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The Printer Working Group Internet Printing Protocol (IPP): Document object

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

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Abstract: This IPP specification extends the IPP Model and Semantics [RFC2911] by defining a Document object. The [RFC2911] Job object is extended to contain one or more Document objects which are passive objects operated on by the Job. The Document object is created by the [RFC2911] Send-Document and Send-URI operations. The extension also adds a Document Attributes group (and tag) to these requests which contains any Document Template attributes to be applied to this Document object being created, overriding any corresponding Job Template attribute supplied at the job level (including the “document-overrides” operation attributes at the Job or Document level). Also there are seven new operations defined for Documents once they have been created: Cancel-Current-Document, Cancel-Document, Get-Document-Attributes, Get-Documents, Delete-Document, Set-Document-Attributes, and Validate-Document. This specification also lists all of the attributes defined in other IPP specifications to show their relationship to corresponding attributes defined in this IPP specification for use with the Document object. The full semantics of the “document-state” and “document-state-reasons” Document Description attributes is given along side of the corresponding [RFC2911] “job-state” and “job-state-reasons” Job Description attributes.

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

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This document is available electronically at:

ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/IPP-document-object.pdf, .doc, .rtf

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99 Program of the IEEE ISTO." In order to meet this objective, the PWG will document the results of their work as open
100 standards that define print related protocols, interfaces, procedures and conventions. Printer manufacturers and
101 vendors of printer related software will benefit from the interoperability provided by voluntary conformance to these
102 standards.

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104 multiple, independent and interoperable implementations with substantial operational experience, and enjoys
105 significant public support.

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114 2) leave the subject line blank

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116 subscribe ipp

117 end

118 Implementers of this specification are encouraged to join the IPP Mailing List in order to participate in any
119 discussions of clarifications or review of registration proposals for additional names. Requests for additional media
120 names, for inclusion in this specification, should be sent to the IPP Mailing list for consideration.

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121	Contents	
122	1	Introduction and Summary 1
123	1.1	Scope 1
124	2	Terminology 2
125	2.1	Conformance Terminology..... 2
126	2.2	Other Terminology 2
127	3	Document Operations..... 3
128	4	Operation Attributes for the Job and Document Creation operations 7
129	4.1	Operation Attributes supplied in Job Creation and Document Creation requests 7
130	4.2	Operation Attributes returned in Job and Document Creation responses 8
131	5	Job Template and Document Template attributes 9
132	6	Job Description and Document Description attributes 15
133	6.1	document-number (integer(1:MAX)) <Document> 17
134	6.2	job-state (type1 enum) <Job> 17
135	6.3	document-state (type1 enum) <Document> 17
136	6.3.1	The “job-state” attribute and the Job Life Cycle 19
137	6.3.2	The “document-state” Document Description attribute and the Document object life Cycle 20
138	6.3.3	Forwarding Servers 21
139	6.3.4	Partitioning of Job/Document States 21
140	6.4	job-state-reasons (1setOf type2 keyword) <Job>..... 22
141	6.5	document-state-reasons (1setOf type2 keyword) <Document>..... 22
142	7	Printer attributes 27
143	8	New Values for Existing Printer Description Attributes..... 32
144	8.1	operations-supported (1setOf type2 enum) 32
145	9	Conformance Requirements..... 32
146	9.1	Printer conformance requirements 32
147	9.2	Client conformance requirements..... 33
148	10	Normative References 33
149	11	Informative References 34
150	12	IANA Considerations 35
151	12.1	Attribute Registrations..... 35
152	12.2	Additional Enum Attribute Value Registrations for the “operations-supported” Printer Attribute 38
153	12.3	Operation Registrations 38
154	13	Internationalization Considerations 39
155	14	Security Considerations..... 39
156	15	Contributors 39
157	16	Acknowledgments..... 39

158 17 Author’s Address 39
 159 18 Annex B: Change Log (informative) 39
 160

161 **Tables**

162 Table 1 - List of Document operations 1
 163 Table 2 - Document operations compared to Job operations 3
 164 Table 3 - Operation Attributes supplied in Job and Document Creation operation *requests* 7
 165 Table 4 - Operation attributes returned in Job and Document Creation operation *responses* 9
 166 Table 5 - Job Template and Document Template attributes 11
 167 Table 6 - Job and Document Description attributes 16
 168 Table 7 - "job-state" and "document-state" attribute values 18
 169 Figure 1 - The "job-state" Job Description attribute and the Job object life cycle 20
 170 Figure 2 The "document-state" Document Description attribute and the Document object life Cycle 21
 171 Table 8 - "job-state-reasons" and "document-state-reasons" attribute values 23
 172 Table 9 - Printer attributes (Job Template and Printer Description) 28
 173 Table 10 – Operation-id assignments 32
 174

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176 1 Introduction and Summary

177 This specification is a proposal to extend the IPP semantics to include a Document object. The Job object is said to
178 contain one or more Document objects. The Document object is created by the existing Send-Document and Send-
179 URI operations. The extension is to add a Document Attributes group (and tag) to the request which contains any
180 Document Template attributes to be applied to this Document object being created, overriding any corresponding Job
181 Template attribute supplied at the job level (including the “document-overrides” operation attributes at the Job or
182 Document level).

183 The intent is to propose this specification as an IPP extension and which will be referenced as part of the PWG
184 Semantic Model. The purpose for specifying the Document object, is so that we can have a common specification
185 for use in IPP, the PWG Semantic Model, the PWG PSI project, and the Free Standards Group Job Ticket API which
186 all have a Document object.

187 1.1 Scope

188 Part of the extension is to allow the client to supply printing instructions, called Document Template attributes, when
189 creating each Document object. An IPP Printer object implementation MAY support most of the existing Job
190 Template attributes as Document Template attributes as well. (The PWG Semantic Model currently calls the Job
191 Template attributes and Document Template attributes simply “Processing” attributes).

192 The Document object is a passive object¹ and is operated upon by the Job. However, there are 7 new operations
193 that affect the Document object after it is created as summarized in Table 1.

194

Table 1 - List of Document operations

Operation Name	Brief Description
Cancel-Current-Document	Cancel the current document that is printing.
Cancel-Document	Cancel the specified Document in the specified Job, but don't remove it.
Get-Document-Attributes	Get requested attributes of specified Document in the specified Job.
Get-Documents	Get requested attributes of all of the Documents in the specified Job.
Delete-Document	Delete the specified Document object and its data.
Set-Document-Attributes	Set the supplied Document attributes on the specified Document
Validate-Document	Validate that the supplied attributes are supported

195

196 This document specifies the semantics of these seven new operations by comparing them to the corresponding Job
197 operations.

198 **ISSUE 1a: Do we need formal definitions of each Operation or is the comparison with Job operations in Table 2**
199 **sufficient?**

200 This specification also specifies the life cycle of the Document object by defining the “document-state” and
201 “document-state-reasons” attributes. No “document-state-message” is defined since the Job’s “job-state-message”
202 text message can identify individual documents when that is needed. Finally, the analogous Document Descriptions
203 attributes that correspond to the Job Description attributes are proposed.

