 2: Unsupported Attributes

1065 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 8.2.22), the "document-state-reasons" attribute (see section 8.2.24) 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**¹² ([rfc2911] section 3.3.4), **Get-Jobs**¹³ ([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 Job Creation operations

This section defines the extensions to Job Creation operations.

¹² The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Document, Send-Document, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

¹³ The Printer MUST NOT copy up to the Job object any Document attributes supplied at the Document Level in Create-Document, Send-Document, or Send-URI to the Job object as observable by the client in any Get-Job-Attributes operation responses.

1101 The following Operation attribute extensions are defined for use in all the Job Creation operations and Validate-Job:

1102 **4.1.1 ipp-attribute-fidelity (boolean) ([rfc2911] section 3.2.1 and 15)**

1103 This REQUIRED Operation attribute specifies the policy for the Printer to use (see [rfc2911] §3.2.1.1) when the
1104 client supplies unsupported Job Template or Document Template attributes¹⁴ or value in a Job Creation operation or
1105 a subsequent Document Creation operation for this job. The value 'true' indicates that total fidelity to client supplied
1106 Job Template and Document Template attributes and values is required for this Job Creation operation and all
1107 subsequent Document Creation operations for this job. If the client supplies the value 'false' or omits the attribute,
1108 then the Printer MUST accept the Job Creation operation and all subsequent Document Creation operations even if
1109 the client supplies unsupported attributes or values in them.

1110 The Printer MUST copy this attribute to the corresponding (new) Job Description attribute (see section 8.1.1) and use
1111 its value for validating subsequent Document Creation operations for this job.

1112 Note: The inheritance of the effect of the "ipp-attribute-fidelity" Operation attribute by subsequent Document Creation
1113 operations is like the inheritance of other Operation attributes supplied at the Job Level but affecting the behavior of
1114 the Document Level (see Table 3).

1115 **4.1.2 job-mandatory-attributes (1setOf type2 keyword) Operation attribute**

1116 This REQUIRED¹⁵ Operation attribute identifies which Job Template and Document Template attributes the Printer
1117 MUST Honor in this Job Creation request and all subsequent Document Creation requests for this job. The Printer
1118 MUST reject this Job Creation operation or any subsequent Document Creation operations for this job, if the client
1119 supplies an unsupported Job Template or Document Template attribute or value in the request that is also identified
1120 in this list. The client MAY supply this attribute in a Job Creation operation. If the Printer supports this Operation
1121 attribute, the Printer MUST support this attribute in Job Creation operations and Validate-Job with any values and
1122 MUST NOT support this attribute in any other operations.

1123 The values of the "job-mandatory-attributes" attribute are the keyword attribute names that identify Job Template
1124 and/or Document Template attributes, for example, 'job-hold-until', 'job-finishings' (see section 7.1.4), 'copies' and
1125 'media'. In order to identify a member attribute of a collection attribute, the keyword names of both the collection
1126 attribute and the member attribute are given separated by a period (.) character. For example, to make the "media"
1127 attribute of the "cover-front" collection attribute mandatory, supply the keyword value: 'cover-front.media'.

1128 If the Printer supports the "document-format-details" (1setOf collection) operation/Document Description attribute
1129 (see sections 6.1.4 and 8.2.11), the Printer MUST support any of the 'document-format-details.xxx' keywords¹⁶ that
1130 identify a member attribute of the "document-format-details" Operation attribute so that the client can specify that the
1131 Printer MUST Honor a supplied version or other property of the supplied Document object.

¹⁴ The value of the "ipp-attribute-fidelity" Operation attribute has no effect on other *Operation* attributes supplied by the client, only on Job Template and Document Template attributes supplied by the client.

¹⁵ The Printer MUST support the "job-mandatory-attributes" Operation/Job Description attributes for conformance to this Document Object specification. However, an implementation that isn't supporting the Document Object MAY still support the "job-mandatory-attributes" Operation attribute. See the definition of REQUIRED in section 2.1.

¹⁶ 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 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.

1132 The Printer MUST copy this attribute to the corresponding "job-mandatory-attributes" Job Description attribute (see
1133 section 4.1.2) for auditing and trouble shooting purposes and use its value for validating subsequent Document
1134 Creation operations for this job.

1135 A client MUST NOT supply this "job-mandatory-attributes" Operation attribute in a Document Creation operation. If a
1136 client does supply it, the Printer MUST ignore and only support the "job-mandatory-attributes" Operation attribute
1137 supplied at the Job level. Thus the "job-mandatory-attributes" Operation attribute controls all other attributes supplied
1138 at the Job Level and Document Level uniformly. Note: The inheritance of the effect of "job-mandatory-attributes"
1139 Operation attribute supplied at the Job Level by subsequent Document Creation operations is like the inheritance of
1140 other operation and Job Template attributes.

1141 4.1.3 Create-Job ([rfc2911] section 3.2.4)

1142 This REQUIRED operation creates the Job object with all of the mixture of Job and Document attributes supplied in
1143 the Create-Job operation. All Operation attributes supplied affect the Job as a whole. The client supplies Job
1144 Template attribute [RFC2911] that are a mixture of Job and Document attributes supplied together in the Job
1145 attribute group in the request¹⁷. For example, such Job Template attributes as "job-priority" and "job-hold-until" are
1146 Job attributes that affect the Job as a whole. On the other hand, such Job Template attributes as "media" and
1147 "number-up" are Document attributes that the client is supplying as defaults for the Document objects. The
1148 Document objects that are subsequently created for the specified Job are said to inherit the Document attributes from
1149 the Job object, unless the Document Creation operation supplies a corresponding Document Template attribute.
1150 However, the Printer MUST NOT copy down any Job Level attributes to the Document object as observable by a
1151 client in any Get-Documents or Get-Documents-Attributes operation responses.

1152 A Printer that supports the Document object MUST support the Create-Job operation¹⁸ since the Create-Job
1153 operation is the only operation that creates a Job object so that subsequent Document objects can be created in the
1154 Job object.

1155 4.1.4 Print-Job ([rfc2911] section 3.2.1)

1156 This REQUIRED operation creates one Document object as a side effect of the Print-Job operation. All of the
1157 attributes supplied by the client MUST remain at the Job Level as part of the Job object. Any Document attributes
1158 supplied have affect on the Document object because the Document object inherits them from the Job object. The
1159 Printer MUST populate the single Document object's "document-state", "document-state-reasons", and "document-
1160 number" Document Description attributes with appropriate values. Thus a Get-Documents or Get-Documents-
1161 Attributes for a Job created by Print-Job will return no attributes supplied by the client, but will return the populated
1162 Document Description attributes.

1163 4.1.5 Print-URI ([rfc2911] section 3.2.2)

1164 This OPTIONAL operation creates one Document object as a side effect of the Print-URI operation. All of the
1165 attributes supplied by the client MUST remain at the Job Level as part of the Job object. Any Document attributes
1166 supplied have affect on the Document object because the Document object inherits them from the Job object. The
1167 Printer MUST populate the Document object's "document-state", "document-state-reasons", and "document-number"
1168 Document Description attributes with appropriate values. Thus a Get-Documents or Get-Documents-Attributes for a
1169 Job created by Print-Job will return no attributes supplied by the client, but will return the populated Document
1170 Description attributes.

¹⁷ In the PWG Semantic Model, attributes are classified as Job Processing versus Document Processing in their definition. The client supplies them in separate Job Processing or Document Processing groups in the Job Creation operation. Such Document Processing attributes are defaults for subsequent Document Creation operations for that Job.

¹⁸ In [rfc2911] the Create-Job operation is OPTIONAL for a Printer to support.

1171 4.2 Cancel-Current-Job ([adm-ops] section 4.2)

1172 This OPTIONAL operation sets the "document-state" Document Description attribute to 'canceled' and the
1173 "document-state-reasons" Document Description attribute to 'canceled-by-xxx' for any documents in the current Job
1174 that have not yet reached a terminal state ('completed', 'canceled', or 'aborted'), where "xxx" is 'user' or 'operator'.
1175 See [adm-ops] section 4.2.

1176 4.3 Cancel-Job ([rfc2911] section 3.3.3)

1177 This REQUIRED operation sets "document-state" Document Description attribute to 'canceled' and the "document-
1178 state-reasons" Document Description attribute to 'canceled-by-user' or 'canceled-by-operator' for *all* Document
1179 objects in the identified Job that have not yet reached a terminal state ('completed', 'canceled', or 'aborted').

1180 4.4 Close-Job

1181 This REQUIRED operation closes the Job¹⁹. The Printer MUST support this operation. The client MAY issue this
1182 operation to close the job, instead of supplying the "last-document" Operation attribute (see section 3.1.1.1) with a
1183 'true' value in a Document Creation operation (or a Send-Document operation with no data - see [rfc2911] section
1184 3.3.1). The Printer MUST support both means of closing jobs for backward compatibility with [rfc2911].

1185 As in [RFC2911], the Printer MUST support the "multiple-operation-time-out" Printer attribute (see [RFC2911] section
1186 4.4.31) and MUST time-out clients that do not supply Document Creation or Close-Job operations quickly enough
1187 (see [RFC2911] section 3.3.1).

1188 *Access Rights:* The authenticated user (see [rfc2911] section 8.3) performing this operation must either be the job
1189 owner (as determined in the Create-Job operation) or an operator or administrator of the Printer object (see [rfc2911]
1190 sections 1 and 8.5). Otherwise, the Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-
1191 not-authenticated', or 'client-error-not-authorized' as appropriate.

1192 4.4.1 Close-Job Request

1193 The client supplies the following groups as part of the Close-Job Request:

1194 Group 1: Operation Attributes

1195 Natural Language and Character Set:

1196 First, the client MUST supply the "attributes-charset" and "attributes-natural-language" Operation attributes
1197 as described in [rfc2911] section 3.1.4.1. The Printer object MUST copy these values to the corresponding
1198 Job Description attributes described in [rfc2911] sections 4.3.19 and 4.3.20.

1199 Target:

1200 Next, the client MUST supply either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri"
1201 (uri) Operation attribute(s) which define the target Job object for this operation as described in [rfc2911]
1202 section 3.1.5. The client MAY supply the remaining Operation attributes in any order following:

1203 Requesting User Name:

1204 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as described in
1205 [rfc2911] section 8.3.

¹⁹ Close-Job is a new operation defined by this Document object specification and is not defined in [RFC2911].

1206 **Group 2: Document Template Attributes:** *MUST NOT be present.*

1207 **Group 3: Subscription Attributes (see [ntfy] section 11.1.3.1):** *MUST NOT be present.*

1208 4.4.2 Close-Job Response

1209 The Printer object MUST return the following sets of attributes to the client as part of the Close-Job response:

1210 Group 1: Operation Attributes

1211 Status Message:

1212 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a
1213 "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) Operation attribute as
1214 described in [rfc2911] sections 13 and 3.1.6.

1215 Natural Language and Character Set:

1216 The "attributes-charset" and "attributes-natural-language" attributes as described in [rfc2911] section 3.1.4.2.

1217 Group 2: Unsupported Attributes

1218 See [rfc2911] section 3.1.7 for details on returning Unsupported Attributes.

1219 Group 3: Job Object Attributes

1220 In addition, the Printer MUST return the same Job status attributes that [rfc2911] REQUIRES for the Send-
1221 Document and Send-URI operation responses (which are the same as for the Print-Job response - [rfc2911]
1222 section 3.2.1.2):

1223 "job-uri" (uri) - see [rfc2911] section 4.3.1

1224 "job-id" (integer(1:MAX)) - see [rfc2911] section 4.3.2

1225 "job-state" (type1 enum) - see [rfc2911] section 4.3.7

1226 "job-state-reasons" (1setOf type2 keyword) - see [rfc2911] section 4.3.8

1227

1228 The Printer MAY return:

1229 "job-state-message" (text(MAX)) - see [rfc2911] section 4.3.9

1230 "number-of-intervening-jobs" (integer(0:MAX)) - see [rfc2911] section 4.3.15

1231

1232 4.5 Purge-Jobs ([rfc2911] section 3.2.9)

1233 This OPTIONAL operation removes all Job and all of their contained Document objects.

1234 4.6 Release-Job ([rfc2911] section 3.3.6)

1235 This OPTIONAL operation moves the job to the 'pending' state, if there are no other "job-state-reasons" to hold the
1236 job. The values of the "document-state-reasons" attributes MUST NOT affect job scheduling (see Table 13), only the
1237 Job's "job-state-reasons" values.

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

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

4.8 Restart-Job ([rfc2911] section 3.3.7)

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

4.9 Send-Document ([rfc2911] section 3.3.1)

This REQUIRED operation accepts a new Document Attributes group (Group 4) that the client can supply Document Template attribute and creates a Document object (see section 3.3).

4.10 Send-URI ([rfc2911] section 3.3.2)

This OPTIONAL operation accepts a new Document Attributes group (Group 4) that the client can supply Document Template attribute and creates a Document object (see section 3.4).

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

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

5 Attribute Precedence during job processing

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

The attribute precedence model has the following features:

- 1) In principle, each defined attribute can occur at each of the precedence levels.
- 2) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print driver, submission client, protocol, and Printer:
 - Attributes are supplied by different agents in the system: application, user, print driver, administrator, operator, Printer object, and the output device hardware.
 - Attributes are supplied at different points in time: PDL generation, job submission, job acceptance, job pending, job processing.

- 1271 3) Attributes can be introduced and modified at different points in the job workflow, e.g., in the application, print
1272 driver, submission client, protocol, and Printer.
- 1273 4) The later that an attribute is introduced into the work flow or the closer the specified scope of the attribute is to
1274 the affected object, the higher the precedence is assigned to that attribute, since precedence is intended to
1275 reflect the user's wishes.
- 1276 The following levels of Attribute Precedence are defined in order of decreasing priority:
- 1277 1. **queue override** - The value that the Printer enforces for any job submitted to it (see [ippsave] section
1278 3.1). Set by the administrator when configuring the Printer by setting an "xxx-supported" Printer attribute
1279 to contain a single value, i.e., the override value. Example: the administrator sets the Printer's "sides" =
1280 'two-sided-long' so that all jobs submitted to that (logical) Printer are printed two-sided flipped along the
1281 long edge.

1282 Note: The **queue override** level is only available for Printers that support the 'guaranteed' value for
1283 its "pdl-override-supported" attribute (see [ippsave] section 8.1). All other levels are available for all
1284 Printers independent of the "pdl-override-supported" value.
 - 1285 2. **Document Level - page override programming** - The special "page-overrides" collection Document
1286 Template attribute (see [pwg5100.4]) supplied at the Document Level, that is, in a Create-Documents,
1287 Send-Documents, or Send-URI operation, that contains the attributes that are to have the page override
1288 status for the specified ranges of pages in the Input-Documents or the Output-Documents. Supplied by the
1289 client when submitting a Document object, or set by the user or operator after the Document has been
1290 accepted either using the Set-Documents-Attributes operation, or by the operator using means local to the
1291 Printer. Example: "page-overrides" = {"input-documents" = '1:1'; "pages" = '1:1'; "media" = 'letterhead'}
 - 1292 3. **Job Level - page override programming** - The special "page-overrides" collection Job Template
1293 attribute (see [pwg5100.4]) supplied at the Job Level, that is, in a Job Creation operation, that contains
1294 the attributes that are to have the page override status for the specified ranges of pages in the Input-
1295 Document or the Output-Documents. Supplied by the client when submitting a job either in the protocol,
1296 or set by the user or operator after the job has been accepted either using the Set-Job-Attributes
1297 operation, or by the operator using means local to the Printer. Example: "page-overrides" = {"input-
1298 documents" = '1:1'; "pages" = '1:1'; "media" = 'letterhead'}
 - 1299 4. **Document Level - Document object attributes** - The Document attributes supplied at the Document
1300 Level, that is, in a Create-Documents, Send-Documents, or Send-URI operation to apply to the Input
1301 Document. Supplied by the client when submitting a Document object, or set by the user or operator
1302 after the Document has been accepted either using the Set-Job-Attributes operation, or by the operator
1303 using means local to the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
 - 1304 5. **Document Level - document override programming** - The special "document-overrides" collection
1305 Operation attribute (see [pwg5100.4]) supplied by the client in the Send-Documents or Send-URI request.
1306 The collection contains the member attributes that are to override attributes specified at lower
1307 precedence for the specified range of documents, including the current Document and subsequently
1308 created Documents. Clients that support the Document object SHOULD supply the attributes as
1309 Document Template attributes directly when creating the Document, instead of using the Operation
1310 attribute mechanism. Example: "document-overrides" = {"input-documents" = '5:5'; "media" =
1311 'transparency'}
 - 1312 6. **Job Level - document override programming** - The special "document-overrides" collection Job
1313 Template attribute (see [pwg5100.4]) that contains the attributes that are to have the document override
1314 status for the specified Input-Documents or Output-Documents. Supplied by the client when submitting a
1315 job either in the protocol, or set by the user or operator after the job has been accepted either using the

1316 Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "document-
1317 overrides" = {"input-documents" = '5:5'; "media" = 'transparency'}

1318 7. **Job Level - Job object and Document object attributes** - The Job attributes and Document attributes
1319 supplied at the Job Level, i.e., with a Create-Job, Print-Job, or Print-URI operation. Supplied by the
1320 client when submitting a Job in the protocol, or set by the user or operator after the job has been
1321 accepted either using the Set-Job-Attributes operation, or by the operator using means local to the
1322 Printer. Examples: "media" = 'na-letter' and "copies" = '2'.

1323 8. **PDL document data** - an instruction in the PDL document data. Supplied by the application or print
1324 driver that created the PDL. Example: PostScript setPageDevice specifying na-letter media. Whether
1325 PDL document data is actually lower precedence than the preceding levels depends on the
1326 implementation as expressed in the "pdl-override-supported" Printer Description attribute (see [rfc2911]
1327 section 4.4.28 and [ippsave] section 8.1).

1328 Job Template and Document Template attributes of the form "xxx-requested", such as "orientation-
1329 requested" (see [rfc2911] section 4.2.10) have a lower priority than the PDL. If the PDL contains a
1330 corresponding instruction, that PDL instruction will be used instead of the supplied "xxx-requested"
1331 attribute. For example, PostScript PDL data always has a well-defined orientation, so that "orientation-
1332 requested" never affects the result. On the other hand, PDLs such as text/plain never has orientation
1333 and PCL MAY omit orientation, in which case, "orientation-requested" takes affect.
1334

1335 9. **PDL Init File data** - a file that the Printer uses to initialize the PDL Interpreter before it starts interpreting
1336 each document in a Job. See description of "pdl-init-file" Job Template attribute in [ippsave] Section 5.8.
1337 It is immaterial how this file is specified, whether it be by a queue override, job object attribute or printer
1338 default – the precedence of the contents of this file is at this level.

1339 10. **printer default** - a Printer "xxx-default" attribute that is applied by the Printer provided that none of the
1340 higher levels have supplied a value. The Printer implementation MUST supply values for all of the
1341 Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For example,
1342 if the output device will use media from the large-capacity input tray if not directed otherwise, the
1343 implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity' keyword
1344 value without requiring the administrator to configure that value. The implementation MUST allow the
1345 administrator to configure the Printer's "xxx-default" attributes to other values, if other value are
1346 supported by the implementation. Example: The administrator changes the Printer's "media-default"
1347 from 'large-capacity' to 'na-letter'.

1348 Note: Because of the requirement that the implementation supply pre-configured values for the
1349 Printer's "xxx-default" attributes, there is no need for a lower "hardware default" precedence
1350 level.

1351 6 Operation Attributes for the Job and Document Creation operations

1352 This section lists *all* the Operation attributes that have been defined in other IPP specifications that are used in Job
1353 Creation operations and extends their use to the Document Creation operations defined in the IPP specification.
1354 Operation attributes relate to the operation and do not depend on the printing capabilities of the Printer.

1355 6.1 Operation Attributes *supplied* at the Job and Document Levels for Creation

1356 Table 7 lists the Operation attributes that clients supply at the Job Level and/or the Document Level.

1357 The "Level Supplied" column indicates whether the Operation attribute can be supplied at the Job Level (Print-Job,
1358 Print-URI, and Create-Job) and at the Document Level (Create-Document, Send-Document, and Send-URI) . The

1359 Conformance column indicates the conformance requirements for what the client supplies in a request and the
 1360 Printer supports in a request. The Reference and Section columns list the IETF or IEEE-ISTO specification which
 1361 defines the semantics of the attribute.