¹ The Document object is *not* a sub-job. If Job trees are desired where sub-jobs can be on different network nodes, such as in JDF, then a separate specification should be generated for Job trees.

204 2 Terminology

205 This section defines terminology used throughout this document.

206 2.1 Conformance Terminology

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

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

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

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

225 2.2 Other Terminology

226 This document uses the same terminology as [RFC2911], such as "client", "Printer", "attribute", "attribute value",
227 "keyword", "operation", "request", "response", and "support" with the same meaning. In addition, the following terms
228 are defined for use in this document:

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

231 **Document Creation operation** - operations that create Document objects. Specifically: Send-Document and Send-
232 URI as defined in [RFC2911].

233 **Document Template attribute** - an attribute that the client supplies in a Document Creation operation request

234 **ISSUE 1b:** Should Print-Job and Print-URI also be called Document Creation operations since they create one
235 Document object? The answer probably depends on the answer to the following issue:

236 **ISSUE 1c:** We're adding a Document Attribute group (tag) to Send-Document and Send-URI so that a client can
237 supply Document Template attributes. OK that we don't add this group to Print-Job and Print-URI? The problem with
238 adding the Document Template attribute group to Print-Job and Print-URI requests is that there becomes two ways
239 for a client to supply many of the Job Template attributes that are Document Processing attributes, such as "media",
240 "number-up", etc.,. Those two ways in a Print-Job or Print-URI are (1) in the Job Template attribute group or (2) in the
241 Document Template attribute group. The PWG Semantic Model is defining each Processing attribute to be either a
242 Job Processing attribute or a Document Processing attribute, but not both, so that there will only be one way to
243 submit each Processing attribute in a PrintJob operation according to whether it is defined to be a Job Processing

244 Attribute or a Document Processing Attribute. But for backward compatibility, IPP's Job Template attributes are a
 245 mixture of Job and Document Processing attributes, i.e., "job-priority" and "job-hold-until" versus "media" and
 246 "number-up" are passed mixed together in the Job Template attribute group.

247 Document Overrides - a way for a client to specify attributes to apply to specified documents in a multi-document job.
 248 Specifically, as member attributes of the "document-overrides" Job Template attribute in a Job Creation operation or
 249 the "document-overrides" operation attribute in a Document Creation operation as defined in [override].

250 3 Document Operations

251 The Document object semantics are as parallel to the Job object semantics as possible. Therefore, most of the Job
 252 operations have analogous Document operations as shown in Table 2. Operations that can apply only to an entire
 253 job, have no analogous document operation as indicated. This extension adds 7 new Document operations that
 254 operate on the Document object once it is created by either of the existing two: Send-Document and Send-URI
 255 operations.

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

258 Table 2 compares the Job and Document operations. The two Conf. columns indicate the conformance
 259 requirements (REQUIRED = REQ, OPTIONAL = OPT) for the Job and Document operations respectively. A "REQ"
 260 in the Document Conformance column means if the Document object is supported. Whether a Document operation
 261 is a method on the Job object or the Document object depends on the modeling regime and is not an essential part
 262 of the semantics described here, since these semantics are intended to apply to both to object-oriented and object-
 263 based protocols, APIs, and implementations.

264 ISSUE 1d: Agree that the Cancel-Current-Documnet, Delete-Documnet, and Set-Documnet-Attributes operations
 265 are OPTIONAL and that the Cancel-Documnet, Get-Documnet-Attributes, Get-Documents, and Validate-Documnet
 266 operations are REQUIRED as indicated in Table 2 when supporting the Document object?

267 ISSUE 1a repeated: Do we need formal definitions of each Operation or is the comparison with Job operations in
 268 Table 2 sufficient?

269 **Table 2 - Document operations compared to Job operations**

Job operations	Job Conf.	Document operations	Doc Conf
Cancel-Current-Job Sets "job-state" to 'canceled' and "job-state-reasons" to 'canceled-by-xxx'. Sets "document-state" to 'canceled' and "document-state-reasons" to 'canceled-by-xxx' for any documents that have not yet reached a terminal state ('completed', 'canceled', or 'aborted').	OPT	Cancel-Current-Documnet Cancels processing of the current Document no matter for which Job, set the "document-state" attributes of the current documents in the job to 'canceled', and proceed with processing the next Document of the current Job or with the next Job if the current Job has no more Document objects. Its an operator emergency method. In some modeling regimes, it may be a Device method, rather than a Job or Documnet method. Inputs: same as Cancel-Current-Job, plus an OPTIONAL "document-number" operation attribute which the Printer checks to see if the current document being processed is the specified document, else the Printer rejects the operation in a manner analogous to the handling of the OPTIONAL "job-id" input parameter to both Cancel-Current-Job and Cancel-Current-Documnet, if supplied.	OPT

Job operations	Job Conf.	Document operations	Doc Conf
<p>Cancel-Job Sets "job-state" to 'canceled' and "job-state-reasons" to 'canceled-by-xxx'. Sets "document-state" to 'canceled' and "document-state-reasons" to 'canceled-by-xxx' for any documents that have not yet reached a terminal state ('completed', 'canceled', or 'aborted').</p>	REQ	<p>Outputs: same as Cancel-Current-Job</p> <p>Cancel-Document Cancels the processing of the document content for the specified Document object in the job, sets the specified document's "document-state" attribute to 'canceled', but does not remove the document from the Job, so that the Job can be resubmitted later. Thus Cancel-Document has the same semantics as Cancel-Job, which only cancels the processing of the job, and doesn't delete the job/document itself. See Delete-Document to delete the Document object itself immediately. This operation does not affect the states of any of the other documents in the job. If the job was processing and 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. Note: Unlike Reprocess-Job, there is no Reprocess-Document. However, the Reprocess-Job and Restart-Job operations will process all documents in the job, including ones that have been canceled by Cancel-Document. Inputs: same as Cancel-Job, plus a REQUIRED "document-number" operation attribute. Outputs: same as Cancel-Job.</p>	OPT
<p>Create-Job The operation and Job Template attributes remain at the job level on the Job object. Document objects inherit the job level attributes unless the Document Creation operation supplies the attribute. However, the Printer MUST NOT copy down job level attributes to the Document object, including "document-overrides" (except operation attributes that initialize Document Description attributes marked with an "*" in Table 6)</p>	OPT	<p>N/A. See <i>Send-Document</i> and <i>Send-URI</i></p>	
<p>Get-Job-Attributes</p>	REQ	<p>Get-Document-Attributes Returns all or selected attributes and values of the specified Document object. Two new group names are defined: 'document-template' and 'document-description'. Only attributes that were supplied by any client explicitly for the Document object, i.e., in a Send-Document, Send-URI, or Set-Document-Attributes operations are returned. Document attributes supplied as members of the "document-overrides" operation attribute on the Job Creation operations are not returned. In other words, a client sees what clients submitted at the Document level; the Printer MUST NOT merge the attributes that were supplied at the Job level in this response (except Document Description attributes marked with an "*" in Table 6). Inputs: same as Get-Job-Attributes, plus a REQUIRED "document-number" operation attribute.</p>	REQ