1362 Legend:

1363 **[job-]** an attribute that shouldn't have had a "job-" prefix in its name in [rfc2911], so that the same attribute name
 1364 could also be used for the Document object as a Document Description attribute. Note: For the PWG
 1365 Semantic Model, the "job-" prefix is dropped.
 1366 **"y"** the Operation attribute is defined for all Job Creation operations when in the "Job" column and for all
 1367 Document Creation operations when in the "Doc" column.
 1368 **"p"** the Operation attribute is defined for the Print-Job and Print-URI Job Creation operations, but not the Create-
 1369 Job operation. Such an Operation attribute must be supplied in a Document Creation operation in order to
 1370 affect the Document objects in a Job.
 1371 **"-"** the Operation attribute is *not* defined for the any Job Creation operations when in the "Job" column and is *not*
 1372 define for any Document Creation operations when in the "Doc" column.
 1373 **y⇒** the Printer MUST copy this Operation attribute to the corresponding Job Description or Document Description
 1374 attribute. See Table 11 for the corresponding Job and Document Description attributes.
 1375 **p⇒** For Print-Job and Print-URI operations only: the Printer MUST copy this Operation attribute to the
 1376 corresponding Document (*not* Job) Description attribute with the same name and attribute syntax.
 1377 ****** these Operation attributes are defined for *all* operations, not just Job Creation and Document Creation
 1378 operations

Table 7 - Operation Attributes supplied at the Job and Document Levels in Job and Document Creation Requests

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied		Conformance		Reference	Description Attributes		Corresponding Printer attributes	
		Job	Doc	Client supply	Printer support		Job	Doc	xxx-default	xxx-supported
attributes-charset **	charset	p⇒	y⇒	MUST	MUST	[rfc2911] §3.1.4	-	§8.2.1	-	y ²⁰
attributes-natural-language **	naturalLanguage	p⇒	y⇒	MUST	MUST	[rfc2911] §3.1.4	-	§8.2.2	-	-
compression	type3 keyword	p⇒	y⇒	MAY	MUST	[rfc2911] §3.2.1.1	-	§8.2.3	-	y
document-charset	charset	p⇒	y⇒	MAY	CMUST ₂₁	§6.1.1	-	§8.2.8	y	y
document-digital-signature	type2 keyword	p⇒	y⇒	MAY	MAY	§6.1.2	-	§8.2.9	y	y
document-format	mimeMediaType	p⇒	y ₂₂ ⇒	MAY	MUST	[rfc2911] §3.2.1.1, [this spec] §6.1.3	-	§8.2.10	y	y
document-format-details	1setOf collection	p⇒	y⇒	MAY	CMUST ₂₃	§6.1.4	-	§8.2.11	y	y
document-creator-application-name	name(MAX)	p⇒	y⇒	MAY	MAY	§6.1.4.1	-	8.2.11	-	-
document-creator-application-version	text(127)	p⇒	y⇒	MAY	MAY	§6.1.4.2	-	8.2.11	-	-
document-creator-os-name	name(40)	p⇒	y⇒	MAY	MAY	§6.1.4.3	-	8.2.11	-	-
document-creator-os-version	text(40)	p⇒	y⇒	MAY	MAY	§6.1.4.4	-	8.2.11	-	-
document-format	mimeMediaType	p⇒	y⇒	MAY	MUST	§6.1.4.5	-	8.2.11	y	-
document-format-device-id	text(127)	p⇒	y⇒	MAY	MAY	§6.1.4.6	-	8.2.11	-	-
document-format-version	text(127)	p⇒	y⇒	SHOULD	MUST	§6.1.4.7	-	8.2.11	y	-
document-natural-language	1setOf naturalLanguage	p⇒	y⇒	MAY	MAY	§6.1.4.8	-	8.2.11	-	-
document-format-version	text(127)	p⇒	y⇒	MAY	MAY	§6.1.5	-	§8.2.14	y	y
document-message **	text(MAX)	-	y⇒	MAY	MAY	§3.1.1.2	-	§8.2.17	-	-
document-name	name(MAX)	y	y⇒	MAY	MUST	[rfc2911] §3.2.1.1	-	§8.2.18	-	-
document-natural-language	naturalLanguage	y	y⇒	MAY	MAY	[rfc2911] §3.2.1.1, [this spec] §6.1.6	-	§8.2.19	y	y

²⁰ The “charset-supported” attribute ([rfc2911] section 4.4.18) is the “xxx-supported” Printer attribute that corresponds to the “attributes-charset” Operation attribute.

²¹ The Printer MUST support the “document-charset” Operation/Document Description attributes, if the Printer supports a charset-ambiguous document format (see section 6.1.1).

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

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

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied		Conformance		Reference	Description Attributes		Corresponding Printer attributes	
		Job	Doc	Client supply	Printer support		Job	Doc	xxx-default	xxx-supported
document-overrides ²⁴ TO BE DELETED in next version of [pwg5100.4]	1setOf collection	-	y	MAY	MAY	[pwg5100.4] §5.1, §9.2.2	-	y	y	y
document-uri	uri	y	y⇒	CMUST ²⁵	MAY	[rfc2911] §3.2.2	-	y	-	y ²⁶
input-document-number TO BE DELETED in next version of [pwg5100.4]	integer(1:MAX)	-	y	MAY	MAY	[pwg5100.4] §9.2	-	-		
ipp-attribute-fidelity	boolean	y⇒ ²⁷	-	MAY	MUST	[rfc2911] §3.2.1.1, [this spec] §4.1.1,	§8.1.1	-	-	-
[job-]impressions	integer(0:MAX)	y⇒	y⇒	MAY	MAY	[rfc2911] §3.2.1.1	§8.2.29	§8.2.29	-	y
[job-]k-octets	integer(0:MAX)	y⇒	y⇒	MAY	MAY	[rfc2911] §3.2.1.1	§8.2.31	§8.2.31	-	y
job-mandatory-attributes	1setOf type2 keyword	y⇒	-	MAY	MUST	§4.1.2	§8.1.2	-	-	-
[job-]media-sheets	integer(0:MAX)	y⇒	y⇒	MAY	MAY	[rfc2911] §3.2.1.1	§8.2.33	§8.2.33	-	y
job-name	name(MAX)	y⇒	-	MAY	MUST	[rfc2911] §4.3.5	y	-	-	-
job-password	octetString(255)	y⇒	-	MAY	MAY	[ippsave] §4.1	y	-	-	y
job-password-encryption	type3 keyword name(MAX)	y⇒	-	MAY	MAY	[ippsave] §4.2	y	-	-	y
last-document	boolean	-	y⇒ ²⁸	MUST	MUST	[rfc2911] §3.3.1.1, [this spec] §3.1.1.1	-	§8.2.38	-	-
operation-id **	integer(1:0x8FFF)	y	y	MUST	MUST	[rfc2911] §3.1.2	-	-	-	y ²⁹
original-requesting-user-name **	name(MAX)	y⇒		MAY	MAY	[adm-ops] §11.7.2.2	y	-	-	-

²⁴ 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. See “document-overrides” in Table 10 for the list of member attributes.

²⁵ 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.

²⁶ The “reference-uri-schemes-supported” attribute ([rfc2911] section 4.4.27) is the “xxx-supported” Printer attribute that corresponds to the “document-uri” supported”.

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

²⁸ The Printer MUST copy the “last-document” Operation attribute to the corresponding (new) Document Description attribute defined in this specification so that the client can determine the last document when querying the Document objects.

²⁹ The “operations-supported” attribute ([rfc2911] section 4.4.15) is the “xxx-supported” Printer attribute that corresponds to the “operation-id” parameter.

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Level Supplied		Conformance		Reference	Description Attributes		Corresponding Printer attributes	
		Job	Doc	Client supply	Printer support		Job	Doc	xxx-default	xxx-supported
page-overrides	1setOf collection ³⁰	-	y ³¹	MAY	MAY	[pwg5100.4] §5.2, §9.2.3	-	y	-	y
printer-uri **	uri	y ³²	y	MUST	MUST	[rfc2911] §3.1.5	y	y	n	y
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	-	-	-	y ³³

“y⇒”, “p⇒”, and “***”. See Legend at the beginning of the Table.

³⁰ See “page-overrides” in Table 10 for the list of its member attributes.

³¹ The “page-overrides” Operation attribute is supplied in the Send-Document or Send-URI operation in [pwg5100.4] as an Operation attribute, since there was no place for supplying Job Template or Document Template attributes until the IPP Document Object specification. The Printer copies the “page-overrides” Operation attribute to the corresponding Job Template Document attribute. There is no “page-overrides” Job or Document Description attribute.

³² The Printer MUST copy the “printer-uri” Operation attribute to the Job’s “job-printer-uri” Job Description attribute and Document’s “document-printer-uri” Document Description attribute.

³³ The “ipp-versions-supported” attribute ([rfc2911] section 4.4.14) is the “xxx-supported” Printer attribute that corresponds to the “version-number” Operation attribute.

1382 The rest of the section defines the semantics for the Operation attributes that a client MAY supply in a Document
1383 Creation operation:

1384 6.1.1 document-charset (charset)

1385 ISSUE 01: Since we agreed that this attribute isn't a hint, OK to make it CONDITIONALLY REQUIRED for Printers
1386 that support charset-ambiguous document formats?

1387 This CONDITIONALLY REQUIRED Operation attribute identifies the charset of the Document Object content. The
1388 Printer MUST reject a Document Creation request if the Printer doesn't support the supplied charset, since the
1389 interpretation of the content will be mis-understood by the Printer.

1390 If a client supplies the "document-charset" Operation attribute with a value that the Printer doesn't support, the Printer
1391 MUST reject the job and return the status code: 'client-error-charset-not-supported' (see [rfc2911] section 3.1.4.14).
1392 This behavior is independent of the value of the "job-mandatory-attributes" Operation attribute (section 4.1.2) that the
1393 client MAY supply in the original Job Creation operation.

1394 The Printer MUST copy this "document-charset" Operation attribute to the corresponding CONDITIONALLY
1395 REQUIRED "document-charset" Document Description attribute (see section 8.2.10). The standard values for these
1396 attributes are Internet Media types (sometimes called MIME types). For further details see the description of the
1397 'mimeMediaType' attribute syntax in [rfc2911] section 4.1.9.

1398 The Printer MUST support this attribute if it supports a document format for which the Document Object content can
1399 be ambiguous with respect to the charset being used to encode the data. For example, the 'application/vnd.hp-PCL'
1400 MAY omit the charset escape sequence. Although [rfc2854] strongly RECOMMENDS that 'text/html' include a ";
1401 charset=charset" parameter in the MIME type itself (that is, explicitly in the value of the "document-format" attribute),
1402 often the charset= parameter is not present in the MIME type and the Printer MUST assume a charset. Thus a
1403 Printer that supports the text/html MIME type MUST support the "document-charset" operation/Document Description
1404 attributes. Also many text files use the various 8-bit ISO 8859 charsets in which the lower half is US-ASCII and the
1405 upper half is various Latin sets (about 8 or 9), Greek, Cyrillic, Hebrew, and Arabic. Shift JIS is another example
1406 where the left half is US-ASCII, but the right half can be one of a number of things. But if the data doesn't contain the
1407 charset escape sequences, this attribute can help the Printer know what the charset is in the Document. Such
1408 document formats are called "charset-ambiguous" document formats. Finally, even though [rfc2046] REQUIRES the
1409 "; charset=" MIME type parameter if the file contains other than US-ASCII, in practice, the "; charset=" MIME type
1410 parameter is often omitted, thus making 'text/plain' a charset-ambiguous document format. See the discussion in
1411 [rfc2911] section 4.1.9 and [rfc2046].

1412 Printer MAY also check the Document Object content while processing to see that the document data meets the
1413 coding requirements for the supplied charset. If the data contains something that is outside the charset encoding,
1414 the Printer MUST either (1) hold the job or (2) abort, and SHOULD NOT continue printing square boxes for encoded
1415 characters that are outside the charset supplied by the client.

1416 Many other document formats, such as 'application/postscript' and 'application/pdf', are *not* charset-ambiguous, so
1417 that Printers that support only such formats MAY omit support of the "charset" Operation/Document Description
1418 attributes.

1419 If the Printer supports the "document-charset" Operation attribute, it MUST also support the corresponding
1420 "document-charset" Document Description attribute (see section 8.2.8) and the "document-charset-default" and
1421 "document-charset-supported" Printer Description attributes as well and vice versa (see sections 9.3 and 9.4).

1422 6.1.2 document-digital-signature (type2 keyword)

1423 This OPTIONAL Operation attribute identifies the technology of digital signature in the Document Object content. If
1424 the Printer supports this attribute, the Printer MUST copy this "document-digital-signature" Operation attribute to the

1425 corresponding OPTIONAL "document-digital-signature" Document Description attribute. If the Printer doesn't support
1426 this attribute, the Printer MUST ignore the attribute (as with any OPTIONAL Operation attribute).

1427 Different PDLs have different techniques of embedding the signature. If the Printer supports the "document-digital-
1428 signature" attribute and the supplied "document-format", the Printer MUST accept the document. However, if the
1429 Printer either doesn't support the value of the "document-digital-signature" Operation attribute or doesn't support the
1430 technique used by the supplied "document-format" attribute, the Printer MUST either (1) ignore the signature or (2)
1431 put the job on hold and wait for human intervention, depending on implementation. If the Printer doesn't support the
1432 supplied value, the Printer MUST return the "document-digital-signature" attribute with its value as unsupported in the
1433 Unsupported attributes group as specified in [RFC2911] section 3.1.7.

1434 If the Printer supports this attribute and the value supplied by the client, the Printer MUST verify the signature
1435 according to the rule for that signature format. If the signature does not verify, then the Printer MUST either (1)
1436 ignore the signature or (2) put the job on hold and wait for human intervention, depending on implementation. The
1437 Printer gives no additional indication to the client. ISSUE 02: Is either (1) ignore the signature or (2) put the job on
1438 hold the correct behavior for the Printer if the digital signature doesn't verify?

1439 This Printer behavior is backwards compatible with a Printer that doesn't support the "digital-signature" attribute.
1440 However, if the Printer supports the "job-mandatory-attributes" attribute (see section 8.1.2) and the client supplies the
1441 "job-mandatory-attribute" Operation attribute with the 'digital-signature' keyword value, then the Printer MUST reject
1442 the job if the "digital-signature" attribute is supplied with a value that isn't supported by the Printer (or the Printer
1443 doesn't support the "digital-signature" attribute at all). Thus the client can force the Printer to reject a signed
1444 document for a signature technology that the Printer does not support. ISSUE 03: What if the digital signature is
1445 supported, but the signature fails verification by the Printer when "job-mandatory-attributes" identifies 'document-
1446 digital-signature'?

1447 The following standard keyword values are defined:

1448 'dss': Digital Signature Standard (DDS) [dss].

1449 'none': There is not a digital signature in the Document Object content. If this attribute is supported, the
1450 'none' value MUST be supported.

1451 'pgp': PGP Message Exchange Formats [rfc1991].

1452 'smime': Enhanced Security Services for S/MIME [rfc2634].

1453 'xmldsig' XML Digital Signature [xmldsig].

1454 If the Printer supports the "document-digital-signature" Operation attribute, it MUST also support the corresponding
1455 "document-digital-signature" Document Description attribute (see section 8.2.9) and the "document-digital-signature-
1456 default" and "document-digital-signature-supported" Printer Description attributes as well and vice versa (see
1457 sections 9.6 and 9.7).

1458 6.1.3 document-format (mimeMediaType)

1459 This REQUIRED Operation attribute identifies the document format of the Document Object content. The Printer
1460 MUST copy the value of this Operation attribute, if supplied by the client, including MIME parameters, if any, to the
1461 corresponding REQUIRED³⁴ Document Description attribute (see section 8.2.10).

1462 The standard values for this attribute are Internet Media types (sometimes called MIME types). For some MIME
1463 types, such as 'text/plain' [rfc2046], the "; charset=" parameter is defined which specifies the charset of the Document
1464 content. The Printer MUST support the charset MIME parameter as well as the "document-charset" Operation
1465 attribute (section 6.1.1) if the Printer supports any text MIME type, such as 'text/plain' or 'text/html'. For further

³⁴ The Printer MUST support the (new) "document-format" Document Description attribute defined in this specification.

1466 details see the description of the 'mimeType' attribute syntax in [rfc2911] section 4.1.9 and [rfc2046] and the
1467 "document-charset" Operation attribute (section 6.1.1).

1468 If a client supplies this "document-format" Operation attribute with a value that the Printer doesn't support, the Printer
1469 MUST reject the request and return the 'client-error-document-format-not-supported' status code (see [rfc2911]
1470 section 13.1.4.11). This behavior is independent of the value of the "job-mandatory-attributes" (section 4.1.2)
1471 Operation attribute that the client MAY supply in the original Job Creation operation, since the semantics of the
1472 "document-format" Operation attribute are always Must Honor. See also the "document-format-version" Operation
1473 attribute in section 6.1.5 and the "document-format-details" Operation attribute in section 6.1.4.

1474 As in [RFC2911], the Printer MUST support the corresponding "document-format" Document Description attribute
1475 (see section 8.2.10) and the "document-format-default" and "document-format-supported" Printer Description
1476 attributes as well and vice versa (see [RFC2911] sections 4.4.21 and 4.4.22).

1477 6.1.4 document-format-details (1setOf collection)

1478 This **CONDITIONALLY REQUIRED** Operation attribute supplied in Document Creation operations summarizes the
1479 details of the Document Object content, including any files contained in the Document object. See Table 8 for a list
1480 of the member attributes along with the client and Printer conformance requirements.

1481 If a Printer supports a *packaging* MIME type, such as 'multipart/related' or 'application/zip', the Printer MUST support
1482 this "document-format-details" Operation attribute and the corresponding Document Description attribute (see section
1483 8.2.11). If a Printer does not support a packaging MIME type, it MAY omit support of the "document-format-details"
1484 Operation attribute and Document Description attribute. The purpose of the "document-format-details" Operation
1485 attribute is to describe the details of the document format or formats in the supplied instance of the Document object,
1486 including the packaging format itself, so that the Printer knows what to expect.

1487 If the Printer supports this attribute, the Printer MUST copy this Operation attribute to the corresponding Document
1488 Description attribute (see section 8.2.11). If the Printer doesn't support this attribute, the Printer MUST ignore the
1489 attribute (as with any OPTIONAL Operation attribute).

1490 For a packaging format, the "document-format-details" attribute does not provide means to associate each collection
1491 value with particular document in the archive file, so it does not provide a "manifest"³⁵ of the packaging. One of the
1492 packaging collection values MAY describe the packaging format itself, in which case that collection value MUST be
1493 the first collection value. The remaining collection values provides the summary of the details of the contained files in
1494 any order.

1495 There MUST NOT be any duplicate collection values, that is, no collection values with all the same member attribute
1496 values; it's a set, not a sequence. So 100 PostScript files with the same details in a .zip file:

1497 (1) MAY have one collection value with the "document-format" member attribute = 'application/zip' MIME type
1498 value and MAY have additional member attributes that give details about the .zip file itself and

1499 (2) MUST have one collection value containing a "document-format" member attribute =
1500 'application/postscript' and MAY have additional member attributes that give the details about the PostScript
1501 files.

1502 If a file in a packaging file is itself a packaging file, the single "document-format-details" (1setOf collection) Operation
1503 attribute SHOULD contain the flattened distinct collection values for all files at all nested levels. Therefore, the

³⁵ If the client wants to achieve a "manifest", that is a complete list of each file in a packaging, then the client needs to extract each file from the package and submit each one as a separate Document object. Note: the client can re-compress each file before sending, so the compression isn't lost when sending each document separately.

1504 “document-format-details” collection attribute is not recursively defined and MUST NOT contain the “document-
1505 format-details” attribute as a member attribute.

1506 If the Printer supports this “document-format-details” Operation attribute, it MUST also support the corresponding
1507 “document-format-details” Document Description attribute (see section 8.2.11) and the “document-format-details-
1508 default” and “document-format-details-supported” Printer Description attributes as well and vice versa (see sections
1509 9.8 and 9.9).