Job operations	Job Conf.	Document operations	Doc Conf
		Outputs: same as Get-Job-Attributes.	
Get-Jobs	REQ	<p>Get-Documents Returns all or selected attributes and values of all Document objects in the specified Job. Two new group names are defined: 'document-template' and 'document-description'. Only attributes that were supplied by any client explicitly for the Document object, i.e., in a Send-Document, Send-URI, or Set-Document-Attributes operations are returned. Document attributes supplied as members of the "document-overrides" operation attribute on the Job Creation operations are not returned. In other words, a client sees what clients submitted at the Document level; the Printer MUST NOT merge the attributes that were supplied at the Job level in this response (except Document Description attributes marked with an "*" in Table 6). Inputs: same as Get-Jobs, except a "which-documents" operation attribute (instead of "which-jobs" with values: 'completed', 'not-completed', and 'all' (default) and no equivalent to "my-jobs". Outputs: same as Get-Jobs.</p>	REQ
Hold-Job Sets "job-state" to 'pending-held' and "job-state-reasons" to 'job-hold-until-specified'. The Documents' "document-state" and "document-state-reasons" are unaffected.		<i>N/A, can only hold an entire job.</i>	
Print-Job	REQ	<p>Send-Document (existing operation - see [RFC2911]) Adds a Document object to the Job that include actual document content. The extension is to add the Document Attributes group (and tag) to the request which contains any Document Template attributes to be applied to this document, overriding any corresponding Job Template attribute supplied at the job level (including "document-overrides" operation attributes at the Job or Document level). It is a method on the Job object.</p>	REQ ²
Print-URI	OPT	<p>Send-URI (existing operation - see [RFC2911]) Adds a Document object to the Job that contains a URL for the specified document content. The extension is to add the Document Attributes group (and tag) to the request which contains any Job Template attributes to be applied to this document, overriding any corresponding Job Template attribute supplied at the job level (including "document-overrides" operation attributes at the Job or Document level). The device then pulls the document content data as needed. It is a method on a Job object.</p>	OPT
Promote-Job	OPT	<i>N/A, can only promote an entire job</i>	
Purge-Jobs Requires operator/administrator privileges.	OPT	<p>Delete-Document Deletes the specified Document object and its data immediately if the Document is still in the 'pending' state (there is no 'pending-held' state for Documents), else reject the request. The "document-number" values are not re-assigned, so that the deleted document leaves a hole in the document numbering space for the job. A subsequent Get-Document-Attributes request for this document will return a 'client-</p>	OPT

² The Send-Document operation is OPTIONAL for a Printer to conform to [RFC2911], but is REQUIRED for a Printer to conform to this Document object specification.

Job operations	Job Conf.	Document operations	Doc Conf
		<p>error-not-found' status code. This operation is similar to the Purge-Jobs operation which immediately deletes all jobs from the Printer. However, Delete-Document only deletes a single Document from the Job.</p> <p>Requires operator/administrator privileges, otherwise a rogue client could submit, then delete, at will using up valuable spooling space. Unprivileged users use Cancel-Document which go through the normal accounting, if any.</p> <p>Inputs: Same as Cancel-Document. Outputs: Same as Cancel-Document.</p>	
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>	
<p>Resume-Job</p> <p>If there are no other reasons to hold the job, changes "job-state" to 'pending' and removes 'job-hold-until-specified' value from "job-state-reasons".</p> <p>The Documents' "document-state" and "document-state-reasons" are unaffected.</p>	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	<p>Set-Document-Attributes</p> <p>Changes the values of the specified Document object attributes. If the specified Document object didn't have the attribute, the attribute is added to the Document object. Such set attributes override any corresponding attributes supplied at the job level, including any "document-overrides" operation attributes supplied at the job or document level.</p> <p>Inputs: same as Set-Job-Attributes, plus a REQUIRED "document-number" operation attribute.</p> <p>Outputs: same as Set-Job-Attributes.</p>	OPT
<p>Suspend-Current-Job</p> <p>Sets "job-state" to 'processing-stopped' and "job-state-reasons" to 'job-suspended-by-xxx'. The Documents' "document-state" and "document-state-reasons" are unaffected.</p>	OPT	<i>N/A, can only suspend an entire job in order to run another one</i>	
Validate-Job	REQ	<p>Validate-Document</p> <p>Checks that the print instructions and the document data are available. Note: The PWG PSI has added this operation for documents. The document data is not sent. However, if the client supplies the "document-uri" operation attribute, the Printer MUST validate that the Document exists and is accessible.</p> <p>Inputs: Same as Validate-Job, with the addition of an OPTIONAL</p>	REQ

Job operations	Job Conf.	Document operations	Doc Conf
		“document-uri” operation attribute to be checked. Outputs: same as Validate-Job.	

270

271 4 Operation Attributes for the Job and Document Creation operations

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

275 4.1 Operation Attributes supplied in Job Creation and Document Creation requests

276 Table 3 lists the Operation attributes that clients supply in Job Creation operation *requests*: Print-Job, Print-URI, and
277 Create-Job and in Document Creation operation *requests*: Send-Document and Send-URI. The value of the “ipp-
278 attribute-fidelity” operation attribute does *not* affect the Printer’s handling of the other operation attributes, only its
279 handling of the Job Template attributes (see section 5).

280 The “Supplied” column indicates whether the Operation attribute can be supplied in a Job Creation operation (Job =
281 y) and/or a Document Creation operation (Doc = y). The Conformance column indicates the conformance
282 requirements for what the client supplies in a request and the Printer supports in a request. The Reference and
283 Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute

284 **Table 3 - Operation Attributes supplied in Job and Document Creation operation requests**

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
attributes-charset *	charset	y	y	MUST	MUST	[RFC2911] §3.1.4
attributes-natural-language *	naturalLanguage	y	y	MUST	MUST	[RFC2911] §3.1.4
compression	type3 keyword	y ³	y	MAY	MUST	[RFC2911] §3.2.1.1
document-format	mimeMediaType	y ³	y	MAY	MUST	[RFC2911] §3.2.1.1
document-name	name(MAX)	y ³	y	MAY	MUST	[RFC2911] §3.2.1.1
document-natural- language	naturalLanguage	y ³	y	MAY	MAY	[RFC2911] §3.2.1.1
document-overrides	1setOf collection		y ⁴	MAY	MAY	[override] §5.1

³ The “compression”, “document-format”, “document-name”, and “document-natural-language” MAY be supplied in the Create-Job Job Creation operation as an extension to [RFC2911] as specified in [override]. If supplied in any Job Creation operation, the Printer copies them to corresponding Job Description attributes for subsequent Job query. These supplied attributes become defaults for the Documents in the job and used if the client does not supply the corresponding operation attribute in the Send-Document or Send-URI Document Creation operation.