1510 **Table 8 - “document-format-details” member Operation attributes**

Member Attribute Name	Attribute Syntax	Client supplies	Printer Support	Member Attribute Section	Top Level Attribute Section
document-creator-application-name	name(MAX)	MAY	MAY	6.1.4.1	N/A
document-creator-application-version	text(127)	MAY	MAY	6.1.4.2	N/A
document-creator-os-name	name(40)	MAY	MAY	6.1.4.3	N/A
document-creator-os-version	text(40)	MAY	MAY	6.1.4.4	N/A
document-format	mimeMediaType	MUST	MUST	6.1.4.5	6.1.3
document-format-device-id	text(127)	MAY	MAY	6.1.4.6	N/A
document-format-version	text(127)	SHOULD	MUST	6.1.4.7	6.1.5
document-natural-language	1setOf naturalLanguage	MAY	MAY	6.1.4.8	6.1.6

1511 The client can determine which member attributes of the “document-format-details” are supporter by querying the
1512 Printer’s “document-format-details-supported” attribute (see section 9.9). The client can determine a supported set of
1513 document details by querying the Printer’s “document-format-details-implemented” attribute (see section 9.10).
1514

1515 Table 8 shows that three of the member attributes also have comparable top level Operation attributes defined with
1516 the same names. See the sections listed in the rightmost column. The three high level attributes have
1517 corresponding “xxx-default” and “xxx-supported” Printer Description attributes. These values are also for use with
1518 the corresponding three member attributes. The remaining member attributes do not have any corresponding “xxx-
1519 default” and “xxx-supported” Printer Description attribute.

1520 If a client supplies the “document-format-details” Operation attribute in a Creation request with member attributes
1521 and/or values that the Printer doesn’t support, the Printer MUST ignore them, except for the “document-format”
1522 member attribute. The Printer MUST reject the request if the “document-format” member attribute is a value that is
1523 not supported, same as for the “document-format” Operation attribute (see section 6.1.3). However, if the client had
1524 supplied the “job-mandatory-attributes” Operation attribute (see section 8.1.2) in the original Job Creation
1525 operation³⁶, the Printer MUST check for complete support as follows.

1526 The Printer MUST reject the Creation request if the client had supplied in the original Job Creation operation
1527 keyword values of the “job-mandatory-attributes” Operation attribute that identified the “document-format-
1528 details” attribute itself (keyword = ‘document-format-details’) or had identified one or more of its member
1529 attributes (keyword = ‘document-format-details.xxx’) that are unsupported. In such a case, the Printer MUST
1530 return the unsupported attributes in the Unsupported Attributes Group in the Document Creation response
1531 along with the error status code: ‘client-error-document-format-not-supported’ (see [rfc2911] section
1532 3.1.4.11).

³⁶ 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.

1533 To perform the above checks, the Printer MUST compare the supplied "document-format-details" collection
 1534 value supplied by the client with each of the collection values of the Printer's "document-format-details-
 1535 implemented" attribute (see section 9.10). The Printer supports the supplied document details if the supplied
 1536 collection value is a subset of one of the Printer's collection values.

1537 **6.1.4.1 document-creator-application-name (name(MAX))**

1538 This OPTIONAL member Operation attribute identifies the application that created the document. The
 1539 version number MUST NOT be included (see the "document-creator-application-version" attribute).
 1540 Examples: "Photoshop", "Microsoft Word".

1541 **6.1.4.2 document-creator-application-version (text(127))**

1542 This OPTIONAL member Operation attribute identifies the version number of the application that created the
 1543 document. The intent of this attribute is for display to a human being, rather than being parsed by the
 1544 Printer for purpose of affecting the interpreting by the Printer and so may also include the name of the
 1545 application, as well as build or service pack numbers. Examples:

1546 "Winzip® 8.1 (4331)", "Acrobat 5.0.5 10/26/2001", "Microsoft® Word 2000 (9.0.4119 SR-1)"

1547 When populating the "document-creator-application-version-implemented" member attribute of the
 1548 "document-format-details-implemented" Printer Description attribute, some of the trailing information MAY be
 1549 omitted, so that a substring match of the Printer's value with the value supplied by the client is sufficient for a
 1550 match. For example, the Printer's value MAY be "Winzip® 8.1", "Acrobat 5.0", and "Microsoft® Word 2000"
 1551 as compared to the corresponding example values above that MAY be supplied by the client.

1552 If the client omits this member attribute or supplies a zero length string, that matches with any version.
 1553 Similarly, the Printer's member attribute MAY be omitted or be a zero length string to indicate any.

1554 **6.1.4.3 document-creator-os-name (name(40))**

1555 This OPTIONAL member Operation attribute identifies the name of the operating system on which the
 1556 document was generated. Valid values are the operating system names defined in the IANA Operating
 1557 System name registry [os-names] with the version number portion removed (see the "document-creator-os-
 1558 version" attribute). IANA Operating System Names are consist of up to 40 *uppercase* US-ASCII letters,
 1559 hyphen ("-"), period ("."), and slash ("/") characters. The zero length string represents unknown³⁷.

1560 Example IANA OS Registry values: 'AIX', 'DOS', 'LINUX', 'MACOS', 'MSDOS', 'MVS', 'NETWARE', 'OS/2',
 1561 'SUN', 'SUN-OS', 'UNIX', 'VMS', 'WINDOWS'.

1562 **6.1.4.4 document-creator-os-version (text(40))**

1563 This OPTIONAL member Operation attribute identifies the version of the operating system on which the
 1564 document was generated. Valid values include the version portion of any of the operating system names
 1565 defined in the IANA Registry [os-names]. The value MUST NOT include the name portion of the registered
 1566 OS name (see "document-creator-os-name" attribute). The zero length string represents unknown³⁷.

1567 Example values for the indicated "document-creator-os-name" value are:
 1568 For 'AIX': '370', 'PS/2'

³⁷ The IANA Registry of OS Names does have an "UNKNOWN" value. However, that value is not being used for the "document-creator-os-name" and "document-creator-os-version" attributes. Instead, a zero length string indicates unknown, so that clients don't have to make a special case check for the UNKNOWN token and localize UNKNOWN to the language of the user while the client is not localizing any other OS name or version values.

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]

6.1.4.5 document-format (mimeMediaType)

This REQUIRED member Operation attribute identifies 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 top level "document-format" operation/Document Description attribute with the same name (see section 6.1.3 for the semantics).

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

This OPTIONAL 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;

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

This REQUIRED member Operation attribute identifies 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 if the Printer supports the "document-format-details" Operation/Document Description attribute. The semantics and supported values of this "document-format-version" member attribute MUST be the same as for the top level "document-format-version" Operation/Document Description attribute with the same name (see section 6.1.5 for the semantics).

6.1.4.8 document-natural-language (1setOf naturalLanguage)

This OPTIONAL member Operation attribute specifies the natural language(s) 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 top level "document-natural-language" (naturalLanguage) operation/Document Description attribute with the same name (see section 6.1.6 for the semantics). The only difference in semantics is that the member attribute is multi-valued (1setOf) so that multi-lingual documents can be represented, while the top level "document-natural-language" Operation attribute is single-valued.

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

This OPTIONAL Operation attribute identifies the level or version of the document format of the Document Object content identified by the "document-format" Operation attribute (section 6.1.3). The Printer MUST copy the value of this Operation attribute, if supplied by the client, to the corresponding Document Description attribute (see section 8.2.14).

The defined values are taken from the Printer MIB [rfc1759] langTC values (after removing the "lang") used in the prtInterpreterLangFamily and the prtInterpreterLangLevel attributes (SNMP calls them "objects") separated by the "/"

1613 character. If there is no version, just the langTC prefix without the "/" is used. Note: the Printer MIB
 1614 prtInterpreterLangVersion attribute is not used, since no standard values are given in the Printer MIB.

1615 The short first field before the "/" character are unique, so that the version values are self-identifying so that all the
 1616 versions for all document formats can be combined into a single list for the Printer's "document-format-version-
 1617 supported" Printer attribute. The first field also tends to be the acronym for the document format and often is also the
 1618 file name extension registered with IANA. The Printer MIB shows the first field in uppercase for readability.
 1619 However, the Printer MUST perform case-insensitive matching of supplied values with supported values.

1620 If the client supplies this "document-format-version" Operation attribute, the client MUST also supply the "document-
 1621 format" Operation attribute (section 6.1.3), so that the Printer does not need to parse the "document-format-version"
 1622 string in order to determine the document format and version.

1623 If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support,
 1624 the Printer MUST accept the request³⁸ and return the attribute and value in the Ignored Attributes group in the
 1625 response (see [rfc2911] section 3.1.7). However, the client MAY force the Printer to validate the "document-format-
 1626 version" Operation attribute as part of the request by supplying the "job-mandatory" Operation attribute (see section
 1627 4.1.2) with the 'document-format-version' keyword value. In this case, if the Printer does not support the supplied
 1628 version, the Printer MUST reject the request and return the 'client-error-document-format-not-supported' status code
 1629 (see [rfc2911] section 13.1.4.11).

1630 Many printer languages in the Printer MIB do not have a MIME type registered with IANA.³⁹ In order to submit a
 1631 document format which does not have a registered MIME type, the client MUST supply the "document-format" with
 1632 the 'application/octet-stream' MIME type along with the version string. For example, the NEC NPDLE printer language
 1633 from the Printer MIB does not have a MIME type registered with IANA. Therefore, the client MUST supply the
 1634 following two Operation attributes in the Document Creation operation:

1635 "document-format" = 'application/octet-string'
 1636 "document-format-version" = 'NPDLE'

1637
 1638 If the document format and version is from a standard that doesn't have a MIME type registered with IANA, but does
 1639 have a versioning mechanism specified in the standard, then that versioning is used along with the acronym for the
 1640 standard. For example, ISO 12639:1998 Graphic technology -- Prepress digital data exchange -- Tag image file
 1641 format for image technology (TIFF/IT) [iso12639] defines the TIFF/IT document format and a versioning mechanism.
 1642 For the TIFF/IT Continuous Tone picture data - profile 1, a client supplies:

1643 "document-format" = 'application/octet-string'
 1644 "document-format-version" = 'TIFF/IT-CT/P1:1998'

1645
 1646 If the document format and version is from a standard that doesn't have a MIME type registered with IANA and also
 1647 does not have a versioning specification in the standard, then the standards body's designation for the standard is
 1648 used, including part numbers, if applicable, and year. For example, ISO 10180:1995 defines the Standard Page
 1649 Description Language (SPDL) [spdl] document format. For SPDL, a client supplies:

1650 "document-format" = 'application/octet-string'
 1651 "document-format-version" = 'SPCL/ISO/IEC 10180:1995'

1652
 1653 The values of the "document-format" and their corresponding "document-format-version" values will be kept in a flat
 1654 text file on the PWG server for use by the PWG and CIP4. Implementers and implementations will be able to access
 1655 this file at any time (at CD writing time, install time, vendor update time, and/or at power-up time, etc.). New values

³⁸ The Printer MUST ignore any unsupported "document-format-version" Operation attribute or attribute values as with any OPTIONAL Operation attribute.

³⁹ Companies are urged to register their Printer languages with IANA using the 'application/vnd.XX-yyy vendor tree. There has also been a long standing PWG proposal to register all of these as 'application/vnd.pwg-yyy.

will be added to the flat file by its Maintainer after sending to the PWG list for a two week review whenever they are registered with or standardized by some recognized body, such as IANA, CIP4, ISO, etc. ACTION ITEM (Tom): Get CIP4 buy-in to use the same flat file (which will require an additional field for the JDF FileType attribute. ACTION ITEM (Tom and Ira): Propose a format for the file. The URL is:

ftp://ftp.pwg.org/pub/pwg/????.txt ISSUE 04: What should the URL be for the flat file? What is the formatting conventions for the flat file. Is it a PWG Schema of sorts?

Example values:

'PS/3': For Postscript level 3 [rfc1759].
 'PCL/5e': For PCL 5e [rfc1759].
 'PDF/1.4': For PDF version 1.4 [pdf]
 'PDF/X-1a:2001': For PDF/X-1a [iso15930]
 'TIFF/IT-FP:1998': TIFF/IT [iso12639] - Full Page - baseline.
 '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
 'Automatic': auto sense the format [rfc1759]. Is use in combination with the 'application/octet-stream' (see [rfc2911] section 4.1.9.1) value of the "document-format" attribute (section 6.1.3).

If the Printer supports the "document-format-version" Operation attribute, it MUST also support the corresponding "document-format-version" Document Description attribute (see section 8.2.14) and the "document-format-version-default" and "document-format-version-supported" Printer Description attributes as well and vice versa (see section 9.11 and 9.12).

6.1.6 document-natural-language (naturalLanguage)

This OPTIONAL Operation attribute specifies the natural language of the Document Object content (see [rfc2911] section 3.2.1.1 and section 4.1.8. The Printer MUST copy the value of this Operation attribute, if supplied by the client, to the corresponding Document Description attribute (see section 8.2.19).

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

'en': for English
 'en-us': for US English
 'fr': for French
 'de': for German

If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support, the Printer MUST accept the request⁴⁰ and return the attribute and value in the Ignored Attributes group in the response (see [rfc2911] section 3.1.7). However, the client MAY force the Printer to validate the "document-natural-language" Operation attribute as part of the request by supplying the "job-mandatory" Operation attribute (see section 4.1.2) with the 'document-natural-language' keyword value. In this case, if the Printer does not support the supplied natural language, the Printer MUST reject the request and return the 'client-error-document-format-not-supported' status code (see [rfc2911] section 13.1.4.11).

If the Printer supports the "document-natural-language" Operation attribute, it MUST also support the corresponding "document-natural-language" Document Description attribute (see section 8.2.19) and the "document-natural-

⁴⁰ The Printer MUST ignore any unsupported "document-natural-language" Operation attribute or attribute values as with any OPTIONAL Operation attribute.

language-default" and "document-natural-language-supported" Printer Description attributes as well and vice versa (see section 9.13 and 9.14).

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 10) 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.

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 10 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.

6.3 Operation Attributes returned in Job and Document Creation responses

Table 9 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 9 - Operation attributes returned in Job and Document Creation operation responses

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
attributes-charset *	charset	MUST	MUST	[rfc2911] §3.1.4
	'utf-8'	MAY	MUST	[rfc2911] §4.1.7
	'us-ascii'	MAY	MAY	[rfc2911] §4.1.7
	'iso-8859-1'	MAY	MAY	[rfc2911] §4.1.7
	'iso-10646-ucs-2'	MAY	MAY	[rfc2911] §4.1.7
attributes-natural-language *	naturalLanguage	MUST	MUST	[rfc2911] §3.1.4

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
	'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-number	integer(1:MAX)	MUST	MUST	§8.2.20
job-id	integer(1:MAX)	MUST	MUST	[rfc2911] §4.3.2
job-uri	uri	MUST	MUST	[rfc2911] §4.3.1
redirect-uri (uri) ⁴¹	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 10 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., “number-up” 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 attributes 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.

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 10.

⁴¹ 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.

1757 The “Defined for use” column indicates whether the client MAY supply and the Printer support the attribute at the
1758 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.

1759
1760 “***” - Most Job Template and Document Template attributes correspond to the PWG Semantic Model Job
1761 Processing and Document Processing attributes, respectively. However, 4 of the IPP Job Template
1762 attributes are represented in the PWG Semantic Model as Job Description attributes, instead of Job
1763 Processing attributes. These are indicated in the first column with “***”.

1764 **Table 10 - Job Template and Document Template attributes**

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
copies	integer(1:MAX)	y ⁴²	y	n	MAY	MAY	[rfc2911] §4.2.5

⁴² 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 ⁴³	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
<i>any other Job Template attributes that affect documents, such as "media" or "media-col"</i>					MAY	MAY	
feed-orientation	type3 keyword	y	y	n	MAY	MAY	[ippsave] §5.1
finishings	1setOf type2 enum	y ⁴⁴	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 ⁴⁴	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

⁴³ 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.

⁴⁴ The IPP "finishings" and "finishings-col" attributes are *extensive* attributes, so their effect when supplied at the Job Level is not always inherited by the documents in a multi-document job. Instead, their effect depends on the value of the "multiple-document-handling" Job Template attribute. The 'single-document' and 'single-document-new-sheet' cause the finishing to be applied to each job copy as a whole. The 'separate-documents-collated-copies' and 'separate-document-uncollated-copies' values cause the finishing to be applied to each document.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
force-front-side	1setOf integer(1:MAX)	y ⁴⁵	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 ⁴⁵	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 ⁴⁶	n	MAY	MAY	§7.1.1

⁴⁵ 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.

⁴⁶ 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 ⁴⁷	n	MAY	MAY	§7.1.2
same as cover-back	see cover-back						
job-cover-front	collection	y	n ⁴⁸	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 ⁴⁹	n	MAY	MAY	§7.1.4
job-finishings-col	collection	y	n ⁵⁰	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 ⁵¹	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

⁴⁷ 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’.

⁴⁸ 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’.

⁴⁹ 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’.

⁵⁰ 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’.

⁵¹ 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 ⁵²	type3 keyword name(MAX)	y	y	y	MAY	MAY	§7.1.6, [upnp]
media-type ⁵³	type3 keyword name(MAX)	y	y	y	MAY	MAY	[upnp], [pwg5100.3] §3.13.2

⁵² UPnPv1 and UPnPv2 define a separate MediaSizeName Job Template attribute with values from PWG 5101.1.

⁵³ 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 ⁵⁴	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 ⁵⁵	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

⁵⁴ 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.

⁵⁵ The client MUST supply the “pages-per-subset” Job Template attribute 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 [pwg-sm] - 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. Unless specified otherwise, each Job Template attribute has a corresponding “xxx-default” and “xxx-supported Job Template Printer attribute. See Table 14 for the attribute syntax.

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.

1782 7.1.3 job-cover-front (collection)

1783 This attribute specifies the cover for the front of the job, i.e., with all of the Document objects taken together and is
1784 independent of the value of the “multiple-document-handling” Job Template attribute. The member attributes are the
1785 same as the “cover-front” Job Template attribute (see [pwg5100.3] section 3.2). However, the “cover-front” Job
1786 Template attribute switches between a job front cover and a document front cover depending on the value of the
1787 “multiple-document-handling” Job Template attribute.

1788 7.1.4 job-finishings (1setOf type2 enum)

1789 This attribute specifies the job finishings, i.e., with all of the Document objects taken together. Its interpretation is
1790 independent of the value of the “multiple-document-handling” Job Template attribute. See the “finishings” Job
1791 Template attribute defined in [rfc2911] section 4.2.6 which switches between job finishings and document finishings
1792 depending on the value of the “multiple-document-handling” Job Template attribute.

1793 7.1.5 job-finishings-col (1setOf collection)

1794 This attribute specifies the job finishings collection, i.e., with all of the Document objects taken together. Its
1795 interpretation is independent of the value of the “multiple-document-handling” Job Template attribute. See the
1796 “finishings” Job Template attribute defined in [rfc2911] section 4.2.6 which switches between job finishings collection
1797 and document finishings collection depending on the value of the “multiple-document-handling” Job Template
1798 attribute.

1799 7.1.6 media-size-name (type3 keyword | name(MAX))

1800 This Job Template and Document Template attribute specifies the name of a size of media. The values are defined
1801 in [pwg5101.1]. The attribute is used in [upnp] as a Job Template attribute.

1802 The “media-size-name” attribute is also defined as a member attribute of the “media-col” Job Template (see
1803 [pwg5100.3] section 3.13) and Document Template attribute. Examples:

1804 ‘na_letter_8.5x11in’ - The letter size (8.5 inches by 11 inches) used in North America.
1805 ‘iso_a4_210x297mm’ - The iso A4 size (210 mm by 297 mm) used in metric countries.

1806 7.1.7 media-type (type3 keyword | name(MAX))

1807 This Job Template and Document Template attribute specifies the type of media. The values are defined in
1808 [pwg5101.1] and [pwg5100.3] section 3.13.2. The attribute is used in [upnp] as a Job Template attribute.

1809 The “media-type” attribute is also defined as a member attribute of the “media-col” Job Template (see [pwg5100.3]
1810 section 3.13.2) and Document Template attribute. Examples:

1811 ‘stationery’ - Separately cut sheets of an opaque material.
1812 ‘transparency’ - Separately cut sheets of a transparent material
1813

1814 7.2 Document Template attributes

1815 Most Job Template attributes can be used as Document Template attributes for use in Document Creation
1816 operations to apply to the Document object. However, the Job Template attributes that have the “job-” prefix MUST
1817 NOT be used as Document Template attributes, since they are defined to apply to the job as a whole. Table 10
1818 shows lists all of the Document Template attributes for use with the Document Creation operations and the
1819 Document object. All of the definitions of the Document Template attributes are done by reference to the
1820 corresponding Job Template attributes in other specifications. However, the semantics of each Document Template
1821 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 11 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.
 - “⇒y”** the Printer MUST populate this Job or Document Description attribute by copying *from* the corresponding Operation attribute that the client MAY supply⁵⁶ in a Job or Document Creation operation. See Table 7 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 11 - Job and Document Description attributes

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform- ance	Reference	
					Job Description Attr	Doc Desc.
attributes-charset	charset	-	⇒y	MUST	[rfc2911] §4.3.19	§8.2.1
attributes-natural-language	naturalLanguage	-	⇒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

⁵⁶ 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.

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform- ance	Reference Job Description Attr	Doc Desc.
date-time-at-creation	dateTime	y	y	MAY	[rfc2911] §4.3.14.5	§8.2.6
date-time-at-processing	dateTime	y	y	MAY	[rfc2911] §4.3.14.6	§8.2.7
document-charset	charset	-	⇒y	CMUST ⁵⁷	-	§8.2.8
document-digital-signature	type2 keyword	-	⇒y	MAY	-	§8.2.9
document-format	mimeMediaType	-	⇒y	MUST	[rfc2911] §3.2.1.1	§8.2.10
document-format-details	1setOf collection	-	⇒y	CMUST ⁵⁸	-	§8.2.11
document-creator-application- name	name(MAX)	-	⇒y	MAY	-	§6.1.4.1
document-creator-application- version	text(127)	-	⇒y	MAY	-	§6.1.4.2
document-creator-os-name	name(40)	-	⇒y	MAY	-	§6.1.4.3
document-creator-os-version	text(40)	-	⇒y	MAY	-	§6.1.4.4
document-format	mimeMediaType	-	⇒y	MUST	-	§6.1.4.5
document-format-device-id	text(127)	-	⇒y	MUST	-	§6.1.4.6
document-format-version	text(127)	-	⇒y	MAY	-	§6.1.4.7
document-natural-language	1setOf naturalLanguage	-	⇒y	MAY	-	§6.1.4.8
document-format-details- detected	1setOf collection	-	y	MAY	-	§8.2.12
document-format-detected	mimeMediaType	-	y	MAY	-	§8.2.13
document-format-version	text(127)	-	⇒y	MAY	-	§8.2.14
					-	
document-job-id	integer(1:MAX)	-	y	MUST	-	§8.2.15
document-job-uri	uri	-	y	MUST	-	§8.2.16
document-message(r/w)	text(MAX)	- ⁵⁹	⇒y	MAY	-	§8.2.17
document-name(r/w)	name(MAX)	-	⇒y	MUST	-	§8.2.18
document-natural-language	naturalLanguage	-	⇒y	MAY	-	§8.2.19
document-number	integer(0:MAX)	-	y	MUST	-	§8.2.20
document-printer-uri	uri	-	y	MUST	-	§8.2.21
document-state	type1 enum	-	y	MUST	-	§8.2.22
document-state-message	text(MAX)	-	y	MAY	-	§8.2.23
document-state-reasons	1setOf type2 keyword	-	y	MUST	-	§8.2.24
document-uri	uri	-	⇒y	MAY	-	§8.2.25
impressions-completed- current-copy	integer(0:MAX)	y	y	MAY	[rfc3381] §4.4	§8.2.26
ipp-attribute-fidelity	boolean	⇒y	-	MUST	[rfc2911] §3.2.1.1 §8.1.1	-
job-collation-type	type2 enum	y	-	MAY	[rfc3381] §4.1	-
[job-]detailed-status-message	1setOf text (MAX)	y	y	MAY	[rfc2911] §4.3.10	§8.2.27
[job-]document-access-errors	1setOf text(MAX)	y	y	MAY	[rfc2911] §4.3.11	§8.2.28
job-id	integer (1:MAX)	y	-	MUST	[rfc2911] §4.3.2	-

⁵⁷ The Printer MUST support the “document-charset” Operation/Document Description attributes if the Printer supports any charset-ambiguous document formats (see section 6.1.2).

⁵⁸ The Printer MUST support the “document-format-details” Operation/Document Description attributes if the Printer supports a packaging MIME type document format, such as ‘application/zip’ or ‘multipart/related’.

⁵⁹ 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.

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform- ance	Reference Job Description Attr	Doc Desc.
[job-]impressions	integer(0:MAX)	⇒y	⇒y	MAY	[rfc2911] §4.3.17.2	§8.2.29
[job-]impressions-completed	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.2	§8.2.30
[job-]k-octets	integer(0:MAX)	⇒y	⇒y	MAY	[rfc2911] §4.3.17.1	§8.2.31
[job-]k-octets-processed	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.1	§8.2.32
job-mandatory-attributes	1setOf type2 keyword	⇒y	-	MUST	§8.1.2	-
[job-]media-sheets	integer(0:MAX)	⇒y	⇒y	MAY	[rfc2911] §4.3.17.3	§8.2.33
[job-]media-sheets-completed	integer(0:MAX)	y	y	MAY	[rfc2911] §4.3.18.3	§8.2.34
job-message-from-operator	text(127)	y	- ⁶⁰	MAY	[rfc2911] §4.3.16	-
[job-]more-info	uri	y	y	MAY	[rfc2911] §4.3.4	§8.2.35
job-name(r/w)	name(MAX)	⇒y	- ⁶¹	MUST	[rfc2911] §4.3.5	-
job-originating-user-name	name (MAX)	y	-	MUST	[rfc2911] §4.3.6	-
job-password	octetString(255)	⇒y	-	MAY	[ippsave] §6.2	-
job-password-encryption	type3 keyword name(MAX)	⇒y	-	MAY	[ippsave] §6.3	-
job-printer-make-and-model	text(127)	y	-	CMUST ⁶²	[ippsave] §6.1	-
[job-]printer-up-time	integer (1:MAX)	y	y	MUST	[rfc2911] §4.3.14.4	§8.2.36
job-printer-uri	uri	⇒ ⁶³ y	-	MUST	[rfc2911] §4.3.3	-
job-state	type1 enum	y	- ⁶⁴	MUST	[rfc2911] §4.3.7	-
job-state-message	text(MAX)	y	- ⁶⁵	MAY	[rfc2911] §4.3.9	-
job-state-reasons	1setOf type2 keyword	y	- ⁶⁶	MUST	[rfc2911] §4.3.8	-
job-uri	uri	y	-	MUST	[rfc2911] §4.3.1	-
[job-]warnings-count	integer(0:MAX)	y	y	MAY	[pwg5100.4] §6.1	§8.2.37
last-document	boolean	-	⇒y	MAY	[rfc2911] §4.3.12	§8.2.38
number-of-documents	integer(0:MAX)	y	-	MAY	[rfc2911] §4.3.15	-
number-of-intervening-jobs	integer(0:MAX)	y	-	MAY	[rfc2911] §4.3.13	-
output-device-assigned	name(127)	y	y	MAY	[rfc2911] §4.3.7.2	§8.2.39
sheet-completed-copy-number	integer(0:MAX)	y	y	MAY	[rfc3381] §4.2	§8.2.40
sheet-completed-document- number	integer(0:MAX)	y	-	MAY	[rfc3381] §4.3	-
time-at-completed	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.3	§8.2.41
time-at-creation	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.1	§8.2.42

⁶⁰ 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 8.2.17) to communicate with each other.

⁶¹ The Document Description attribute that corresponds to the “job-name” Job Description attribute is the (existing) “document-name” attribute defined in [rfc2911].

⁶² The Printer MUST support the “job-printer-make-and-model” Job Description attribute if the “job-save-disposition” Job Template attribute is supported.

⁶³ The Printer sets the “job-printer-uri” Job Description attribute from the “printer-uri” Operation attribute.

⁶⁴ The Document Description attribute that corresponds to the “job-state” Job Description attribute is the (new) “document-state” attribute.

⁶⁵ The Document Description attribute that corresponds to the “job-state-message” Job Description attribute is the (new) “document-state-message” attribute.

⁶⁶ The Document Description attribute that corresponds to the “job-state-reasons” Job Description attribute is the (new) “document-state-reasons” attribute.

Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform- ance	Reference	
					Job Description Attr	Doc Desc.
time-at-processing	integer (MIN:MAX)	y	y	MUST	[rfc2911] §4.3.14.2	§8.2.43

“⇒y” 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 the Job Description attributes that 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)⁶⁷ 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)

This REQUIRED⁶⁸ Job Description attribute indicates which Job Template and Document Template attributes that the client required that the Printer 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 4.1.2) 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 4.1.2 for additional details of the semantics of the “job-mandatory-attributes” operation/Document Description attribute that are not repeated here.

⁶⁷ The “ipp-attribute-fidelity” attribute is defined only as an Operation attribute in [RFC2911]. This specification is defining it as a Document Description attribute as well which the Printer MUST support.

⁶⁸ The Printer MUST support the “job-mandatory-attributes” Operation/Job Description attributes is REQUIRED for conformance to this Document Object specification. However, an implementation that isn’t conforming to this specification MAY still support the “job-mandatory-attributes” Operation attribute by itself. 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. The Printer MAY support changing these Document Description attributes with the Set-Document-Attributes operation (see section 3.7), but only if indicated explicitly in this section.

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

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.

1918 8.2.8 document-charset (charset)

1919 This REQUIRED Document Description attribute specifies the digital signature technology used in the Document
1920 Object content. The Printer sets this Document Description attribute from the corresponding “document-digital-
1921 signature” Operation attribute (section 6.1.1 for the semantics), if supplied by the client in the Document Creation
1922 operation (see section 3.1).

1923 8.2.9 document-digital-signature (type2 keyword)

1924 This OPTIONAL Document Description attribute specifies the digital signature technology used in the Document
1925 Object content. The Printer sets this Document Description attribute from the corresponding “document-digital-
1926 signature” Operation attribute (section 6.1.2 for the semantics), if supplied by the client in the Document Creation
1927 operation (see section 3.1). If a Printer supports the “document-digital-signature” Operation attribute, the Printer
1928 MUST support this “document-digital-signature” Document Description attribute.

1929 8.2.10 document-format (mimeMediaType)

1930 This REQUIRED⁶⁹ Document Description attribute specified the document format of the Document Object content.
1931 The Printer sets this Document Description attribute from the corresponding “document-format” Operation attribute
1932 (see section 6.1.3 for the semantics), if supplied by the client in the Document Creation operation (see section 3.1).

1933 The “document-format-details” attribute summarizes the content (see section 8.2.11) whether the “document-format”
1934 is a single document format or a packaging document format, such as “multipart/related” or “application/zip”.

1935 8.2.11 document-format-details (1setOf collection)

1936 This OPTIONAL Document Description attribute specifies the details of the document format(s) of the Document
1937 Object content. The Printer sets this Document Description attribute from the corresponding “document-format-
1938 details” Operation attribute (section 6.1.4 for the semantics), if supplied by the client in the Document Creation
1939 operation (see section 3.1). is a copy of the corresponding “document-format-details” Operation attribute (see
1940 section 6.1.4 for the semantics) that the client supplied in the Document Creation operation. If a Printer supports the
1941 “document-format-details” Operation attribute, the Printer MUST support this “document-format-details” Document
1942 Description attribute.

1943 8.2.12 document-format-details-detected (1setOf collection)

1944 This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format
1945 details of the Document object. The member attributes are the same as the “document-format-details” Operation
1946 attribute (see section 6.1.4 for the semantics) and Document Description attribute (see section 8.2.11). Before the
1947 document format details are known, the Printer populates this attribute's member attributes with a zero length string.
1948 As the Printer processes the Document object, the Printer populates this attribute's member attributes with the actual
1949 values detected⁷⁰ whether or not the client supplied a “document-format-details” Operation attribute in the Document
1950 Creation operation. This value will differ from the value submitted by the client, if the Printer automatically senses the
1951 document format details by examining the document content, such as when the “document-format” attribute has the
1952 value: ‘application/octet-stream’ (see [rfc2911] section 4.1.9.1).

⁶⁹ [RFC2911] did not define a “document-format” Document Description attribute; it is a new attribute defined in this specification.

⁷⁰ 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”).

1953 **8.2.13 document-format-detected (mimeMediaType)**

1954 This OPTIONAL Document Description attribute is generated by the Printer to indicate the actual document format of
1955 the Document object content. This value will differ from the value submitted by the client or defaulted by the Printer,
1956 if the Printer automatically senses the document format by examining the document content, such as when the
1957 "document-format" attribute has the value: 'application/octet-stream' (see [rfc2911] section 4.1.9.1). Before the
1958 document format is known, the Printer populates this attribute with a zero length string.

1959 **8.2.14 document-format-version (text(127))**

1960 This OPTIONAL Document Description attribute specifies the version of the document format of the Document
1961 Object content. The Printer sets this Document Description attribute from the corresponding "document-format-
1962 version" Operation attribute (section 6.1.5 for the semantics), if supplied by the client in the Document Creation
1963 operation (see section 3.1). If a Printer supports the "document-format-version" Operation attribute, the Printer
1964 MUST support this "document-format-version" Document Description attribute.

1965 **8.2.15 document-job-id (integer(1:MAX))**

1966 This REQUIRED Document Description attribute is a *copy* of the Job's "job-id" Job Description attribute (see
1967 [rfc2911] §4.3.2), i.e., the "job-id" of the Job containing this Document.

1968 **8.2.16 document-job-uri (uri)**

1969 This REQUIRED Document Description attribute is a *copy* of the Job's "job-uri" Job Description attribute (see
1970 [rfc2911] §4.3.1), i.e., the URI of the Job that contains this Document. Example:
1971 `ipp://www.company.com/printers/myprinter/jobs/22`

1972 **8.2.17 document-message (text(MAX))**

1973 This OPTIONAL Document Description contains a message from either (1) the user to the operator about the
1974 Document or (2) from the operator, system administrator, or "intelligent" process to indicate to the end user the
1975 reasons for modification or other management action taken on the Document. The Printer populates this Document
1976 Description attribute from the "document-message" (text(MAX) Operation attribute value supplied by the client in any
1977 of the Document Creation operations (see section 3.1.1) or in a Cancel-Document operation (see section 3.8).

1978 In addition, the user and the operator can set the value of this Document Description attribute explicitly using the Set-
1979 Document-Attributes operation (see section 3.7).

1980 **8.2.18 document-name (name(MAX))**

1981 This REQUIRED Document Description attribute specifies the name of the document (see [rfc2911] §3.2.1.1). The
1982 Printer sets this Document Description attribute from the corresponding Operation attribute supplied by the client in
1983 the Document Creation operation (see section 3.1).

1984 This attribute may be modified by a client using the Set-Documents-Attributes operation (see section 3.7).

1985 **8.2.19 document-natural-language (naturalLanguage)**

1986 This OPTIONAL Document Description attribute specifies the natural language of the Document Object content. The
1987 Printer sets this Document Description attribute from the corresponding "document-natural-language" Operation
1988 attribute (section 6.1.6 for the semantics), if supplied by the client in the Document Creation operation (see section
1989 3.1). If a Printer supports the "document-natural-language" Operation attribute, the Printer MUST support this
1990 "document-natural-language" Document Description attribute.

1991 **8.2.20 document-number (integer(1:MAX))**

1992 This REQUIRED Document Description attribute is the ordinal number of the document within the job which
1993 determines its order of being printed in a multi-document job. The Printer MUST generate the values monotonically
1994 increasing from 1 for each job.

1995 **8.2.21 document-printer-uri (uri)**

1996 This REQUIRED Document Description attribute is a copy of the "printer-uri" Operation attribute (see [rfc2911]
1997 §3.1.5), i.e., the URI of the Printer containing the Job which contains this Document. Example:
1998 ipp://www.company.com/printers/myprinter.

1999 **8.2.22 document-state (type1 enum) and job-state (type1 enum)**

2000 The REQUIRED "job-state" and the REQUIRED "document-state" Document Description attributes identify the
2001 current state of the job and document, respectively. Even though IPP defines seven values for job/document states
2002 (plus the out-of-band 'unknown' value - see [rfc2911] section 4.1), implementations only need to support those states
2003 which are appropriate for the particular implementation. In other words, an IPP Printer object implementation
2004 supports only those job/document states implemented by the output device and available to the IPP Printer object
2005 implementation.

2006 Table 12 lists the "job-state" and "document-state" attribute values.

2007 **Table 12 - "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

2008
2009 The (JD) and (J) notation below indicates whether the keyword is defined for the "job-state" and "document-state"
2010 attributes or just the "job-state" attribute as indicated in Table 12. 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

Value	Symbolic Name and Description
	<p>finishing, such as stapling, etc.,</p> <p>3. The Printer object has made the job ready for printing, but the output device is not yet printing it, either because the job hasn't reached the output device or because the job is queued in the output device or some other spooler, awaiting the output device to print it.</p> <p>When the job is in the 'processing' state, the entire job/document state includes the detailed status represented in the Printer object's "printer-state", "printer-state-reasons", and "printer-state-message" attributes.</p> <p>On the other hand, the 'processing' state for the Document indicates that the Document has begun to be processed. Even if the job stops being processed, the Document remains in the 'processing' state until it moves to one of the three terminal states.</p> <p>Implementations MAY include additional values in the job's/document's "job-state-reasons"/"document-state-reasons" attribute to indicate the progress of the job/document, such as adding the 'job-printing'/'printing' value to indicate when the output device is actually making marks on paper and/or the 'processing-to-stop-point' value to indicate that the Printer is in the process of canceling or aborting the job/document. Most implementations won't bother with this nuance.</p>
'6'	<p>'processing-stopped' (J): The job has stopped while processing for any number of reasons and will return to the 'processing' state as soon as the reasons are no longer present.</p> <p>The job's "job-state-reason" attribute MAY indicate why the job has stopped processing. For example, if the output device is stopped, the 'printer-stopped' value MAY be included in the job's "job-state-reasons" attribute.</p> <p>Note: When an output device is stopped, the device usually indicates its condition in human readable form locally at the device. A client can obtain more complete device status remotely by querying the Printer object's "printer-state", "printer-state-reasons" and "printer-state-message" attributes.</p>
'7'	<p>The 'processing-stopped' state does not apply to the Document object's "document-state" attribute.</p> <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>

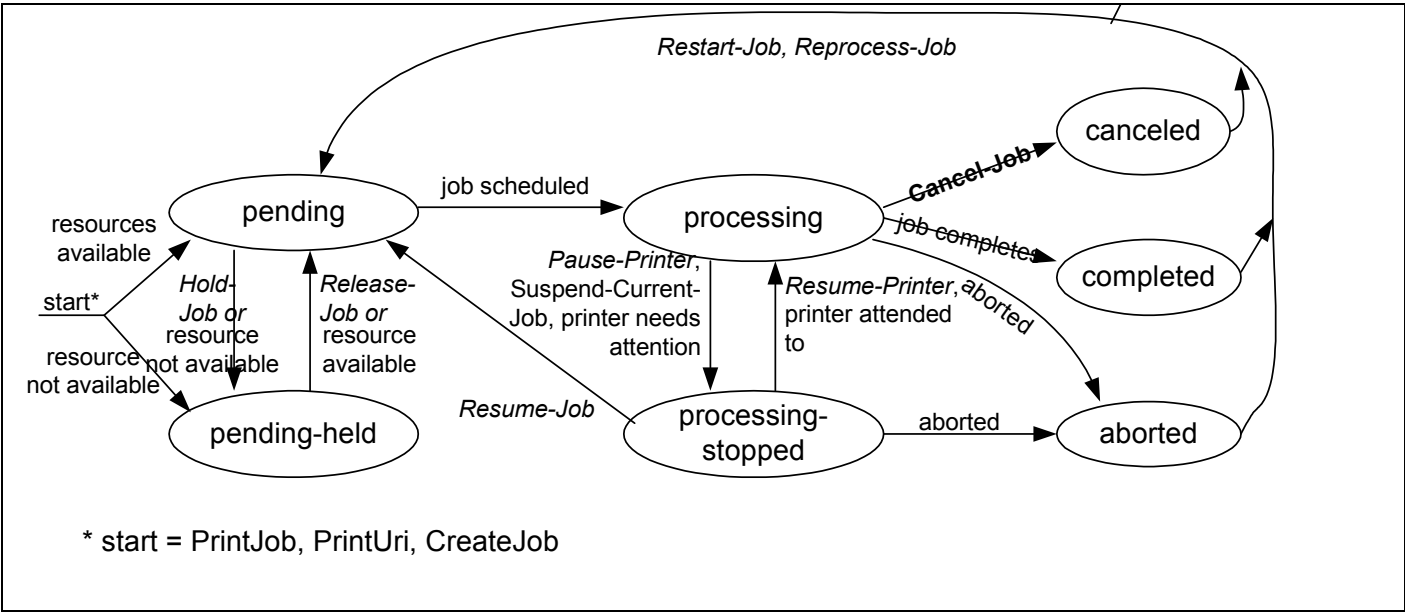
Value	Symbolic Name and Description
'9'	'completed' (JD): The job/document has completed successfully or with warnings or errors after processing and all of the job/document media sheets have been successfully stacked in the appropriate output bin(s) and all job/document status attributes have reached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

2011 The final value for this attribute MUST be one of: 'completed', 'canceled', or 'aborted' before the Printer removes the
2012 job/document altogether. The length of time that jobs/document remain in the 'canceled', 'aborted', and 'completed'
2013 states depends on implementation.