⁴ The “document-overrides” (collection) attribute MAY be supplied by the client in a Send-Document or Send-URI request as an Operation attribute to apply document overrides to this and/or subsequent documents in the job. See the “page-overrides” Job Template attribute in Table 5 for the listing of the member attributes. However, with the

Operation attribute name for Job and Document Creation <i>requests</i>	Attribute Syntax	Supplied		Conformance		Reference
		Job	Doc	Client supply	Printer support	
document-uri	uri	-	y	MAY	MAY	[RFC2911] §3.2.2
input-document-number ⁵	integer(1:MAX)	-	y	MAY	MAY	[override] §9.2
ipp-attribute-fidelity	boolean	y	y	MAY	MUST	[RFC2911] §3.2.1.1
job-impressions	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-k-octets	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-media-sheets	integer(0:MAX)	y	y	MAY	MAY	[RFC2911] §3.2.1.1
job-name	name(MAX)	y	-	MAY	MUST	[RFC2911] §4.3.5
last-document	boolean	-	y	MAY	MUST	[RFC2911] §3.3.1.1
operation-id *	integer(1:0x8FFF)	y	y	MUST	MUST	[RFC2911] §3.1.2
original-requesting-user-name	name(MAX)	y	y	MAY	MAY	[adm-ops] §11.7.2.2
page-overrides	1setOf collection	-	y ⁶	MAY	MAY	[override] §
printer-uri *	uri	y	y	MUST	MUST	[RFC2911] §3.1.5
request-id *	integer(1:MAX)	y	y	MUST	MUST	[RFC2911] §3.1.2
requesting-user-name *	name(MAX)	y	y	SHOULD	MUST	[RFC2911] §3.2.1.1
version-number *	X.Y	y	y	MUST	MUST	[RFC2911] §3.1.8

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

286 **4.2 Operation Attributes returned in Job and Document Creation responses**

287 Table 4 lists the Operation attributes that Printers return in Job Creation operation *responses*: Print-Job, Print-URI,
 288 and Create-Job and in Document Creation operation *responses*: Send-Document and Send-URI. The column
 289 labeled “Conformance” indicates the conformance for what the Printer returns and what the Printer supports. The
 290 Reference and Section columns list the IETF or IEEE-ISTO specification which defines the semantics of the attribute.

291 **ISSUE 1e:** Currently the returns operation attributes are the same for Job Creation and Document Creation
 292 responses. Should the “document-number” be added as an additional OPTIONAL response attribute to the
 293 Document Creation responses?

introduction of the Document object, the “document-overrides” (collection) attribute SHOULD NOT be used (either as a Job Template attribute or an Operation attribute). Instead, the client simply supplies the Document Template attributes (see Table 5) for each Document Creation request (in a new Document Template attribute group) without needing a collection.

⁵ The “input-document-number” operation attribute sets the Document’s “document-number” Document Description attribute (see section 6.1).

⁶ 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. See the “page-overrides” Job Template attribute in Table 5 for the listing of the member attributes. However, with the introduction of the Document object, the “page-overrides” (collection) attribute SHOULD be more simply supplied as one of the Document Template attributes for this document only.

294

Table 4 - Operation attributes returned in Job and Document Creation operation responses

Operation attribute name	Attribute Syntax Values	Conformance		References
		Printer return	Printer support	
attributes-charset *	charset	MUST	MUST	[RFC2911] §3.1.4
	'utf-8'	MAY	MUST	[RFC2911] §4.1.7
	'us-ascii'	MAY	MAY	[RFC2911] §4.1.7
	'iso-8859-1'	MAY	MAY	[RFC2911] §4.1.7
	'iso-10646-ucs-2'	MAY	MAY	[RFC2911] §4.1.7
attributes-natural-language *	naturalLanguage	MUST	MUST	[RFC2911] §3.1.4
	'en-US'	MAY	MAY	[RFC2911] §4.1.8
detailed-status-message *	text	MAY	MAY	[RFC2911] §3.1.6.3
document-access-error	text	MAY	MAY	[RFC2911] §3.1.6.4
job-id	integer(1:MAX)	MUST	MUST	[RFC2911] §4.3.2
job-uri	uri	MUST	MUST	[RFC2911] §4.3.1
redirect-other-site ⁷	uri	MAY	MAY	[not-srv] §???
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

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

296

297 5 Job Template and Document Template attributes

298 Table 5 lists *all* of the Job Template attributes defined in other IPP specifications and lists their corresponding
 299 Document Template attributes defined in this IPP specification. The Job Template attributes can be supplied in the
 300 Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

301 A subset of these Job Template attributes (e.g., “document-format” and “media”, but not “job-priority”) have
 302 corresponding Document Template attributes defined to apply to Documents and are called Document Template
 303 attributes. Document Template attribute can be supplied in Document Creation operations: Send-Document and
 304 Send-URI.

305 These Document Template attributes can also be supplied as Document Overrides using the “document-overrides”
 306 Job Template attribute.

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

310 According to [override], the “document-overrides” (collection) attribute MAY be supplied by the client in a Send-
 311 Document or Send-URI request as an Operation attribute to apply document overrides to this and/or subsequent
 312 documents in the job. See the “document-overrides” Job Template attribute in Table 5 for the listing of the member
 313 attributes. However, with the introduction of the Document object, the “document-overrides” (collection) attribute

⁷ The Printer returns the “redirect-other-site” operation attribute as a hint that it will redirect any future Get-Notification operation requests to a separate Notification Server.

314 SHOULD NOT be used (either as a Job Template attribute or an Operation attribute). Instead, the client simply
 315 supplies the Document Template attributes (see Table 5) for each Document Creation request (in a new Document
 316 Template attribute group) without needing a collection.

317 ISSUE 02: What do we want to do with the “document-overrides” collection attributes when supporting the
 318 Document object, which is no longer needed as either a Job Template, Document Template, or operation attribute in
 319 Document Creation requests? Not completely true, since the “document-copies” member attribute of the “document-
 320 overrides” attribute allows the client to supply different attributes to different copies of a document. Has anyone
 321 implemented Document Overrides?

322 Similarly, according to [override], the “page-overrides” (collection) attribute MAY be supplied by the client in a Send-
 323 Document or Send-URI request as an Operation attribute to apply page overrides to this and/or subsequent
 324 documents in the job. See the “page-overrides” Job Template attribute in Table 5 for the listing of the member
 325 attributes. However, with the introduction of the Document object, the “page-overrides” (collection) attribute
 326 SHOULD be more simply supplied as one of the Document Template attributes for the document being created only.

327 ISSUE 03: What do we want to do with the “page-overrides” collection attributes when supporting the Document
 328 object, which is still needed as a Job Template and Document Template attribute for overriding attributes in specified
 329 page ranges, but is not needed as an operation attribute on Document Creation requests?

330 The “Defined for use” column indicates whether the client MAY supply and the Printer support the attribute at the
 331 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.

332 Job Template and Document Template attributes are OPTIONAL for a Printer to support and for a client to supply in
 333 a Job Creation or Document Creation request or a Document Overrides or Page Overrides. If a Printer supports a
 334 Job Template or Document Template attribute, then it MUST copy the supplied attribute to the Job or Document
 335 object, respectively so that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs and Get-
 336 Document-Attributes/Get-Documents operations, respectively. The effect of Job Template Attributes supplied in Job
 337 Creation requests are inherited by the Document objects, unless the Document Creation operation supplies the
 338 attribute with a different value. However, the Printer MUST NOT propagate Job Template attributes supplied in Job
 339 Creation operations to the Document object. Similarly, the Printer MUST NOT promote Document Template
 340 attributes up to the Job object when no corresponding Job Template attribute was supplied in the Job Creation
 341 operation. Thus the Printer returns in queries only Job Template and Document Template attributes that were
 342 actually supplied by a client.