2014 Jobs/documents reach one of the three terminal states: 'completed', 'canceled', or 'aborted', after the jobs/documents
2015 have completed all activity, including stacking output media, after the jobs/documents have completed all activity,
2016 and all job/document status attributes have reached their final values for the job/document.

2017 **8.2.22.1 The “job-state” Job Description attribute and the Job Life Cycle**

2018 The “job-state” attribute is one of the most important Job Description attributes. Figure 1 shows the values of the
2019 “job-state” attribute and the Job object life cycle as affected by actions on the Job, Printer, and job processing.



2020

2021 **Figure 1 - The “job-state” Job Description attribute and the Job object life cycle**

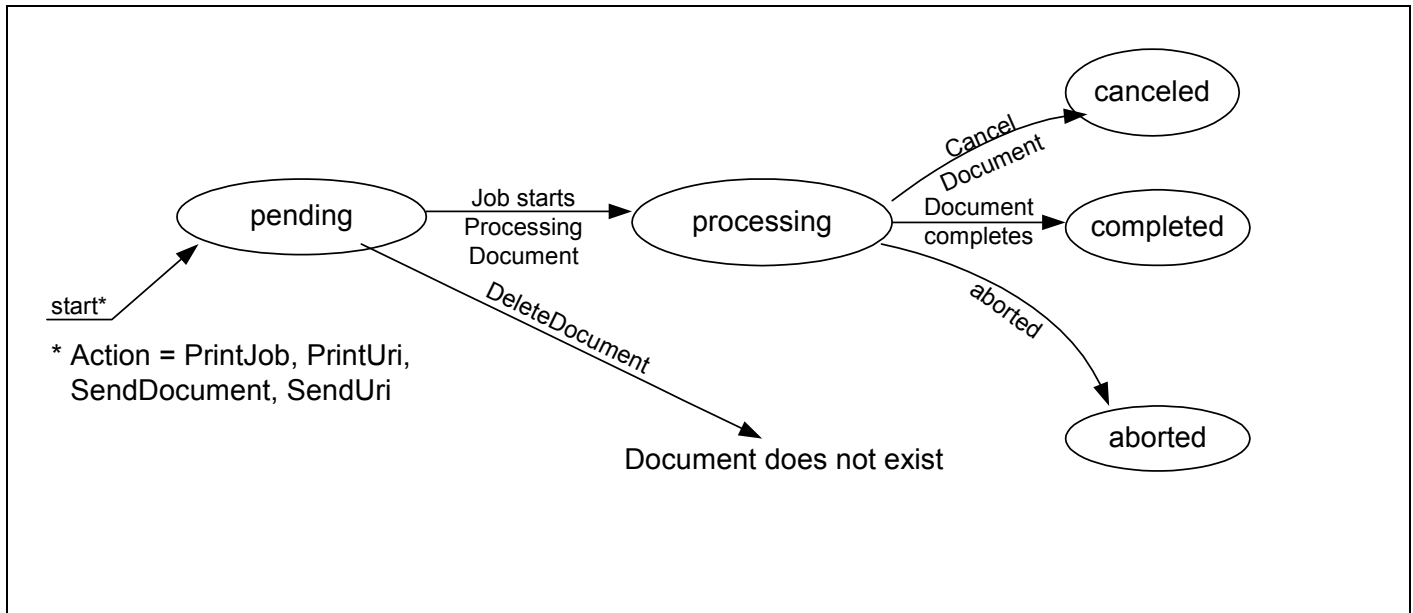
2022 Normally a job progresses from left to right. Other state transitions are unlikely, but are not forbidden. Not shown
2023 are the transitions to the 'canceled' state from the 'pending', 'pending-held', and 'processing-stopped' states.

2024 **8.2.22.2 The “document-state” Document Description attribute and the Document object life Cycle**

2025 The “document-state” attribute is one of the most important Document Description attributes. Figure 2 shows the
2026 values of the “document-state” attribute and the Document object life cycle as affected by actions on the Job,
2027 Document, Printer, and job processing. Documents are not active objects and their life cycle is closely tied to the

lifecycle of a Job⁷¹. 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).

2032
2033



2034

2035 **Figure 2 - The “document-state” Document Description attribute and the Document object life Cycle**

2036 A Document object has a much simpler life cycle than a Job object. A Document always progresses from left to right
2037 in the state diagram. No other state transitions are defined.

2038 8.2.22.3 Forwarding Servers

2039 As with all other IPP attributes, if the implementation can not determine the correct value for this attribute, it SHOULD
2040 respond with the out-of-band value 'unknown' (see [rfc2911] Section 4.1) rather than try to guess at some possibly
2041 incorrect value and give the end user the wrong impression about the state of the Job/Document object. For
2042 example, if the implementation is just a gateway into some printing system from which it can normally get status, but
2043 temporarily is unable, then the implementation should return the 'unknown' value. However, if the implementation is
2044 a gateway to a printing system that never provides detailed status about the print job/document, the implementation
2045 MAY set the IPP Job/Document object's state to 'completed', provided that it also sets the 'queued-in-device' value in
2046 the job's/document's "job-state-reasons"/"document-state-reasons" attribute (see "job-state-reasons"/"document-
2047 state-reasons" attribute below).

2048 8.2.22.4 Partitioning of Job/Document States

2049 This section partitions the job/document states into phases: Job/Document Not Completed, Job/Document
2050 Retention, Job/Document History, and Job/Document Removal. This section also explains the 'job-restartable' value
2051 of the "job-state-reasons" Job Description attribute for use with the Restart-Job operation.

⁷¹ 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.

2052 **Job/Document Not Completed:** When a job is in the 'pending', 'pending-held', 'processing', or 'processing-stopped'
2053 states, the job is not completed. When a Document is in the 'pending' or 'processing' state, it is not completed.

2054 **Job Retention:** When a job enters one of the three terminal job states: 'completed', 'canceled', or 'aborted', the IPP
2055 Printer object MAY "retain" the job in a restartable condition for an implementation-defined time period. This time
2056 period MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention. While
2057 in the Job Retention phase, the job's document data is retained and a client may restart the job using the Restart-Job
2058 operation. If the Printer supports the Restart-Job operation, then it SHOULD indicate that the job is restartable by
2059 adding the 'job-restartable' value to the job's "job-state-reasons" attribute (see section 8.2.24) during the Job
2060 Retention phase. If the Printer supports the Document object, then the Get-Document-Attributes and Get-
2061 Documents operations MUST be supported while the job is in the Job Retention phase.

2062 **Job History:** After the Job Retention phase expires for a job, the Printer object deletes the document data for the
2063 job and the job becomes part of the Job History. The Printer object MAY also delete any number of the job and
2064 document attributes. Since the job is no longer restartable, the Printer object MUST remove the 'job-restartable'
2065 value from the job's "job-state-reasons" attribute, if present. If the implementation supports the Document object, it
2066 SHOULD retain at least the "document-state" and "document-state-reasons" attributes on the Document object
2067 during the Job History phase which can be queried using the Get-Document-Attributes and Get-Documents
2068 operations.

2069 **Job Removal:** After the job has remained in the Job History for an implementation-defined time, such as when the
2070 number of jobs exceeds a fixed number or after a fixed time period (which MAY be zero seconds), the IPP Printer
2071 removes the Job and Document objects from the system.

2072 Using the Get-Jobs/Get-Documents operation and supplying the 'not-completed' value for the "which-jobs" Operation
2073 attribute, a client is requesting jobs/documents in the Job/Document Not Completed phase. Using the Get-Jobs/Get-
2074 Documents operation and supplying the 'completed' value for the "which-jobs" Operation attribute, a client is
2075 requesting jobs/documents in the Job Retention and Job History phases. Using the Get-Job-Attributes/Get-
2076 Document-Attributes operation, a client is requesting a job/documents in any phase except Job Removal. After Job
2077 Removal, the Get-Job-Attributes/Get-Documents and Get-Jobs/Get-Documents operations no longer are
2078 capable of returning any information about a job/document.

2079 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

2080 **8.2.23 document-state-message (text(MAX)) and job-state-message (text(MAX))**

2081 This OPTIONAL Document Description attribute specifies information about the "job-state"/"document-state" and
2082 "job-state-reasons"/"document-state-reasons" attributes in human readable text. If the Printer object supports this
2083 attribute, the Printer object MUST be able to generate this message in any of the natural languages identified by the
2084 Printer's "generated-natural-language-supported" attribute (see the "attributes-natural-language" Operation attribute
2085 specified in [rfc2911] Section 3.1.4.1).

2086 The value SHOULD NOT contain additional information not contained in the values of the "job-state" and "job-states-
2087 reasons" attributes, such as interpreter error information. Otherwise, application programs might attempt to parse the
2088 (localized text). For such additional information such as interpreter errors for application program consumption or
2089 specific document access errors, new attributes with keyword values, needs to be developed and registered.

2090 **8.2.24 document-state-reasons (1setOf type2 keyword) and job-state-reasons(1setOf type2 2091 keyword)**

2092 The REQUIRED "job-state-reasons" and the REQUIRED "document-state-reasons" Document Description attributes
2093 provide additional information about the job's and each document's current state, i.e., information that augments the
2094 value of the job's "job-state" attribute and each Document's "document-state" attribute, respectively. The Printer

2095 SHOULD support the same values for both the "job-state-reasons" and the "document-state-reasons" attribute for
2096 those attributes that are defined for both as indicated in the "Job" and "Doc" columns in Table 13.

2097 These values MAY be used with any job or document state or states for which the reason makes sense. Some of
2098 these value definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when
2099 implemented, the Printer MUST return these values when the reason applies and MUST NOT return them when the
2100 reason no longer applies whether the value of the Job's "job-state" attribute or the Document's "document-state"
2101 attribute changed or not. When the Job or Document does not have any reasons for being in its current state, the
2102 value of the Job's "job-state-reasons" attribute or Document's "document-state-reasons" attribute MUST be 'none'.

2103 Some of the Job's "job-state-reasons" values affect job scheduling, such as 'resources-are-not-ready' and 'job-hold-
2104 until-specified'. However, "document-state-reasons" values MUST NOT affect job scheduling, since Document
2105 objects are passive objects operated on by the containing Job object.

2106 Note: While values cannot be added to the "job-state" or "document-state" attributes without impacting deployed
2107 clients that take actions upon receiving "job-state" or "document-state" values, it is the intent that additional "job-
2108 state-reasons" and "document-state-reasons" values can be defined and registered without impacting such deployed
2109 clients. In other words, the "job-state-reasons" and the "document-state-reasons" attributes are intended to be
2110 extensible.

2111 Table 13 lists the standard keyword values for the "job-state-reasons" and/or "document-state-reasons" attributes
2112 defined in this and other IPP specifications as indicated in the References column. In Table 13 the keywords are
2113 listed in alphabetic order (observing the "[job-]" prefix), while in their descriptions following Table 13, they are listed in
2114 the most likely order of occurrence to help understanding.

2115 When the Document object is supported, the Printer implementation SHOULD still support the corresponding Job
2116 level "job-state-reasons", so that clients that do not support the Document object will receive the same information.
2117 Also it is usually more convenient for the client to obtain just the Job level status. However, the client SHOULD
2118 query both Job and Document attributes and convert them to some canonical form for display to the user, so that all
2119 Jobs and their Documents are displayed in a uniform manner, no matter from which clients they were submitted.

2120 **Notation:**

2121 [job-] indicates a state reason keyword value that has the 'job-' prefix when it is a value of the "job-state-reasons"
2122 attribute, but does not have the 'job-' prefix when it is a value of the "document-state-reasons" attribute⁷².
2123 For purposes of sorting in Table 13, the "[job-]" prefix is observed, since this is an IPP specification.
2124 "-" indicates that the Job or Document value is *not* defined.

2125 **Table 13 - "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	- ⁷³	MUST	[rfc2911] §4.3.8
document-state-reasons	1setOf type2 keyword	-	y	MUST	8.2.24
	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

⁷² 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.

⁷³ 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]-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
	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

2126

2127

2128

2129

2130

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 13 indicating whether the keyword is defined for the "job-state-reasons" and/or "document-state-reasons" attributes:

2131

2132

'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

2133 value and MUST be used when there is no other value, since the 1setOf attribute syntax requires at
2134 least one value.

2135 **'job-hold-until-specified' (J):** The value of the job's "job-hold-until" attribute was specified with a time
2136 period that is still in the future. The job MUST NOT be a candidate for processing until this reason is
2137 removed and there are no other reasons to hold the job. This value SHOULD be supported if the
2138 "job-hold-until" Job Template attribute is supported.

2139 **'job-password-wait' (J):** The Job is currently being held until the correct password is entered at the device.
2140 If the "job-password" (octetString(255)) Operation attribute (See [ippsave] section 4.1) is supported,
2141 this value MUST be supported.

2142 **'proof-print-wait' (J):** The job is currently being held until the operator verifies the output of the proof print
2143 and performs a Release-Job operation. If the "proof-print" (collection) Job Template attribute (See
2144 [ippsave] section 5.9) is supported, this value MUST be supported.

2145 **'resources-are-not-supported' (JD):** At least one of the resources needed by the job/document, such as
2146 media, fonts, resource objects, etc., is not supported on any of the physical printers for which the
2147 job/document is a candidate. This condition MAY be detected when the job/document is accepted,
2148 or subsequently while the job/document is pending or processing, depending on implementation.
2149 The job/document may (1) remain in its current state, (2) be moved to the 'pending-held' state,
2150 depending on implementation and/or job scheduling policy, or (3) scheduled normally, but the Printer
2151 is put into the 'stopped' state when the job/document is attempted to be processed on the Printer.
2152 This value is intended for use with an implementation that supports the "user-defined-values-
2153 supported" Printer attribute (see [pwg5100.3] section 6.1) which allows a job to be accepted with an
2154 unsupported 'name' value.

2155 **'resources-are-not-ready' (JD):** At least one of the resources needed by the job/document, such as media,
2156 fonts, resource objects, etc., is not ready on any of the physical printer's for which the job/document
2157 is a candidate. This condition MAY be detected when the job/document is accepted, or
2158 subsequently while the job/document is pending or processing, depending on implementation. The
2159 job/document may remain in its current state or be moved to the 'pending-held' state, depending on
2160 implementation and/or job/document scheduling policy.

2161 **'[job]-incoming' (JD):** Either (1) the Printer has accepted the Create-Job operation and is expecting
2162 additional Send-Document and/or Send-URI operations or (2) the Printer is retrieving/accepting
2163 document data as a result of a Print-Job, Print-URI, Send-Document or Send-URI operation.

2164 **'[job]-spooling' (JD):** Same as 'job-incoming' with the specialization that the Printer is spooling the
2165 Job/Document data before processing it. This value corresponds to the 'spool' or 'automatic' value of
2166 the "job-spooling-supported" Printer Description attribute.

2167 **'[job]-streaming' (JD):** Same as 'job-incoming' with the specialization that the Printer is processing the
2168 Job/Document data as it is being received (that is, the document is not being spooled, but rather is
2169 being processed in chunks by the output device and is being imaged during reception). This value
2170 corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer Description
2171 attribute.

2172 **'job-data-insufficient' (J):** The Create-Job operation has been accepted by the Printer, but the Printer is
2173 expecting additional document data before it can move the job into the 'processing' state. If a Printer
2174 starts processing before it has received all data, the Printer removes the 'job-data-insufficient'
2175 reason, but the 'job-incoming' remains. If a Printer starts processing after it has received all data, the
2176 Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at the same time.

2177 **'unsupported-compression' (JD):** The job/document was aborted by the system because the Printer
2178 determined while attempting to decompress the document-data's that the compression is actually not
2179 among those supported by the Printer. This value MUST be supported, since "compressions is a
2180 REQUIRED Operation attribute.

- 2181 **'compression-error' (JD):** The job/document was aborted by the system because the Printer encountered
2182 an error in the document-data while decompressing it. If the Printer posts this reason, the document-
2183 data has already passed any tests that would have led to the 'unsupported-compression' job-state-
2184 reason/document-state-reason.
- 2185 **'document-access-error' (JD):** After accepting a Print-URI or Send-URI request, the Printer could not
2186 access one or more documents passed by reference. This reason is intended to cover any file
2187 access problem, including file does not exist and access denied because of an access control
2188 problem. The Printer MAY also indicate the document access error using the "job-document-access-
2189 errors" Job Description attribute (see the description of "job-document-access-errors" above).
2190 Whether the Printer aborts the job/document and moves the job/document to the 'aborted' job state
2191 or prints all documents that are accessible and moves the job/document to the 'completed'
2192 job/document state and adds the 'completed-with-errors' value in the job's "job-state-reasons" or
2193 document's "document-state-reasons" attribute depends on implementation and/or site policy. This
2194 value SHOULD be supported if the Print-URI or Send-URI operations are supported.
- 2195 **'unsupported-document-format' (JD):** The job/document was aborted by the system because the
2196 document-data's document-format is not among those supported by the Printer. If the client
2197 specifies the document-format as 'application/octet-stream', the printer MAY abort the job/document
2198 and post this reason even though the format is a member of the "document-format-supported" printer
2199 attribute, but not among the auto-sensed document-formats. This value MUST be supported, since
2200 "document-format" is a REQUIRED Operation attribute.
- 2201 **'document-format-error' (JD):** The job/document was aborted by the system because the Printer
2202 encountered an error in the document-data while processing it. If the Printer posts this reason, the
2203 document-data has already passed any tests that would have led to the 'unsupported-document-
2204 format' job-state-reason/document-state-reason.
- 2205 **'submission-interrupted' (JD):** The job or document was not completely submitted for some unforeseen
2206 reason, such as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or
2207 the document transfer method has crashed in some non-recoverable way before the document data
2208 was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-
2209 out period. See the description of the "multiple-operation-time-out" Printer attribute in [rfc2911]
2210 Section 4.4.31.
- 2211 **'[job-]outgoing' (JD):** The Printer is transmitting the job/document to the output device.
- 2212 **'job-scheduling' (J):** The printer is in the process of scheduling the processing for the Job.
- 2213 **'[job-]queued' (JD):** Job is in the 'processing' state, but more specifically, the Printer has queued the
2214 Document data.
- 2215 **'[job-]transforming' (JD):** Job/document is in the 'processing' state, but more specifically, the Printer is
2216 interpreting document data and producing another electronic representation.
- 2217 **'[job-]interpreting' (JD):** Job/document is in the 'processing' state, but more specifically, the Printer is
2218 interpreting the document data.
- 2219 **'[job-]queued-for-marker' (JD):** Job/document is in any of the 'pending-held', 'pending', or 'processing'
2220 states, but more specifically, the Printer has completed enough processing of the document to be
2221 able to start marking and the job/document is waiting for the marker. Systems that require human
2222 intervention to release jobs using the Release-Job operation, put the job into the 'pending-held' job
2223 state. Systems that automatically select a job to use the marker put the job into the 'pending' job
2224 state or keep the job in the 'processing' job state while waiting for the marker, depending on
2225 implementation. All implementations put the job/document into (or back into) the 'processing' state
2226 when marking does begin.
- 2227 **'[job-]printing' (JD):** The output device is marking media. This value is useful for Printers which spend a
2228 great deal of time processing (1) when no marking is happening and then want to show that marking
2229 is now happening or (2) when the job/document is in the process of being canceled or aborted while

- 2230 the job/document remains in the 'processing' state, but the marking has not yet stopped so that
2231 impression or sheet counts are still increasing for the job/document.
- 2232 **'printer-stopped-partly' (J):** The value of the Printer's "printer-state-reasons" attribute contains the value
2233 'stopped-partly'.
- 2234 **'printer-stopped' (J):** The value of the Printer's "printer-state" attribute is 'stopped'.
- 2235 **'job-suspending' (J):** The printer is in the process of moving the Job from a processing condition to a
2236 suspended condition where other jobs can be processed.
- 2237 **'job-suspended' (J):** The job has been suspended while processing using the Suspend-Current-Job
2238 operation and other jobs can be processed on the Printer. The Job can be resumed using the
2239 Resume-Job operation which removes this value. Note: Documents cannot be suspended and there
2240 is no Suspend-Current-Document operation.
- 2241 **'job-suspended-by-operator' (J):** The Job has been indefinitely suspended by the printer operator.
- 2242 **'job-suspended-by-user' (J):** The Job has been indefinitely suspended by the user.
- 2243 **'job-suspended-by-system' (J):** The Job has been indefinitely suspended by the Printer's system software
2244 during normal processing of the job.
- 2245 **'job-resuming' (J):** The printer is in the process of moving the Job from a suspended condition to become a
2246 candidate for processing.
- 2247 **'[job]-canceled-by-user' (JD):** The job/document was canceled by the owner of the job using the Cancel-
2248 Job/Cancel-Document request, i.e., by a user whose authenticated identity is the same as the value
2249 of the originating user that created the Job object, or by some other authorized end-user, such as a
2250 member of the job owner's security group. This 'job-canceled' value SHOULD be supported. The
2251 'canceled-by-user' value SHOULD be supported for the "document-state-reasons" attributes for use
2252 with the Cancel-Document.
- 2253 **'[job]-canceled-by-operator' (JD):** The job/document was canceled by the operator using the Cancel-
2254 Job/Cancel-Document request, i.e., by a user who has been authenticated as having operator
2255 privileges (whether local or remote). If the security policy is to allow anyone to cancel anyone's
2256 job/document, then these values may be used when the job/document is canceled by other than the
2257 owner of the job. For such a security policy, in effect, everyone is an operator as far as canceling
2258 jobs/documents is concerned. These values SHOULD be supported if the implementation permits
2259 canceling by other than the owner of the job.
- 2260 **'[job]-canceled-at-device' (JD):** The job/document was canceled by an unidentified local user, i.e., a user
2261 at a console at the device. This value SHOULD be supported if the implementation supports
2262 canceling jobs/documents at the console.
- 2263 **'aborted-by-system' (JD):** The job/document (1) is in the process of being aborted, (2) has been aborted by
2264 the system and placed in the 'aborted' state, or (3) has been aborted by the system and placed in the
2265 'pending-held' state, so that a user or operator can manually try the job/document again. This value
2266 SHOULD be supported.
- 2267 **'processing-to-stop-point' (J):** The requester has issued a Cancel-Job/Cancel-Document operation or the
2268 Printer object has aborted the job/document, but is still performing some actions on the job/document
2269 until a specified stop point occurs or job/document termination/cleanup is completed.
2270 If the implementation requires some measurable time to cancel the job/document in the 'processing'
2271 or 'processing-stopped' job/document states, the Printer MUST use this value to indicate that the
2272 Printer object is still performing some actions on the job/document while the job/document remains in
2273 the 'processing' or 'processing-stopped' state. After all the job's/document's job/document
2274 description attributes have stopped incrementing, the Printer object moves the job/document from
2275 the 'processing' state to the 'canceled' or 'aborted' job/document states.