344 ISSUE 04: Is this query behavior of not appearing to copying down supplied Job attributes to the Document object
 345 and not bubbling up supplied Document attributes to the Job object OK?

346 However, if a Job Template collection attribute is supported (see [coll]), then there are conformance requirements for
 347 which member attributes MUST be supported and which member attributes a client MUST supply as indicated in the
 348 Conformance column for each collection member attribute in Table 5.

349 **Table 5 - 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 ⁸	y	n	MAY	MAY	[RFC2911] §4.2.5
cover-back	collection	y	y	n	MAY	MAY	[prod-print] §3.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.1.1
media-col	collection					MAY	[prod-print] §3.1.1
cover-type	type2 keyword				MUST	MUST	[prod-print] §3.1.2
cover-front	collection	y	y	n	MAY	MAY	[prod-print] §3.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.1.1
media-col	collection					MAY	[prod-print] §3.1.1
cover-type	type2 keyword				MUST	MUST	[prod-print] §3.1.2
document-overrides	collection	y	n	n	MAY	MAY	[override] §5.1
input-documents	1setOf rangeOfInteger(MAX)				MUST be one or the other, but NOT both	MUST	[override] §5.1.1
output-documents	1setOf rangeOfInteger(MAX)					MUST	[override] §5.1.2
document-copies	1setOf rangeOfInteger(MAX)				MAY	MAY	[override] §5.1.3
document-format	mimeMediaType				MAY	MUST	[override] §5.1.4
document-name	name (MAX)				MAY	MUST	[override] §5.1.5
compression	type3 keyword				MAY	MUST	[override] §5.1.6
document-natural-language	naturalLanguage				MAY	MAY	[override] §5.1.7
page-ranges	1setOf rangeOfInteger (1:MAX)				MAY	MAY	[override] §5.1.8
<i>any other Job Template attributes that affect documents, such as "media" or "media-col"</i>					MAY	MAY	

⁸ 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	
finishings	1setOf type2 enum	y ⁹	y	y	MAY be neither or one of, but NOT both	MAY, MUST if “finishing-col” is supported	[RFC2911] §4.2.6 [finish] §2
finishings-col	collection	y ⁹	y	y		MAY	[prod-print] §3.2
finishing-template	name(MAX)				MAY	MAY	[prod-print] §3.2.1
stitching	collection				MAY	MAY	[prod-print] §3.2.2
stitching-reference-edge	type2 keyword				MUST	MUST	[prod-print] §3.2.2.1
stitching-offset	integer (0:MAX)				MUST	MUST	[prod-print] §3.2.2.2
stitching-locations	1setOf integer(0:MAX)				MUST	MUST	[prod-print] §3.2.2.3
force-front-side	1setOf integer(1:MAX)	y ¹⁰	y	y	MAY	MAY	[prod-print] §3.3
imposition-template	type2 keyword name(MAX)	y	y	y	MAY	MAY	[prod-print] §3.4
insert-sheet	1setOf collection	y ¹⁰	y	y	MAY	MAY	[prod-print] §3.5
insert-after-page-number	integer(0:MAX)				MUST	MUST	[prod-print] §3.5.1
insert-count	integer(0:MAX)				MAY	MUST	[prod-print] §3.5.2
media	type3 keyword name(MAX)				MUST be one or the other, but NOT both	MUST	[prod-print] §3.5.3
media-col	collection					MAY	[prod-print] §3.5.3
job-account-id	name(MAX)	y	n	n	MAY	MAY	[prod-print] §3.6
job-accounting-sheets	collection	y	n	n	MAY	MAY	[prod-print] §3.8
job-accounting-sheets-type	type3 keyword name(MAX)				MUST	MUST	[prod-print] §3.8.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.8.2
media-col	collection					MAY	[prod-print] §3.8.2
job-accounting-output-bin	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.8.3
job-accounting-user-id	name(MAX)	y	n	n	MAY	MAY	[prod-print] §3.7
job-error-sheet	collection	y	n	n	MAY	MAY	[prod-print] §3.9
job-error-sheet-type	type3 keyword name(MAX)				MUST	MUST	[prod-print] §3.9.1
job-error-sheet-when	type2 keyword				MAY	MAY	[prod-print] §3.9.2
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.9.3
media-col	collection					MAY	[prod-print] §3.9.3

⁹ 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.

¹⁰ The effect of the IPP “force-front-side” and “insert-sheet” attributes when supplied at the job level of a multi-document job depends on the value of the “multiple-document-handling” Job Template attribute. For the ‘single-document’ and ‘single-document-new-sheet’ values, the pages are numbered as a single set from 1 to n for the job as a whole. For the ‘separate-documents-collated-copies’ and ‘separate-document-uncollated-copies’ values, the pages are numbered from 1 to n for each document separately.

Job Template / Document Template attribute name	Attribute Syntax	Defined for use			Conformance		Reference
		J	D	P	Client supply	Printer support	
job-hold-until	type3 keyword name(MAX)	y	n	n	MAY	MAY	[RFC2911] §4.2.2
job-message-to-operator	text(MAX)	y	n	n	MAY	MAY	[prod-print] §3.10
job-priority	integer(1:100)	y	n	n	MAY	MAY	[RFC2911] §4.2.1
job-sheet-message	text(MAX)	y	n	n	MAY	MAY	[prod-print] §3.12
job-sheets	type3 keyword name(MAX)	y	n	n	MAY be neither or one of, but NOT both	MAY, MUST if "job-sheets-col" supported	[RFC2911] §4.2.3
job-sheets-col	collection	y	n	n			
job-sheets	type3 keyword name(MAX)				MUST	MUST	[prod-print] §3.11.1
media	type3 keyword name(MAX)				MUST be one or the other, but NOT both	MUST	[prod-print] §3.11.2
media-col	collection					MAY	[prod-print] §3.11.2
media	type3 keyword name(MAX)	y	y	y	MAY be neither or one of, but NOT both	MAY, MUST if "media-col" supported	[RFC2911] §4.2.11
media-col	collection	y	y	y			
media-key	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.1
media-type	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.2
media-info	text(255)				MAY	MAY	[prod-print] §3.13.3
media-color	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.4
media-preprinted	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.5
media-hole-count	integer(0:MAX)				MAY	MAY	[prod-print] §3.13.6
media-order-count	integer(1:MAX)				MAY	MAY	[prod-print] §3.13.7
media-size	collection				MAY	MUST	[prod-print] §3.13.8
x-dimension	integer(0:MAX)				MUST	MUST	[prod-print] §3.13.8.1
y-dimension	integer(0:MAX)				MUST	MUST	[prod-print] §3.13.8.2
media-weight-metric	integer(0:MAX)				MAY	MAY	[prod-print] §3.13.9
media-front-coating	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.10
media-back-coating	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.10
media-recycled	type3 keyword name(MAX)				MAY	MAY	[prod-print] §3.13.11
media-input-tray-check	type3 keyword name(MAX)	y	y	y	MAY	MAY	[prod-print] §3.14