- 2276 **'service-off-line' (J):** The Printer is off-line and accepting no jobs. All 'pending' jobs are put into the
 2277 'pending-held' state. This situation could be true if the service's or document transform's input is
 2278 impaired or broken.
- 2279 **'[job-]warnings-detected' (JD):** If the Printer supports these values, the Printer MUST add the value to "job-
 2280 state-reasons" / "document-state-reasons" when it generates the first warning message. That is, a
 2281 single occurrence of this value is present in the "job-state-reasons" / "document-state-reasons" if the
 2282 Printer has generated one or more warnings.
- 2283 **'[job-]completed-successfully' (JD):** The job/document completed successfully. There were no warnings
 2284 or errors in printing. This value SHOULD be supported.
- 2285 **'[job-]completed-with-warnings' (JD):** The print part of the job/document completed with warnings
 2286 (whether or not there were save errors). This value SHOULD be supported if the implementation
 2287 detects warnings. [rfc2911]
- 2288 **'[job-]completed-with-errors' (JD):** The print part of the job/document completed with errors (and possibly
 2289 warnings too) (whether or not there were save errors). This value SHOULD be supported if the
 2290 implementation detects errors. [rfc2911]
- 2291 **'job-saving' (J):** The Printer is transmitting the Job to the save location. This is similar to the 'job-printing'
 2292 value.
- 2293 **'job-saved-successfully' (J):** The Printer saved the Job successfully.
- 2294 **'job-save-error' (J):** The Printer did not save the Job successfully (whether or not it was printed successfully,
 2295 printed with warnings, printed with errors, or not printed). The Printer MUST ensure that none of the
 2296 saved job is accessible, if it was unable to successfully save all of the job.
- 2297 **'job-restartable' (J):** This job is retained (see the description of "job-state" above, specifically "Partitioning of
 2298 Job States") and is currently able to be restarted using the Restart-Job operation (see [rfc2911]
 2299 Section 3.3.7). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the Printer
 2300 MUST accept a Restart-Job operation for that job. This value SHOULD be supported if the Restart-
 2301 Job operation is supported.
- 2302 **'queued-in-device' (JD):** The job/document has been forwarded to a device or print system that is unable to
 2303 send back status. The Printer sets the job's/document's "job-state" / "document-state" attribute to
 2304 'completed' and adds the 'queued-in-device' value to the job's/document's "job-state-reasons" /
 2305 "document-state-reasons" attribute to indicate that the Printer has no additional information about the
 2306 job/document and never will have any better information. See the description of the "job-state" /
 2307 "document-state" attribute above, specifically the portion on "Forwarding Servers".
- 2308 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

2309 8.2.25 document-uri (uri)

2310 This Document Description attribute is the URI that the client supplied in the corresponding Operation attribute in a
 2311 Send-URI operation (see [rfc2911] section 3.3.2). The Printer MUST support this attribute if the Printer supports the
 2312 Send-URI operation (see section 3.4).

2313 8.2.26 impressions-completed-current-copy (integer(0:MAX))

2314 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
 2315 attribute (see [rfc3381] §4.4) applied to the Document object.

2316 **8.2.27 [job-]detailed-status-message (1setOf text(MAX))**

2317 This OPTIONAL "detailed-status-message" Document Description attribute has the same semantics as the
2318 corresponding "job-detailed-status-message" Job Description attribute (see [rfc2911] §4.3.10) applied to the
2319 Document object.

2320 **8.2.28 [job-]document-access-errors (1setOf text(MAX))**

2321 This OPTIONAL "document-access-errors" Document Description attribute has the same semantics as the
2322 corresponding "job-detailed-status-message" Job Description attribute (see [rfc2911] §4.3.11) applied to the
2323 Document object.

2324 **8.2.29 [job-]impressions (integer(0:MAX))**

2325 This OPTIONAL "impressions" Document Description attribute has the same semantics as the corresponding "job-
2326 impressions" Job Description attribute (see [rfc2911] §4.3.17.2) applied to the Document object. The Printer sets
2327 this Document Description attribute from the corresponding Operation attribute supplied by the client in the
2328 Document Creation operation (see section 3.1).

2329 **8.2.30 [job-]impressions-completed (integer(0:MAX))**

2330 This OPTIONAL "impressions-completed" Document Description attribute has the same semantics as the
2331 corresponding "job-impressions-completed" Job Description attribute (see [rfc2911] §4.3.18.2) applied to the
2332 Document object.

2333 **8.2.31 [job-]k-octets (integer(0:MAX))**

2334 This OPTIONAL "k-octets" Document Description attribute has the same semantics as the corresponding "job-k-
2335 octets" Job Description attribute (see [rfc2911] §4.3.17.1) applied to the Document object. The Printer sets this
2336 Document Description attribute from the corresponding Operation attribute supplied by the client in the Document
2337 Creation operation (see section 3.1).

2338 **8.2.32 [job-]k-octets-processed (integer(0:MAX))**

2339 This OPTIONAL "k-octets-processed" Document Description attribute has the same semantics as the corresponding
2340 "job-k-octets-processed" Job Description attribute (see [rfc2911] §4.3.18.1) applied to the Document object.

2341 **8.2.33 [job-]media-sheets (integer(0:MAX))**

2342 This OPTIONAL "media-sheets" Document Description attribute has the same semantics as the corresponding "job-
2343 media-sheets" Job Description attribute (see [rfc2911] §4.3.17.3) applied to the Document object. The Printer sets
2344 this Document Description attribute from the corresponding Operation attribute supplied by the client in the
2345 Document Creation operation (see section 3.1).

2346 **8.2.34 [job-]media-sheets-completed (integer(0:MAX))**

2347 This OPTIONAL "media-sheets" Document Description attribute has the same semantics as the corresponding "job-
2348 media-sheets-completed" Job Description attribute (see [rfc2911] §4.3.18.3) applied to the Document object.

2349 **8.2.35 [job-]more-info (uri)**

2350 This OPTIONAL "more-info" Document Description attribute has the same semantics as the corresponding "job-
2351 more-info" Job Description attribute (see [rfc2911] §4.3.4) applied to the Document object.

2352 8.2.36 [job-]printer-up-time (integer (1:MAX))

2353 This REQUIRED "printer-up-time" Document Description attribute indicates the amount of time (in seconds) that the
2354 Printer implementation has been up and running. This attribute is an alias for the "printer-up-time" Printer Description
2355 attribute (see [rfc2911] section 4.4.29).

2356 A client MAY request this attribute in a Get-Document-Attributes or Get-Documents request and use the value
2357 returned in combination with other requested Event Time Job Description Attributes in order to display time attributes
2358 to a user. The difference between this attribute and the 'integer' value of a "time-at-xxx" attribute is the number of
2359 seconds ago that the "time-at-xxx" event occurred. A client can compute the wall-clock time at which the "time-at-
2360 xxx" event occurred by subtracting this difference from the client's wall-clock time.

2361 8.2.37 [job-]warnings-count (integer(0:MAX))

2362 This OPTIONAL "warnings-count" Document Description attribute has the same semantics as the corresponding
2363 "job-warnings-count" Job Description attribute (see [pwg5100.4] §6.1.) applied to the Document object. See
2364 [pwg5100.4] §6.1.

2365 8.2.38 last-document (boolean)

2366 This OPTIONAL Document Description attribute indicates whether or not this Document is the last Document in the
2367 Job. See [rfc2911] §4.3.12. The Printer sets this Document Description attribute from the corresponding Operation
2368 attribute supplied by the client in the Document Creation operation (see section 3.1). If the client issues the Close-
2369 Job operation (see section 4.4.1), the Printer sets the value of the "last-document" Document Description attribute of
2370 the last document in the Job to 'true'.

2371 8.2.39 output-device-assigned (name(127))

2372 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
2373 attribute (see [rfc2911] §4.3.7.2) applied to the Document object.

2374 8.2.40 sheet-completed-copy-number (integer(0:MAX))

2375 This OPTIONAL Document Description attribute has the same semantics as the corresponding Job Description
2376 attribute (see [rfc3381] §4.2) applied to the Document object.

2377 8.2.41 time-at-completed (integer (MIN:MAX))

2378 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
2379 attribute (see [rfc2911] §4.3.14.3) applied to the Document object.

2380 8.2.42 time-at-creation (integer (MIN:MAX))

2381 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
2382 attribute (see [rfc2911] §4.3.14.1) applied to the Document object.

2383 8.2.43 time-at-processing (integer (MIN:MAX))

2384 This REQUIRED Document Description attribute has the same semantics as the corresponding Job Description
2385 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: 1. “xxx-supported” indicate the supported values 2. “xxx-default” indicate the values that will be used if the client and the PDL omit the attribute. 3. “xxx-ready” indicate the supported values that are available without human intervention, for those few attributes that require human intervention, such as “media” and possibly “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: 1. “xxx-supported” indicate the supported values 2. “xxx-default” indicate the values that will be used if the client and the PDL omit the attribute. 3. “xxx-ready” indicate the supported values that are available without human intervention, for those few attributes that require human intervention, such as “media” and possibly “finishing”. 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 10. 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.

2409

Table 14 - Printer attributes (Job Template and Printer Description)

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
attributes-charset-supported	1setOf charset	PD	MUST	§9.1
attributes-natural-language-supported	1setOf naturalLanguage	PD	MUST	§9.2
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,DT	MAY	[rfc2911] §4.2.5
copies-supported	rangeOfInteger(1:MAX)	JT,DT	MAY	[rfc2911] §4.2.5
cover-back-default	collection	JT,DT	MAY	[pwg5100.3] §3.1.3
cover-back-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.1.4
cover-front-default	collection	JT,DT	MAY	[pwg5100.3] §3.1.3
cover-front-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.1.4
cover-type-supported	1setOf type2 keyword	-	MAY	[pwg5100.3] §3.1.2.1
document-charset-default	charset	PD	CMUST ⁷⁴	[this-spec] §9.3
document-charset-supported	1setOf charset	PD	CMUST ⁷⁴	[this-spec] §9.4
document-creation-attributes-supported	1setOf type2 keyword	PD	MUST	[this-spec] §9.5
document-digital-signature-default	type2 keyword	PD	MAY	[this-spec] §9.6
document-digital-signature-supported	1setOf type2 keyword	PD	MAY	[this-spec] §9.7
document-format-default	mimeMediaType	PD	MUST	[rfc2911] §4.4.21
document-format-details-supported	1setOf type2 keyword	PD	CMUST ⁷⁵	§9.9
document-format-details-implemented	1setOf collection	PD	CMUST ⁷⁵	§9.10
document-format-supported	1setOf mimeMediaType	PD	MUST	[rfc2911] §4.4.22
document-format-varying-attributes	1setOf type2 keyword	PD	MAY	[rfc3380] §6.3
document-format-version-default	text(127)	PD	MAY	§9.11
document-format-version-supported	1setOf text(127)	PD	MAY	§9.12
document-natural-language-default	naturalLanguage	PD	MAY	§9.13
document-natural-language-supported	1setOf naturalLanguage	PD	MAY	§9.14
document-overrides-supported TO BE DELETED in next version of [pwg5100.4]	1setOf type2 keyword	JT,DT	MAY	[pwg5100.4] §5.1.14
feed-orientation-default	type3 keyword	JT,DT	MAY	[ippsave] §5.1.1
feed-orientation-supported	1setOf type3 keyword	JT,DT	MAY	[ippsave] §5.1.2
finishings-col-default	collection	JT,DT	MAY	[pwg5100.3] §3.2.3
finishings-col-ready	1setOf collection	JT,DT	MAY	[pwg5100.3] §3.2.4
finishings-col-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.2.5
finishings-default	1setOf type2 enum	JT,DT	MAY	[rfc2911] §4.2.6
finishings-ready	1setOf type2 enum	JT,DT	MAY	[rfc2911] §4.2.6
finishings-supported	1setOf type2 enum	JT,DT	MAY	[rfc2911] §4.2.6
finishing-template-supported	1setOf name(MAX)	-	MAY	[pwg5100.3] §3.2.1.1

⁷⁴ The Printer MUST support the “document-charset-default” and “document-charset-supported” Printer Description attributes, if the Printer supports a charset-ambiguous document format (see section 6.1.1).

⁷⁵ The Printer MUST support the “document-format-details-supported” and “document-format-details-implemented” Printer attributes if the Printer supports a packaging document format, such as application/zip or multipart/related.

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
font-name-requested-default	name(MAX)	JT,DT	MAY	[ippsave] §5.2.1
font-name-requested-supported	1setOf name(MAX)	JT,DT	MAY	[ippsave] §5.2.2
font-size-requested-default	integer (1:MAX)	JT,DT	MAY	[ippsave] §5.3.1
font-size-requested-supported	1setOf integer (1:MAX)	JT,DT	MAY	[ippsave] §5.3.1
force-front-side-default	1setOf integer(1:MAX)	JT,DT	MAY	[pwg5100.3] §3.3
force-front-side-supported	rangeOfInteger(1:MAX)	JT,DT	MAY	[pwg5100.3] §3.3
generated-natural-language-supported	1setOf naturalLanguage	PD	MUST	[rfc2911] §4.4.20
imposition-template-default	type3 keyword name(MAX)	JT,DT	MAY	[pwg5100.3] §3.4
imposition-template-supported	1setOf (type3 keyword name(MAX))	JT,DT	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,DT	MAY	[pwg5100.3] §3.5.4
insert-sheet-supported	1setOf type2 keyword	JT,DT	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-copies-default	integer(1:MAX)	JT	MAY	[this-spec] §7.1.1
job-copies-supported	rangeOfInteger(1:MAX)	JT	MAY	[this-spec] §7.1.1
job-cover-back-default	collection	JT	MAY	[this-spec] §7.1.2
job-cover-back-supported	1setOf type2 keyword	JT	MAY	[this-spec] §7.1.2
job-cover-front-default	collection	JT	MAY	[this-spec] §7.1.3
job-cover-front-supported	1setOf type2 keyword	JT	MAY	[this-spec] §7.1.3
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
job-finishings-default	1setOf type2 enum	JT	MAY	[this-spec] §7.1.4
job-finishings-supported	1setOf type2 enum	JT	MAY	[this-spec] §7.1.4
job-finishings-col-default	collection	JT	MAY	[this-spec] §7.1.5
job-finishings-col-supported	1setOf type2 keyword	JT	MAY	[this-spec] §7.1.5
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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
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)	JT	MAY	[pwg5100.3] §3.12
job-sheet-message-supported	boolean	JT	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	- ⁷⁶	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,DT	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 name(MAX))	-	MAY	[pwg5100.3] §3.13.5.1
media-ready	1setOf (type3 keyword	JT,DT	MAY	[rfc2911] §4.2.11

⁷⁶ The Printer does not return the "media-col-database" attribute 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-recycled-supported	1setOf (type3 keyword name(MAX))	-	MAY	[pwg5100.3] §3.13.11.1
media-size-name-default	type3 keyword name(MAX)	JT	MAY	[this spec] §7.1.6
media-size-name-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[this spec] §7.1.6
media-size-supported	1setOf collection	-	MAY	[pwg5100.3] §3.13.8.3
media-supported	1setOf (type3 keyword name(MAX))	JT,DT	MAY	[rfc2911] §4.2.11
media-type-default	type3 keyword name(MAX)	JT,DT	MAY	[this spec] §7.1.7
media-type-supported	1setOf (type3 keyword name(MAX))	JT,DT -	MAY	[this spec] §7.1.7, [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,DT	MAY	[rfc2911] §4.2.9
number-up-supported	1setOf (integer(1:MAX) rangeOfInteger(1:MAX))	JT,DT	MAY	[rfc2911] §4.2.9
operations-supported	1setOf type2 enum	PD	MUST	[rfc2911] §4.4.15
orientation-requested-default	type2 enum	JT,DT	MAY	[rfc2911] §4.2.10
orientation-requested-supported	1setOf type2 enum	JT,DT	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,DT	MAY	[pwg5100.3] §3.15
page-delivery-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.15
page-order-received-default	type2 keyword	JT,DT	MAY	[pwg5100.3] §3.16
page-order-received-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.16
page-overrides-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.4] §5.2.9
page-ranges-supported	boolean	JT,DT	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

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
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,DT	MAY	[pwg5100.3] §3.17
presentation-direction-number-up-supported	1setOf type2 keyword	JT,DT	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,DT	MAY	[rfc2911] §4.2.12
printer-resolution-supported	1setOf resolution	JT,DT	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,DT	MAY	[rfc2911] §4.2.13
print-quality-supported	1setOf type2 enum	JT,DT	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,DT	MAY	[pwg5100.3] §3.18.3
separator-sheets-supported	1setOf type2 keyword	JT,DT	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,DT	MAY	[rfc3381] §3.1
sheet-collate-supported	1setOf type2 keyword	JT,DT	MAY	[rfc3381] §3.1
sides-default	type2 keyword	JT,DT	MAY	[rfc2911] §4.2.8
sides-supported	1setOf type2 keyword	JT,DT	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)	-	MAY	[pwg5100.3]

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
	rangeOfInteger(0:MAX))			§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
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,DT	MAY	[pwg5100.3] §3.19.2
x-image-position-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.19.2
x-image-shift-default	integer(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.3
x-image-shift-supported	rangeOfInteger(MIN:MAX)	JT,DT	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,DT	MAY	[pwg5100.3] §3.19.4
x-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.4
x-side2-image-shift-default	integer(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.5
x-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.5
y-image-position-default	type2 keyword	JT,DT	MAY	[pwg5100.3] §3.19.6
y-image-position-supported	1setOf type2 keyword	JT,DT	MAY	[pwg5100.3] §3.19.6
y-image-shift-default	integer(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.7
y-image-shift-supported	rangeOfInteger(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.7
y-side1-image-shift-default	integer(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.8
y-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.8
y-side2-image-shift-default	integer(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.9
y-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT,DT	MAY	[pwg5100.3] §3.19.9

The remainder of this section defines the Printer Description attributes that are not defined in other specifications. Most of these are “xxx-default” and “xxx-supported” Printer Description attributes. A Printer MUST support these Printer Description attributes, if it supports the corresponding Operation/Description attributes, in order to indicate the default and supported values that the Printer supports.