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	y	n	MAY	MAY	[output-bin] §2.1
page-delivery	type2 keyword	y	y	n	MAY	MAY	[prod-print] §3.15
page-order-received	type2 keyword	y	y	n	MAY	MAY	[prod-print] §3.16
page-overrides	1setOf collection	y ¹¹	y	n	MAY	MAY	[override] §5.2
input-documents	1setOf rangeOfInteger(MAX)				MUST be one or the other, but NOT both	MUST	[override] §5.2.1
output-documents	1setOf rangeOfInteger(MAX)					MUST	[override] §5.2.2
document-copies	1setOf rangeOfInteger(MAX)				MAY	MAY	[override] §5.2.3
pages	1setOf rangeOfInteger(MAX)				MUST	MUST	[override] §5.2.4
<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 ¹¹	y	n	MAY	MAY	[RFC2911] §4.2.7
pages-per-subset	1setOf integer(1:MAX)	y ¹²	y	n	MAY	MAY	[prod-print] §5.3
presentation-direction-number-up	type2 keyword	y	y	y	MAY	MAY	[prod-print] §3.17
print-quality	type2 enum	y	y	y	MAY	MAY	[RFC2911] §4.2.13
printer-resolution	resolution	y	y	y	MAY	MAY	[RFC2911] §4.2.12
separator-sheets	collection	y	y	y	MAY	MAY	[prod-print] §3.18
separator-sheets-type	type3 keyword name(MAX)				MUST	MUST	[prod-print] §3.18.1
media	type3 keyword name(MAX)				MAY be neither or one of, but NOT both	MUST	[prod-print] §3.18.2
media-col	collection					MAY	[prod-print] §3.18.2
sheet-collate	type2 keyword	y	y	n	MAY	MAY	[job-prog] §3.1
sides	type2 keyword	y	y	y	MAY	MAY	[RFC2911] §4.2.8

¹¹ The effect of the IPP "page-overrides" and "page-ranges", 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.

¹² The IPP "pages-per-subset" attribute 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	
x-image-position	type2 keyword	y	y	y	MAY	MAY	[prod-print] §3.19.2
x-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.3
x-side1-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.4
x-side2-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.5
y-image-position	type2 keyword	y	y	y	MAY	MAY	[prod-print] §3.19.6
y-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.7
y-side1-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.8
y-side2-image-shift	integer(MIN:MAX)	y	y	y	MAY	MAY	[prod-print] §3.19.9

350

351 6 Job Description and Document Description attributes

352 Table 6 lists all the Job Description defined in other IPP specifications and the corresponding Document Description
 353 attributes defined in this IPP specification. Job Description and Document Description attributes are Job object and
 354 Document object attributes, respectively, that are filled in by the Printer. Some Job/Document Description attribute
 355 values are supplied by the client in the Job/Document Creation operation using corresponding Operation attributes
 356 as flagged with “**”.

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

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

363 Legend:

364 **[job-]** indicates an attribute that shouldn't have had a “job-” prefix in its name in [RFC2911], so that the same
 365 attribute could also apply to the Document object as a Document Description attribute. Note: For the PWG
 366 Semantic Model, the “job-” prefix is proposed to be dropped.

368 **ISSUE 05:** Should we sort the attributes ignoring the [job-]? Currently the “job-” is used in the sort for
 369 attributes.

371 **ISSUE 06:** How will we register these attributes with IANA, since they will be registered for IPP use, with the
 372 “job-” prefix. Do we add the ones without “job-” as aliases to the IANA registry as is done for charset
 373 registrations?

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

375 “**” indicates a fundamental Document Description that when the client supplies the value at the Job level, but
 376 not at the Document level, the Printer **MUST** appear to copy down the value to each Document object as
 377 returned in Get-Document-Attributes and Get-Documents operation responses.

379 ** indicates a Job and/or Document Description attribute that the client **MAY** supply the values for in a
 380 corresponding Operation attribute.

Table 6 - Job and Document Description attributes

IPP Job Description / Document Description attribute name	IPP Attribute Syntax	Job	Doc	Printer conform ance	Reference
attributes-charset	charset	y	y	MUST	[RFC2911] §4.3.19
attributes-natural-language	naturalLanguage	y	y	MUST	[RFC2911] §4.3.20
compression**	type3 keyword	y*	y*	MUST	[RFC2911] §3.2.1.1
current-page-order	type2 keyword	y ¹³	y	MAY	[prod-print] §4.1
date-time-at-completed	dateTime	y	y	MAY	[RFC2911] §4.3.14.7
date-time-at-creation	dateTime	y	y	MAY	[RFC2911] §4.3.14.5
date-time-at-processing	dateTime	y	y	MAY	[RFC2911] §4.3.14.6
document-format**	documentFormat	y*	y*	MUST	[RFC2911] §3.2.1.1
document-name**	name(MAX)	y*	y*	MUST	[RFC2911] §3.2.1.1
document-natural-language**	naturalLanguage	y*	y*	MAY	[RFC2911] §3.2.1.1
document-number	integer(0:MAX)	-	y	MUST	[this spec] §6.1
document-state	type1 enum	-	y	MUST	[this spec] §6.3.2
document-state-reasons	1setOf type2 keyword	-	y	MUST	[this spec] §6.5
impressions-completed-current-copy	integer(0:MAX)	y	y	MAY	[job-prog] §4.4
job-collation-type	type2 enum	y	-	MAY	[job-prog] §4.1
[job]-detailed-status-message	1setOf text (MAX)	y	y	MAY	[RFC2911] §4.3.10
[job]-document-access-errors	1setOf text(MAX)	y	y	MAY	[RFC2911] §4.3.11
job-id	integer(1:MAX)	y	- ¹⁴	MUST	[RFC2911] §4.3.2
[job]-impressions**	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.2
[job]-impressions-completed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.2
[job]-k-octets**	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.1
[job]-k-octets-processed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.1
[job]-media-sheets**	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.17.3
[job]-media-sheets-completed	integer(0:MAX)	y	y	MAY	[RFC2911] §4.3.18.3
job-message-from-operator	text(127)	y	-	MAY	[RFC2911] §4.3.16
[job]-more-info	uri	y	y	MAY	[RFC2911] §4.3.4
job-name	name(MAX)	y	- ¹⁵	MUST	[RFC2911] §4.3.5
job-originating-user-name	name (MAX)	y	-	MUST	[RFC2911] §4.3.6
[job]-printer-up-time	integer (1:MAX)	y	y	MUST	[RFC2911] §4.3.14.4
job-printer-uri	uri	y	-	MUST	[RFC2911] §4.3.3
job-state	type1 enum	y	- ¹⁶	MUST	[RFC2911] §4.3.7
job-state-message	text(MAX)	y	- ¹⁷	MAY	[RFC2911] §4.3.9
job-state-reasons	1setOf type2 keyword	y	- ¹⁸	MUST	[RFC2911] §4.3.8

¹³ When documents in a multiple document job have the same page order, the Printer populates both the Job and Document “current-page-order” with the same value, so that clients that only know about the Job Description attribute will get a value. When the page orders differ, the Printer doesn’t populate the “current-page-order” Job Description attribute, but only the Document Description attribute of each Document.

¹⁴ The Document Description attribute that corresponds to the “job-id” Job Description attribute is the (new) “document-number” attribute.

¹⁵ The Document Description attribute that corresponds to the “job-name” Job Description attribute is the (existing) “document-name” attribute defined in [RFC2911].

¹⁶ The Document Description attribute that corresponds to the “job-state” Job Description attribute is the (new) “document-state” attribute.

¹⁷ There is no Document Description attribute that corresponds to the “job-state-message”. Printers can use the “job-state-message” to describe any document level conditions.

¹⁸ 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	Job	Doc	Printer conform ance	Reference
job-uri	uri	y	-	MUST	[RFC2911] §4.3.1
[job-]warnings-count	integer(0:MAX)	y	y	MAY	[override] §6.1
last-document **	boolean	-	y	MAY	[RFC2911] §4.3.12
number-of-documents	integer(0:MAX)	y	-	MAY	[RFC2911] §4.3.15
number-of-intervening-jobs	integer(0:MAX)	y	-	MAY	[RFC2911] §4.3.13
output-device-assigned	name(127)	y	-	MAY	[RFC2911] §4.3.7.2
sheet-completed-copy-number	integer(0:MAX)	y	y	MAY	[job-prog] §4.2
sheet-completed-document-number	integer(0:MAX)	y	-	MAY	[job-prog] §4.3
time-at-completed	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.3
time-at-creation	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.1
time-at-processing	integer (MIN:MAX)	y	y	MUST	[RFC2911] §4.3.14.2

382 ****** and ******* See the description in the Legend before the table.

383

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

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

397 **6.1 document-number (integer(1:MAX))** **<Document>**

398 This Document Description attribute is the ordinal number of the document within the job which determines its order
 399 of being printed in a multi-document job. The Printer generates the values monotonically increasing from 1 for a job.
 400 However, the client MAY supply the value in the “input-document-number” operation attribute.

401 **6.2 job-state (type1 enum)** **<Job>**

402 **6.3 document-state (type1 enum)** **<Document>**

403 The REQUIRED “job-state” and the REQUIRED “document-state” attribute identify the current state of the job and
 404 document, respectively. Even though IPP defines seven values for job/document states (plus the out-of-band
 405 ‘unknown’ value - see [RFC2911] section 4.1), implementations only need to support those states which are
 406 appropriate for the particular implementation. In other words, an IPP Printer object implementation supports only
 407 those job/document states implemented by the output device and available to the IPP Printer object implementation.

408 Table 7 lists the “job-state” and “document-state” attribute values.

409

Table 7 - "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

410

411 The (JD) and (J) notation below indicates whether the keyword is defined for the "job-state" and "document-state"
 412 attributes or just the "job-state" attribute as indicated in Table 7. Standard enum values are:

Value	Symbolic Name and Description
'3'	'pending' (JD): The job is a candidate to start processing, but is not yet processing. The document has not started to be processed at all.
'4'	'pending-held' (J): The job is not a candidate for processing for any number of reasons but will return to the 'pending' state as soon as the reasons are no longer present. The job's "job-state-reason" attribute MUST indicate why the job is no longer a candidate for processing. The 'pending-held' state does not apply to the Document object's "document-state" attribute.
'5'	'processing' (JD): One or more of: <ol style="list-style-type: none"> 1. The job is using, or is attempting to use, one or more purely software processes that are analyzing, creating, or interpreting a PDL, etc., 2. The job is using, or is attempting to use, one or more hardware devices that are interpreting a PDL, making marks on a medium, and/or performing finishing, such as stapling, etc., 3. The Printer object has made the job ready for printing, but the output device is not yet printing it, either because the job hasn't reached the output device or because the job is queued in the output device or some other spooler, awaiting the output device to print it. <p>When the job is in the 'processing' state, the entire job/document state includes the detailed status represented in the Printer object's "printer-state", "printer-state-reasons", and "printer-state-message" attributes.</p> <p>On the other hand, the 'processing' state for the Document indicates that the Document has begun to be processed. Even if the job stops being processed, the Document remains in the 'processing' state until it moves to one of the three terminal states.</p> <p>Implementations MAY, though they NEED NOT, include additional values in the job's/document's "job-state-reasons"/"document-state-reasons" attribute to indicate the progress of the job/document, such as adding the 'job-printing'/'printing' value to indicate when the output device is actually making marks on paper and/or the 'processing-to-stop-point' value to indicate that the IPP object is in the process of canceling or aborting the job/document. Most implementations won't bother with this nuance.</p>
'6'	'processing-stopped' (J): The job has stopped while processing for any number of reasons and will return to the 'processing' state as soon as the reasons are no longer present.