9.1 attributes-charset-supported (1setOf charset)

This REQUIRED Printer Description attribute indicates the charsets that the Printer supports as values of text and name attributes, that is, supports as values of the “attributes-charset” Operation attribute ([rfc2911] section 3.1.4), Job Description ([rfc2911] section 4.3.19), and Document Description attributes (section 8.2.1).

9.2 attributes-natural-language-supported (1setOf naturalLanguage)

This REQUIRED Printer Description attribute indicates the natural languages that the Printer supports as values of test and name attributes, that is, supports as values of the “attributes-natural-language” Operation attribute ([rfc2911] section 3.1.4), Job Description ([rfc2911] section 4.3.20), and Document Description attributes (section 8.2.2).

9.3 document-charset-default (charset)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the default charset that the Printer will assume for charset-ambiguous document formats when the client omits the “document-charset” Operation attribute

(section 6.1.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 6.1.1)

9.4 document-charset-supported (1setOf charset)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the charsets that the Printer supports in Document object contents, that is, supports as values of the “document-charset” Operation attribute (section 6.1.1) and Document Description attribute (section 8.2.8). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 6.1.1).

9.5 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.

9.6 document-digital-signature-default (type2 keyword)

This OPTIONAL Printer Description attribute indicates the default digital signature, if any, that the Printer will assume when the client omits the “document-digital-signature” Operation attribute (section 6.1.2). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

9.7 document-digital-signature-supported (1setOf type2 keyword)

This OPTIONAL Printer Description attribute indicates the digital signature technologies that the Printer supports in Document object contents, that is, supports as values of the “document-digital-signature” Operation attribute (section 6.1.2) and Document Description attribute (section 8.2.9). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation and Document Description attributes.

9.8 document-format-details-default (collection)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the default document format details that the Printer will assume when the client omits the “document-format-details” Operation attribute (section §6.1.4). The Printer MUST support this attribute if it supports the “document-format-details” Operation attribute.

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

This CONDITIONALLY REQUIRED 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) Printer Description attribute. Table 15 lists the type2 keywords defined for use in the “document-format-details-supported” Printer attribute.

Table 15 - 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

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

This CONDITIONALLY REQUIRED 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 “job-mandatory-attributes” Job Creation Operation attribute with a ‘document-format-details’ keyword value. If the Printer supports the “document-format-details” Operation attribute, the Printer MUST support this “document-format-details-implemented” Printer Description attribute with the same member attributes that it supports for the “document-format-details” Operation attribute (section 6.1.4) as indicated in the Printer’s “document-format-details-supported” Printer Description attribute (section 9.9). Each “xxx-implemented” member attribute is multi-valued with the same attribute syntax as the corresponding “document-format-details” attribute.

Table 16 - Member attributes of the “document-format-details-implemented” Printer attribute

“document-format-details-implemented” member attributes	Reference
document-creator-application-name-implemented (1setOf name(MAX))	6.1.4.1
document-creator-application-version-implemented (1setOf text(127))	6.1.4.2
document-creator-os-name-implemented (1setOf name(40))	6.1.4.3
document-creator-os-version-implemented (1setOf text(40))	6.1.4.4
document-format-implemented (1setOf mimeType)	6.1.4.5
document-format-device-id-implemented (1setOf text(127))	6.1.4.6
document-format-version-implemented (1setOf text(127))	6.1.4.7
document-natural-language-implemented (1setOf naturalLanguage)	6.1.4.8

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

Example: Suppose that a Printer implements a PostScript™c 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 PostScript™ level 3. The value of “document-format-details-implemented” would have the following three collection values:

```
{“document-format-implemented” = ‘application/postscript’, “document-format-version-implemented” = ‘PS/1’, ‘PS/2’, ‘PS/3’},
{“document-format-implemented” = ‘application/postscript’, “document-format-version-implemented” = ‘PS/3’,
 document-natural-language=en, fr, de},
{“document-format-implemented” = ‘application/vnd.hp-PCL’, “document-format-version-implemented” = ‘PCL/5’, ‘PCL/5e’}}
```

9.11 document-format-version-default (text(127))

This OPTIONAL Printer Description attribute indicates the default document format version that the Printer will assume when the client omits the “document-format-version” Operation attribute (section 6.1.5). The Printer MUST support this attribute if it supports the “document-format-version” Operation and Document Description attributes.

9.12 document-format-version-supported (1setOf text(127))

This OPTIONAL Printer Description attribute indicates the document format versions that the Printer supports for Document object contents, that is, supports as values of the "document-format-version" Operation attribute (section 6.1.5) and Document Description attribute (section 8.2.17). The Printer MUST support this attribute if it supports the "document-format-version" Operation and Document Description attributes.

9.13 document-natural-language-default (naturalLanguage)

This OPTIONAL Printer Description attribute indicates the default document natural language that the Printer will assume for Document Object content when the client omits the "document-natural-language" Operation attribute ([rfc2911] section 3.2.1.1). The Printer MUST support this attribute if it supports the "document-natural-language" Operation and Document Description attributes.

9.14 document-natural-language-supported (1setOf naturalLanguage)

This OPTIONAL Printer Description attribute lists the natural languages supported in any of the supported document formats, that is, it is the union of the natural languages. The Printer MUST support this attribute if it supports the "document-natural-language" Operation attribute ([rfc2911] section 3.2.1.1) and Document Description attribute (section 8.2.19). See the "document-format-details-implemented" (1setOf collection) Printer Description attribute (section 9.10) for how the Printer MAY expose the list of natural languages supported by particular document formats.

9.15 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 17 lists all of the values defined for the "printer-state-reasons" Printer Description attribute.

Table 17 - 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
	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

IPP Printer Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
	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 ⁷⁷	[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 ⁷⁸	[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

2506

2507 This description is taken from [rfc2911] with additions from other IPP extension documents:

2508 This REQUIRED Printer attribute supplies additional detail about the device's state. Some of these value
2509 definitions indicate conformance requirements; the rest are OPTIONAL.

2510 Each keyword value MAY have a suffix to indicate its level of severity. The three levels are: report (least severe),
2511 warning, and error (most severe).

2512 **'-report':** This suffix indicates that the reason is a "report". An implementation may choose to omit some or
2513 all reports. Some reports specify finer granularity about the printer state; others serve as a precursor
2514 to a warning. A report MUST contain nothing that could affect the printed output.

2515 **'-warning':** This suffix indicates that the reason is a "warning". An implementation may choose to omit some
2516 or all warnings. Warnings serve as a precursor to an error. A warning MUST contain nothing that
2517 prevents a job from completing, though in some cases the output may be of lower quality.

2518 **'-error':** This suffix indicates that the reason is an "error". An implementation MUST include all errors. If this
2519 attribute contains one or more errors, printer MUST be in the stopped state.

2520 If the implementation does not add any one of the three suffixes, all parties MUST assume that the reason is an
2521 "error".

2522 If a Printer object controls more than one output device, each value of this attribute MAY apply to one or more of the
2523 output devices. An error on one output device that does not stop the Printer object as a whole MAY appear as a

⁷⁷ The Printer MUST support the 'moving-to-paused' value if the Printer supports the Pause-Printer operation and the Printer takes significant time to move to paused.

⁷⁸ The Printer MUST support the 'paused' value if the Printer supports the Pause-Printer operation.

2524 warning in the Printer's "printer-state-reasons attribute". If the "printer-state" for such a Printer has a value of
2525 'stopped', then there MUST be an error reason among the values in the "printer-state-reasons" attribute.

2526 The following standard keyword values are defined (in alphabetical order):

2527 **'other'**: The device has detected an error other than one listed in this document.

2528 **'none'**: There are not reasons. This state reason is semantically equivalent to "printer-state-reasons" without
2529 any value and MUST be used, since the 1setOf attribute syntax requires at least one value.

2530 **'connecting-to-device'**: The Printer object has scheduled a job on the output device and is in the process of
2531 connecting to a shared network output device (and might not be able to actually start printing the job
2532 for an arbitrarily long time depending on the usage of the output device by other servers on the
2533 network).

2534 **'cover-open'**: One or more covers on the device are open.

2535 **'deactivated'**: A client has issued a Deactivate-Printer operation for the Printer object (see [adm-ops]
2536 section 3.4.1) and the Printer is in the process of becoming deactivated or has become deactivated.
2537 The Printer MUST reject all requests except Activate-Printer, queries (Get-Printer-Attributes, Get-
2538 Job-Attributes, Get-Jobs, etc.), Send-Document, and Send-URI (so that partial job submission can
2539 be completed - see [adm-ops] section 3.1.1) and return the 'server-error-service-unavailable' status
2540 code.

2541 **'developer-empty'**: The device is out of developer.

2542 **'developer-low'**: The device is low on developer.

2543 **'door-open'**: One or more doors on the device are open.

2544 **'fuser-over-temp'**: The fuser temperature is above normal.

2545 **'fuser-under-temp'**: The fuser temperature is below normal.

2546 **'hold-new-jobs'**: The operator has issued the Hold-New-Jobs operation (see [adm-ops] section 3.3.1) or
2547 other means, but the output-device(s) are taking an appreciable time to stop. Later, when all output
2548 has stopped, the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-
2549 paused' value in the "printer-state-reasons" attribute. This value MUST be supported, if the Hold-
2550 New-Jobs operation is supported and the implementation takes significant time to pause a device in
2551 certain circumstances.

2552 **'input-tray-missing'**: One or more input trays are not in the device.

2553 **'interlock-open'**: One or more interlock devices on the printer are unlocked.

2554 **'interpreter-resource-unavailable'**: An interpreter resource is unavailable (i.e. font, form)

2555 **'marker-supply-empty'**: The device is out of at least one marker supply. (e.g. toner, ink, ribbon)

2556 **'marker-supply-low'**: The device is low on at least one marker supply. (e.g. toner, ink, ribbon)

2557 **'marker-waste-almost-full'**: The device marker supply waste receptacle is almost full.

2558 **'marker-waste-full'**: The device marker supply waste receptacle is full.

2559 **'media-empty'**: At least one input tray is empty.

2560 **'media-jam'**: The device has a media jam.

2561 **'media-low'**: At least one input tray is low on media.

2562 **'media-needed'**: A tray has run out of media.

2563 **'moving-to-paused'**: Someone has paused the Printer object using the Pause-Printer operation (see
2564 [rfc2911] section 3.2.7) or other means, but the 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 Pause-Printer operation is supported and the implementation takes significant time to pause a device in certain circumstances.

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

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

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

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

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

'paused': Someone has paused the Printer object using the Pause-Printer operation (see [rfc2911] section 3.2.7) or other means and the Printer object's "printer-state" is 'stopped'. In this state, a Printer MUST NOT produce printed output, but it MUST perform other operations requested by a client. If a Printer had been printing a job when the Printer was paused, the Printer MUST resume printing that job when the Printer is no longer paused and leave no evidence in the printed output of such a pause. This value MUST be supported, if the Pause-Printer operation is supported.

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

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

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

'stopping': The Printer object is in the process of stopping the device and will be stopped in a while. When the device is stopped, the Printer object will change the Printer object's state to 'stopped'. The 'stopping-warning' reason is never an error, even for a Printer with a single output device. When an output-device ceases accepting jobs, the Printer will have this reason while the output device 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 18 – Operation-id assignments

Value	Operation Name	Reference
0x000F	Close-Job	[this-spec] §4.4
0x0033	Cancel-Documnt	[this-spec] §3.8
0x0034	Get-Documnt-Attributes	[this-spec] §3.5
0x0035	Get-Documents	[this-spec] §3.6
0x0036	Delete-Documnt	[this-spec] §3.9
0x0037	Set-Documnt-Attributes	[this-spec] §3.7
0x0039	Create-Documnt	[this-spec] §3.1
0x003A	Send-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:

- MUST meet the conformance requirements for Printers specified in [rfc2911].
- MUST support the Create-Job operation as specified in [rfc2911], even though [rfc2911] does not REQUIRE a Printer to support the Create-Job operation in order to conform to [rfc2911].
- MUST support the Document operations that section 3 REQUIRES a Printer to support.
- MUST support the Close-Job Job operation as defined in section 4.4.
- MUST support the Operation attributes in the Send-Documnt operation and, if supported, the Send-URI operation that section 6 REQUIRES a Printer to support.
- MUST support the “document-format-details” Operation attribute (section 6.1.4) and the corresponding “document-format-details” Document Description attribute (section 8.2.11) along with the “document-format-details-supported” (section 9.9) and “document-format-details-implemented” (section 9.10) Printer attributes, if the Printer supports a packaging document format, such as application/zip or multipart/related MIME types.

- 2631 7. MAY support any of the Document Template attributes in Document Creation operations as indicated in
2632 section 7 and MUST NOT support them for contexts for where they are not defined as indicated in the Table
2633 11 with an "n".
- 2634 8. MUST support the Document Description attributes that section 8 REQUIRES a Printer to support.
- 2635 9. MUST support the Printer attributes that section 8.2.1 REQUIRES a Printer to support.
- 2636 10. MUST support the values of Printer Descriptions attribute that section 10 REQUIRES a Printer to support.

2637 12.2 Client conformance requirements

2638 In order to conform to this specification, a client:

- 2639 1. MUST meet the conformance requirements for clients specified in [rfc2911]
- 2640 2. MAY support any of the Document operations defined in section 3.
- 2641 3. MUST supply the Operation attributes that section 6 REQUIRES a client to supply in operation requests.
- 2642 4. MUST supply any Document Template attributes in the format that section 7 REQUIRES a client to supply in
2643 Document Creation operations and MUST NOT support them for contexts for where they are not defined as
2644 indicated in the Table 11 with an "n".
- 2645 5. SHOULD support any of the Document Description attributes that section 8 REQUIRES a Printer to support.
- 2646 6. MAY support any of the Printer attributes listed in section 8.2.1.
- 2647 7. MAY support any of the values of the Printer Descriptions attributes in section 10.

2648 13 Normative References

2649 Note: The references in the body of this IEEE-ISTO document use the more reader-friendly mnemonic symbols
2650 below, rather than the RFC number (except for [rfc2910] and [rfc2911]). IETF RFCs and IANA registrations require
2651 using the RFC numbers in the body of the document for references.

2652 [adm-ops]
2653 Kugler, C, Hastings, T., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Administrative
2654 Operations", <draft-ietf-ipp-ops-set2-03.txt>, July 17, 2001.

2655 [dss]
2656 U.S. Department of Commerce, "Digital Signature Standard (DDS)", Federal Information Processing
2657 Standards Publication 186-1 (FIPS PUB 186-1), December 15, 1998.

2658 [ippsave]
2659 Hastings, T., and D. Fullman, "Internet Printing Protocol (IPP): Production Printing Attributes - Set 2", to
2660 become a PWG IEEE-ISTO standard, work in progress, August 21, 2002,
2661 ftp://ftp.pwg.org/pub/pwg/ipp/new_PPE/pwg-ipp-pwg5100.3-set2-draft-v0_1-020821.pdf.

- 2662 [get-method]
2663 Herriot, R., and T. Hastings, "Internet Printing Protocol (IPP): The 'ippget' Delivery Method for Event
2664 Notifications", <draft-ietf-ipp-notify-get-08.txt>, September 5, 2002.
- 2665 [iso12639]
2666 ISO 12639:1998 Graphic technology -- Prepress digital data exchange -- Tag image file format for image
2667 technology (TIFF/IT), 1998.
- 2668 [iso15930]
2669 ISO 15930-1:2001 Graphic technology -- Prepress digital data exchange -- Use of PDF -- Part 1: Complete
2670 exchange using CMYK data (PDF/X-1 and PDF/X-1a), 2001.
- 2671 [not-srv]
2672 Hastings, T., Lewis, H., and Ira McDonald, "Distributed Notification Server", September 26, 2002, work in
2673 progress to become IEEE-ISTO 5100.6-2002, [ftp://ftp.pwg.org/pub/pwg/ipp/new_NOT/ipp-dist-not-service-](ftp://ftp.pwg.org/pub/pwg/ipp/new_NOT/ipp-dist-not-service-020926.doc)
2674 020926.doc
- 2675 [ntfy]
2676 Herriot, R., Hastings, T., Shepherd, M., deBry, R., Isaacson, S., Martin, J., and R. Bergman, "Internet Printing
2677 Protocol/1.1: Event Notifications and Subscriptions", <draft-ietf-ipp-not-spec-08.txt>, November 19, 2001.
- 2678 [pdf]
2679 "Adobe Portable Document Format", Version 1.4, PDF Reference, Third Edition, Adobe Systems
2680 Incorporated, <http://www.adobe.com>, December 2001.
- 2681 [pwg5100.1]
2682 Hastings, T., Fullman, D., "Internet Printing Protocol (IPP): "finishings" attribute values extension", IEEE-ISTO
2683 5100.1-2001, February 5, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.1.pdf>
- 2684 [pwg5100.2]
2685 Hastings, T., and R. Bergman, "Internet Printing Protocol (IPP): output-bin attribute extension", IEEE-ISTO
2686 5100.2-2001, February 7, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.2.pdf>.
- 2687 [pwg5100.4]
2688 Herriot, R., Ocke, K., "Internet Printing Protocol (IPP): Override Attributes for Documents and Pages", IEEE-
2689 ISTO 5100.4-2001, February 7, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.4.pdf>.
- 2690 [pwg5100.3]
2691 Ocke, K., Hastings, T., "Internet Printing Protocol (IPP): Production Printing Attributes - Set1", IEEE-ISTO
2692 5100.3-2001, February 12, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf>.
- 2693 [pwg5101.1]
2694 IEEE-ISTO PWG 5101.1-2002, "The Printer Working Group Standard for Media Standardized Names", 26
2695 February 2002, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5101.1.pdf>, .doc, .rtf
- 2696 [rfc1991]
2697 D. Atkins, W. Stallings, P. Zimmermann, "PGP Message Exchange Formats", RFC 1991, August, 1996.

- 2698 [rfc2634]
2699 P. Hoffman, "Enhanced Security Services for S/MIME", RFC 2634, June 1999.
- 2700 [rfc2854]
2701 Connolly, D., and L. Masinter, "The 'text/html' Media Type", RFC 2854, June 2000.
- 2702 [rfc2911]
2703 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.1: Model and
2704 Semantics", RFC 2911, September 2000.
- 2705 [rfc3380]
2706 Hastings, T., Herriot, R., Kugler, C., and H. Lewis, "Internet Printing Protocol (IPP): Job and Printer Set
2707 Operations", RFC 3380, September 2002.
- 2708 [rfc3381]
2709 Hastings, T., Lewis, H., and R. Bergman, "Internet Printing Protocol (IPP): Job Progress Attributes",
2710 RFC3381, September 2002.
- 2711 [rfc3382]
2712 deBry, R., Hastings, T., Herriot, R., Ocke, K., and P. Zehler, "Internet Printing Protocol (IPP): The 'collection'
2713 attribute syntax", RFC 3382, September 2002.
- 2714 [upnp]
2715 Microsoft, "Basic *PrintBasic:1.0* Service Template Version 1.01 For Universal Plug and Play Version 1.0"
- 2716 [xmldsig]
2717 D. Eastlake, J. Reagle, D. Solo "XML-Signature Syntax and Processing", <draft-ietf-xmldsig-core-11.txt>,
2718 October 31, 2000.

2719 14 Informative References

- 2720 [fsg-jt]
2721 Free Software Group, Open Printing Job Ticket API, Visit: <http://www.freestandards.org/openprinting/>
- 2722 [pwg-psi]
2723 "Print Service Interface (PSI)", work in progress to become a PWG IEEE-ISTO standard. Visit
2724 <http://www.pwg.org/>.
- 2725 [pwg-sm]
2726 Zehler, P., and S. Albright, "PWG Semantic Model", work in progress to become a PWG IEEE-ISTO standard,
2727 version 0.11, September 27, 2002. <ftp://ftp.pwg.org/pub/pwg/Semantic-Model/PWG-Semantic-Model.pdf>
- 2728 [rfc2046]
2729 Freed, N., and N. Borenstein, "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", RFC
2730 2046, November 1996.

- 2731 [rfc2565]
 2732 Herriot, R., Butler, S., Moore, P., and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport",
 2733 RFC 2565, April 1999.
- 2734 [rfc2566]
 2735 R. deBry, T. Hastings, R. Herriot, S. Isaacson, and P. Powell, "Internet Printing Protocol/1.0: Model and
 2736 Semantics", RFC 2566, April 1999.
- 2737 [rfc2567]
 2738 Wright, D., "Design Goals for an Internet Printing Protocol", RFC 2567, April 1999.
- 2739 [rfc2568]
 2740 Zilles, S., "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol", RFC 2568,
 2741 April 1999.
- 2742 [rfc2569]
 2743 Herriot, R., Hastings, T., Jacobs, N., Martin, J., "Mapping between LPD and IPP Protocols", RFC 2569, April
 2744 1999.
- 2745 [rfc2616]
 2746 R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee, "Hypertext Transfer
 2747 Protocol - HTTP/1.1", RFC 2616, June 1999.
- 2748 [rfc3196]
 2749 Hastings, T., Manros, C., Zehler, P., Kugler, C., and H. Holst, "Internet Printing Protocol/1.1: Implementer's
 2750 Guide", RFC 3196, November 2001.
- 2751 [rfc3239]
 2752 Kugler, C., Lewis, H. and T. Hastings, "Internet Printing Protocol (IPP): Requirements for Job, Printer, and
 2753 Device Administrative Operations", RFC 3239, February 2002.

2754 **15 IANA Considerations**

2755 This section contains the registration information for IANA to add to the various IPP Registries according to the
 2756 procedures defined in RFC 2911 [rfc2911] section 6 to cover the definitions in this document. The resulting
 2757 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations-registry>.

2758 *Note to the RFC Editor: Replace the References below to [this spec] with the RFC number for the appropriate*
 2759 *document, so that it accurately reflects the content of the information for the IANA Registry.*

2760 **15.1 Attribute Registrations**

2761 The following table lists all the attributes defined in this specification. These are to be registered according to the
 2762 procedures in RFC 2911 [rfc2911] section 6.2. If the attribute has a separate sub-section definition in this
 2763 specification, that sub-section is listed as the Reference. This specification lists most Job Template attributes as also
 2764 being Document Template attributes. However, the definitions of these Document Template attributes are not
 2765 duplicated in this specification. Instead, the Reference column in this sub-section indicates Section 7 which contains
 2766 a table of all Job Template and corresponding Document Template attributes (including dropping the "job-" prefix).
 2767 This table contains the reference in another specification that completely defines each attribute. These Document

2768 Template attributes will also be added to the IANA IPP Registry under the Document Template attributes with a
 2769 reference to this specification and Section 7.

2770	Attribute Name (attribute syntax)	Reference	Section
2771	-----	-----	-----
2772	Document Description attributes:		
2773	attributes-charset (charset)	[this spec]	8.2.1
2774	attributes-natural-language (naturalLanguage)	[this spec]	8.2.2
2775	compression (type3 keyword)	[this spec]	8.2.3
2776	current-page-order (type2 keyword)	[this spec]	8.2.4
2777	date-time-at-completed (dateTime)	[this spec]	8.2.5
2778	date-time-at-creation (dateTime)	[this spec]	8.2.6
2779	date-time-at-processing (dateTime)	[this spec]	8.2.7
2780	detailed-status-message (1setOf text (MAX))	[this spec]	8.2.27
2781	document-access-errors (1setOf text (MAX))	[this spec]	8.2.28
2782	document-charset (charset)	[this spec]	8.2.8
2783	document-digital-signature (type2 keyword)	[this spec]	8.2.9
2784	document-format (mimeMediaType)	[this spec]	8.2.10
2785	document-format-details (collection)	[this spec]	8.2.11
2786	document-creator-application-name (name (MAX))	[this spec]	6.1.4.1
2787	document-creator-application-version (text (127))		
2788		[this spec]	6.1.4.2
2789	document-creator-os-name (name (40))	[this spec]	6.1.4.3
2790	document-creator-os-version (text (40))	[this spec]	6.1.4.4
2791	document-format (mimeMediaType)	[this spec]	6.1.4.5
2792	document-format-device-id (text (127))	[this spec]	6.1.4.6
2793	document-format-version (text (127))	[this spec]	6.1.4.7
2794	document-natural-language (1setOf naturalLanguage)		
2795		[this spec]	6.1.4.8
2796	document-format-details-detected (1setOf collection)		
2797		[this spec]	8.2.12
2798	document-format-detected (mimeMediaType)	[this spec]	8.2.13
2799	document-format-version (text (127))	[this spec]	8.2.14
2800	document-job-id (integer (1:MAX))	[this spec]	8.2.15
2801	document-job-uri (uri)	[this spec]	8.2.16
2802	document-message (text (MAX))	[this spec]	8.2.17
2803	document-name (name (MAX))	[this spec]	8.2.18
2804	document-natural-language (naturalLanguage)	[this spec]	8.2.19
2805	document-number (integer (0:MAX))	[this spec]	8.2.20
2806	document-printer-uri (uri)	[this spec]	8.2.21
2807	document-state (type1 enum)	[this spec]	8.2.22
2808	document-state-message (text (MAX))	[this spec]	8.2.23
2809	document-state-reasons (1setOf type2 keyword)	[this spec]	8.2.24
2810	document-uri (uri)	[this spec]	8.2.25
2811	impressions (integer (0:MAX))	[this spec]	8.2.29
2812	impressions-completed (integer (0:MAX))	[this spec]	8.2.30
2813	impressions-completed-current-copy (integer (0:MAX))		
2814			

2815		[this spec]	8.2.26
2816	k-octets (integer(0:MAX))	[this spec]	8.2.31
2817	k-octets-processed (integer(0:MAX))	[this spec]	8.2.32
2818	last-document (boolean)	[this spec]	8.2.38
2819	media-sheets (integer(0:MAX))	[this spec]	8.2.33
2820	media-sheets-completed (integer(0:MAX))	[this spec]	8.2.34
2821	more-info (uri)	[this spec]	8.2.35
2822	output-device-assigned (name(127))	[this spec]	8.2.39
2823	printer-up-time (integer (1:MAX))	[this spec]	8.2.36
2824	sheet-completed-copy-number (integer(0:MAX))	[this spec]	8.2.40
2825	time-at-completed (integer (MIN:MAX))	[this spec]	8.2.41
2826	time-at-creation (integer (MIN:MAX))	[this spec]	8.2.42
2827	time-at-processing (integer (MIN:MAX))	[this spec]	8.2.43
2828	warnings-count (integer(0:MAX))	[this spec]	8.2.37
2829			
2830			
2831	Document Templates attributes:		
2832	ACTION (Tom) - Need to add the xxx-default and xxx-supported for each.		
2833	copies (integer(1:MAX))	[this spec]	7
2834	cover-back (collection)	[this spec]	7
2835	cover-type (type2 keyword)	[this spec]	7
2836	media (type3 keyword name(MAX))	[this spec]	7
2837	media-col (collection)	[this spec]	7
2838	cover-front (collection)	[this spec]	7
2839	cover-type (type2 keyword)	[this spec]	7
2840	media (type3 keyword name(MAX))	[this spec]	7
2841	media-col (collection)	[this spec]	7
2842	feed-orientation (type3 keyword)	[this spec]	7
2843	finishings (1setOf type2 enum)	[this spec]	7
2844	finishings-col (collection)	[this spec]	7
2845	finishing-template (name(MAX))	[this spec]	7
2846	stitching (collection)	[this spec]	7
2847	stitching-locations (1setOf integer(0:MAX))	[this spec]	7
2848	stitching-offset (integer (0:MAX))	[this spec]	7
2849	stitching-reference-edge (type2 keyword)	[this spec]	7
2850	font-name-requested (name(MAX))	[this spec]	7
2851	font-size-requested (integer(1:MAX))	[this spec]	7
2852	force-front-side (1setOf integer(1:MAX))	[this spec]	7
2853	imposition-template (type2 keyword name(MAX))	[this spec]	7
2854	insert-sheet (1setOf collection)	[this spec]	7
2855	insert-after-page-number (integer(0:MAX))	[this spec]	7
2856	insert-count (integer(0:MAX))	[this spec]	7
2857	media (type3 keyword name(MAX))	[this spec]	7
2858	media-col (collection)	[this spec]	7
2859	media (type3 keyword name(MAX))	[this spec]	7
2860	media-col (collection)	[this spec]	7

2861	media-back-coating (type3 keyword name(MAX))	[this spec]	7
2862	media-color (type3 keyword name(MAX))	[this spec]	7
2863	media-front-coating (type3 keyword name(MAX))	[this spec]	7
2864	media-hole-count (integer(0:MAX))	[this spec]	7
2865	media-info (text(255))	[this spec]	7
2866	media-key (type3 keyword name(MAX))	[this spec]	7
2867	media-order-count (integer(1:MAX))	[this spec]	7
2868	media-preprinted (type3 keyword name(MAX))	[this spec]	7
2869	media-recycled (type3 keyword name(MAX))	[this spec]	7
2870	media-size (collection)	[this spec]	7
2871	x-dimension (integer(0:MAX))	[this spec]	7
2872	y-dimension (integer(0:MAX))	[this spec]	7
2873	media-type (type3 keyword name(MAX))	[this spec]	7
2874	media-weight-metric (integer(0:MAX))	[this spec]	7
2875	media-input-tray-check (type3 keyword name(MAX))		
2876		[this spec]	7
2877	number-up (integer(1:MAX))	[this spec]	7
2878	orientation-requested (type2 enum)	[this spec]	7
2879	output-bin (type2 keyword name(MAX))	[this spec]	7
2880	page-delivery (type2 keyword)	[this spec]	7
2881	page-order-received (type2 keyword)	[this spec]	7
2882	page-overrides (1setOf collection)	[this spec]	7
2883	document-copies (1setOf rangeOfInteger(MAX))	[this spec]	7
2884	input-documents (1setOf rangeOfInteger(MAX))	[this spec]	7
2885	output-documents (1setOf rangeOfInteger(MAX))	[this spec]	7
2886	pages (1setOf rangeOfInteger(MAX))	[this spec]	7
2887	<any other Job Template attributes that affect pages,		
2888	such as media or media-col>		
2889	page-ranges (1setOf rangeOfInteger(1:MAX))	[this spec]	7
2890	pages-per-subset (1setOf integer(1:MAX))	[this spec]	7
2891	presentation-direction-number-up (type2 keyword)	[this spec]	7
2892	print-quality (type2 enum)	[this spec]	7
2893	printer-resolution (resolution)	[this spec]	7
2894	separator-sheets (collection)	[this spec]	7
2895	media (type3 keyword name(MAX))	[this spec]	7
2896	media-col (collection)	[this spec]	7
2897	separator-sheets-type (type3 keyword name(MAX))		
2898		[this spec]	7
2899	sheet-collate (type2 keyword)	[this spec]	7
2900	sides (type2 keyword)	[this spec]	7
2901	x-image-position (type2 keyword)	[this spec]	7
2902	x-image-shift (integer(MIN:MAX))	[this spec]	7
2903	x-side1-image-shift (integer(MIN:MAX))	[this spec]	7
2904	x-side2-image-shift (integer(MIN:MAX))	[this spec]	7
2905	y-image-position (type2 keyword)	[this spec]	7
2906	y-image-shift (integer(MIN:MAX))	[this spec]	7

2907	y-side1-image-shift (integer(MIN:MAX))	[this spec]	7
2908	y-side2-image-shift (integer(MIN:MAX))	[this spec]	7
2909			
2910			
2911	Job Description attributes:		
2912	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	8.1.2
2913			
2914			
2915	Job Template attributes:		
2916	ACTION (Tom) - Need to add the xxx-default and xxx-supported.		
2917	job-copies (integer(1:MAX))	[this spec]	7.1.1
2918	job-cover-back (collection)	[this spec]	7.1.2
2919	<member attributes are the same as "cover-back">		
2920	job-cover-front (collection)	[this spec]	7.1.3
2921	<member attributes are the same as "cover-front">		
2922	job-finishings (1setOf type2 enum)	[this spec]	7.1.4
2923	job-finishings-col (1setOf collection)	[this spec]	7.1.5
2924	<member attributes are the same as "finishings-col">		
2925	media-size-name (type3 keyword name(MAX))	[this spec]	7.1.6
2926	media-type (type3 keyword name(MAX))	[this spec]	7.1.7
2927			
2928			
2929	Printer Description attributes:		
2930	document-creation-attributes-supported (1setOf type2 keyword)		
2931		[this spec]	9.5
2932			
2933			
2934	Operation attributes:		
2935	document-charset (charset)	[this spec]	6.1.1
2936	document-digital-signature (type2 keyword)	[this spec]	6.1.2
2937	document-format-details (1setOf collection)	[this spec]	6.1.4
2938	document-creator-application-name (name(MAX))	[this spec]	6.1.4.1
2939	document-creator-application-version (text(127))		
2940		[this spec]	6.1.4.2
2941	document-creator-os-name (name(40))	[this spec]	6.1.4.3
2942	document-creator-os-version (text(40))	[this spec]	6.1.4.4
2943	document-format (mimeMediaType)	[this spec]	6.1.4.5
2944	document-format-device-id (text(127))	[this spec]	6.1.4.6
2945	document-format-version (text(127))	[this spec]	6.1.4.7
2946	document-natural-language (1setOf naturalLanguage)		
2947		[this spec]	6.1.4.8
2948	document-format-version (text(127))	[this spec]	6.1.5
2949	document-message (text(MAX))	[this spec]	3.1.1.2
2950	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	4.1.2
2951	last-document (boolean)	[this spec]	3.1.1.1
2952			

15.2 Keyword attribute values

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]	8.2.22
3	pending	[this spec]	8.2.22
5	processing	[this spec]	8.2.22
7	canceled	[this spec]	8.2.22
8	aborted	[this spec]	8.2.22
9	completed	[this spec]	8.2.22
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]	4.4
0x0033	Cancel-Document	[this spec]	3.8
0x0034	Get-Document-Attributes	[this spec]	3.5
0x0035	Get-Documents	[this spec]	3.6
0x0036	Delete-Document	[this spec]	3.9
0x0037	Set-Document-Attributes	[this spec]	3.7
0x0039	Create-Document	[this spec]	3.1
0x003A	Send-Data	[this spec]	3.2

15.4 Operations

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

Operations	Reference	Section
-----	-----	-----
Cancel-Document	[this spec]	3.8
Close-Job	[this spec]	4.4
Create-Document	[this spec]	3.1
Delete-Document	[this spec]	3.9
Get-Document-Attributes	[this spec]	3.5
Get-Documents	[this spec]	3.6
Send-Data	[this spec]	3.2
Set-Document-Attributes	[this spec]	3.7

2996

2997 **15.5 Attribute Group tags**

2998 The following table lists all the attribute group tags defined in this document. These are to be registered according to
2999 the procedures in RFC 2911 [rfc2911] section 6.5.

3000	Value	Name	Reference	Section
3001	-----	-----	-----	-----
3002	0x09	document-attributes-tag	[this spec]	11
3003				

3004 **16 Internationalization Considerations**

3005 The internationalization considerations for this extension for handling the Document object are the same as for
3006 handling the Job object in [rfc2911].

3007 **17 Security Considerations**

3008 The Document object should provide no more increased security considerations than the Job object. The Printer
3009 MUST provide the same access control for Document objects as for Job objects.

3010 **18 Contributors**

3011 Don Fullman, Xerox
3012 Ira McDonald, High North
3013 Dennis Carney, IBM

3014 **19 Acknowledgments**

3015 **20 Author's Address**

3016 Tom Hastings
3017 Xerox Corporation
3018 737 Hawaii St.
3019 El Segundo, CA 90245
3020
3021 Phone: 310 333-6413
3022 Fax: 310 333-5514
3023 e-mail: hastings@cp10.es.xerox.com
3024
3025 Peter Zehler
3026 Xerox Corporation
3027 MS: 0128-30E
3028 800 Phillips Road
3029 Webster, NY 14580-9701
3030

3031 Phone: 1+585+2658755
 3032 Fax:
 3033 e-mail: PZehler@crt.xerox.com

3034 21 Appendix A: Document operations compared to Job operations

3035 This appendix compares the Document operations with the existing Job operations to show the parallelism.

3036 Table 19 compares the Job and Document operations. The two Conf. columns indicate the conformance
 3037 requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ"
 3038 in the Document Conformance column means if the Document object is supported. Whether a Document operation
 3039 is a method on the Job object or the Document object depends on the modeling regime and is not an essential part
 3040 of the semantics described here, since these semantics are intended to apply to both to object-oriented and object-
 3041 based protocols, APIs, and implementations.

3042 **Table 19 - Document operations compared to Job operations**

Job operations	Job Conf.	Document operations	Doc Conf
Cancel-Current-Job	OPT	<i>N/A, can only cancel a document explicitly by document number and explicit job id.</i>	OPT
Cancel-Job	REQ	Cancel-Document	REQ
Create-Job	OPT	Create-Document	REQ
Get-Job-Attributes	REQ	Get-Document-Attributes	REQ
Get-Jobs	REQ	Get-Documents	REQ
Hold-Job		<i>N/A, can only hold an entire job.</i>	
Print-Job	REQ	Send-Document (existing operation - see [rfc2911] with an additional Document attributes group defined in section 3.3)	REQ ⁷⁹
Print-URI	OPT	Send-URI (existing operation - see [rfc2911] with an additional Document attributes group defined in section 3.4)	OPT
<i>N/A</i>		Send-Data	REQ
Promote-Job	OPT	<i>N/A, can only promote an entire job</i>	
Purge-Jobs	OPT	Delete-Document	OPT
Release-Held-New-Jobs	OPT	<i>N/A, can only release entire jobs</i>	
Release-Job	OPT	<i>N/A, can only release an entire job</i>	
Reprocess-Job	OPT	<i>N/A, can only reprocess an entire job</i>	
Restart-Job	OPT	<i>N/A, can only restart an entire job</i>	
Resume-Job	OPT	<i>N/A, can only resume an entire job</i>	
Schedule-Job-After	OPT	<i>N/A, can only schedule an entire job</i>	
Set-Job-Attributes	OPT	Set-Document-Attributes	OPT
Suspend-Current-Job	OPT	<i>N/A, can only suspend an entire job in order to run another one</i>	
Validate-Job	REQ	<i>N/A, use Validate-Job to validate a single document or use Create-Job with "ipp-attribute-fidelity" = 'true' and Create-Document request to validate a multi-document job.</i>	REQ

⁷⁹ The Printer MUST support the Send-Document operation in order to conform to this specification, even though the Printer MAY omit support when conforming to [rfc2911].

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 7.
3. Added "y" to "output-bin" in Table 10 so it MAY be a Document Template attribute.
4. Clarified the * and in Table 11 - 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:

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 4 and Table 5 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 7, 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-Documents 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 0.7, 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-Documents 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, 24 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. Changed the name of the collection attribute back to "document-format-details".
4. Removed the Operation attributes and Document Description attributes that were already in the member attributes of "document-format-details", so that any details must use the "document-format-details" (1setOf collection).
5. Clarified that with the removal of "document-overrides", that the client can achieve subset finishing using "pages-per-subset" and "page-overrides".
6. 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.
7. Clarified that containers may contain containers, but that the "document-format-details" MUST be flattened, if present.
8. Clarified that the collection values MAY describe the container format itself, in which case, it must be the first collection value.
9. Added "document-format-details-detected" (1setOf collection) Document Description attribute.
10. Clarified that "document-natural-language" identifies the primary or first language if a Document contains more than one language.
11. Added document-format-details-supported (1setOf type2 keyword) Printer Description attribute.
12. Added document-format-details-implemented (1setOf collection) Printer Description attribute.
13. Clarified that a Printer MUST support the "document-creation-attributes-supported" (1setOf type2 keywords) Printer Description attribute.

Version 0.9, 7 April 2003, agreements from the April 3 telecon:

1. Added "document-charset" (charset), "document-digital-signature" (type2 keyword), "document-format-version" (text(127)), and "document-natural-language" (naturalLanguage) Operation and Document Description attributes and corresponding "xxx-default" and "xxx-supported" Printer Description attributes.
2. Changed the "document-natural-language" member attribute of "document-format-details" (1setOf collection) operation attribute to be 1setOf, but kept the top level "document-natural-language" Operation attribute as single-valued.
3. Added Summary Table 2 of new Operation/Document Description attributes.
4. Defined CONDITIONALLY REQUIRED and CMUST Conformance Terms.
5. Deleted the "document-id-uri" Operation attribute no longer needed by PSI.
6. Changed "ipp-attribute-fidelity" so it doesn't affect operation attributes, so it is the same as in [RFC2911].
7. Clarified the operation attributes supplied at the Job Level in Print-Job and Print-URI versus Create-Job by introducing the "p" notation in Table 7.
8. Added columns to Table 7 to show the corresponding Document Description attributes and the "xxx-default" and "xxx-supported" Printer Description attributes.
9. Clarified that all of the new Operation attributes are hints, except "document-charset" and "document-format" and that the client can turn them into Must Honor by supplying their keyword attribute names in the "job-mandatory-attributes" Operation attribute.
10. Add the unique lang prefix from the Printer MIB to all "document-format-version" values, so that they can all be in a single flat list for the Printer's "document-format-version-supported" Printer Description attribute.