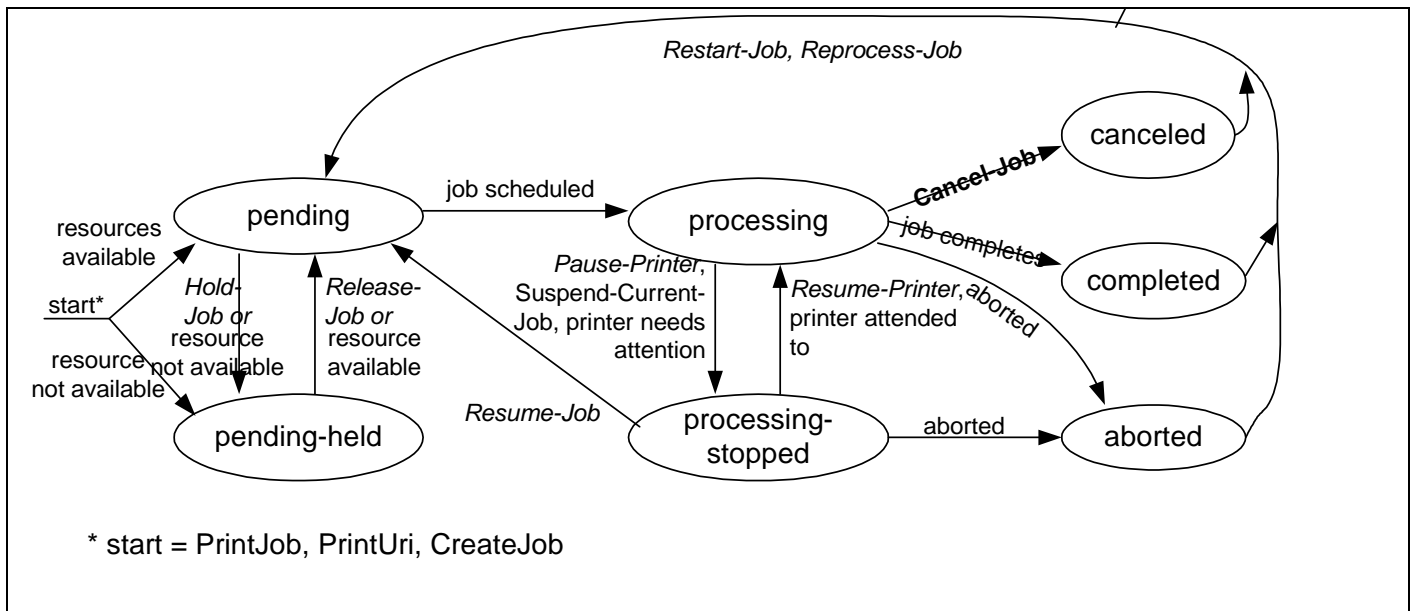
Value	Symbolic Name and Description
	<p>The job's "job-state-reason" attribute MAY indicate why the job has stopped processing. For example, if the output device is stopped, the 'printer-stopped' value MAY be included in the job's "job-state-reasons" attribute.</p> <p>Note: When an output device is stopped, the device usually indicates its condition in human readable form locally at the device. A client can obtain more complete device status remotely by querying the Printer object's "printer-state", "printer-state-reasons" and "printer-state-message" attributes.</p> <p>The 'processing-stopped' state does not apply to the Document object's "document-state" attribute.</p>
'7'	<p>'canceled' (JD): The job/document has been canceled by a Cancel-Job/Cancel-Document operation and the Printer object has completed canceling the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is canceling the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' value and one of the 'canceled-by-user', 'canceled-by-operator', or 'canceled-at-device' value. When the job/document moves to the 'canceled' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'canceled-by-xxx', if present, MUST remain.</p>
'8'	<p>'aborted' (JD): The job/document has been aborted by the system, usually while the job/document was in the 'processing' or 'processing-stopped' state and the Printer has completed aborting the job/document and all job/document status attributes have reached their final values for the job/document. While the Printer object is aborting the job/document, the job/document remains in its current state, but the job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain the 'processing-to-stop-point' and 'aborted-by-system' values. When the job/document moves to the 'aborted' state, the 'processing-to-stop-point' value, if present, MUST be removed, but the 'aborted-by-system' value, if present, MUST remain.</p>
'9'	<p>'completed' (JD): The job/document has completed successfully or with warnings or errors after processing and all of the job/document media sheets have been successfully stacked in the appropriate output bin(s) and all job/document status attributes have reached their final values for the job/document. The job's/document's "job-state-reasons"/"document-state-reasons" attribute SHOULD contain one of: 'completed-successfully', 'completed-with-warnings', or 'completed-with-errors' values.</p>

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

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

419 6.3.1 The "job-state" attribute and the Job Life Cycle

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



422

423

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

424

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

425

426

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

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The “document-state” attribute is one of the most important Document Description attributes. Figure 2 shows the values of the “document-state” attribute and the Document object life cycle as affected by actions on the Job, Document, Printer, and job processing. Documents are not active objects and their life cycle is closely tied to the lifecycle of a Job¹⁹. 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).

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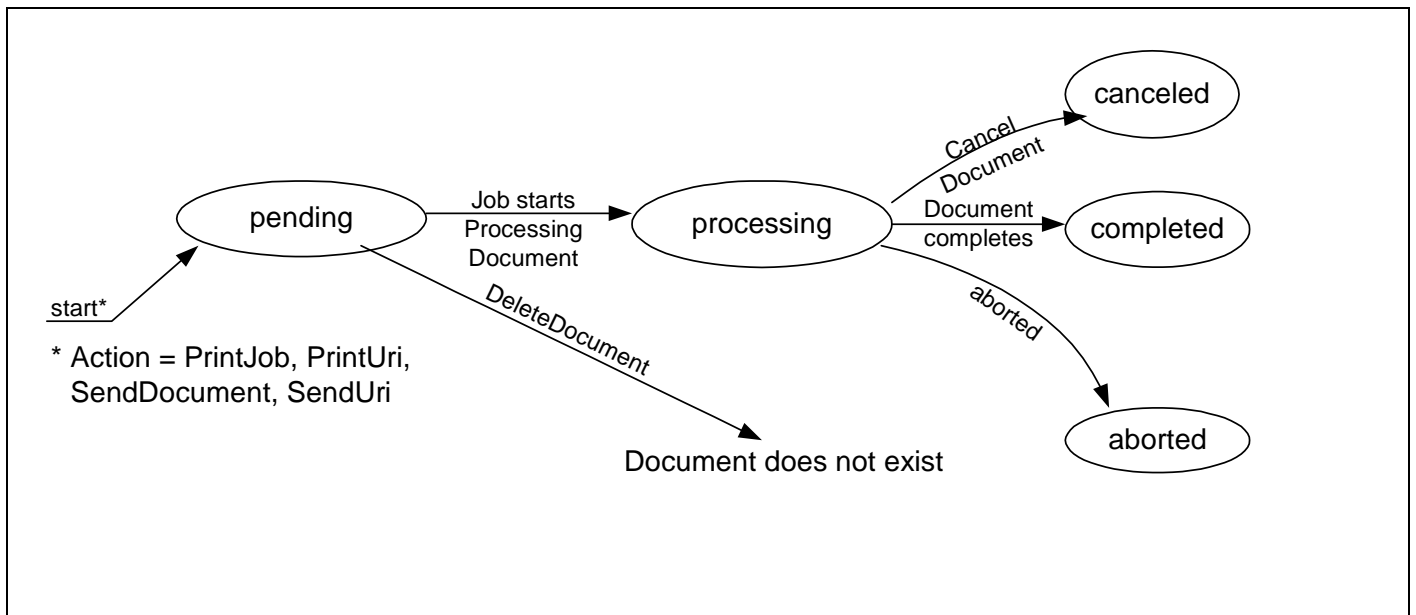
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¹⁹ The Document object is not really a sub-job. If the Document object were its own independent active object, i.e., were a sub-job, then the Document state would affect the job state and there would be complex and debatable roll-up rules for how the 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.



437

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

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

441 **6.3.3 Forwarding Servers**

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

451 **6.3.4 Partitioning of Job/Document States**

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

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

457 **Job Retention:** When a job enters one of the three terminal job states: 'completed', 'canceled', or 'aborted', the IPP
 458 Printer object MAY "retain" the job in a restartable condition for an implementation-defined time period. This time
 459 period MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention. While
 460 in the Job Retention phase, the job's document data is retained and a client may restart the job using the Restart-Job
 461 operation. If the IPP object supports the Restart-Job operation, then it SHOULD indicate that the job is restartable by
 462 adding the 'job-restartable' value to the job's "job-state-reasons" attribute (see Section 6.4) during the Job Retention

463 phase. If the Printer supports the Document object, then the Get-Document-Attributes and Get-Documents
464 operations MUST be supported while the job is in the Job Retention phase.

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

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

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

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

483 6.4 job-state-reasons (1setOf type2 keyword) <Job>

484 6.5 document-state-reasons (1setOf type2 keyword) <Document>

485 The REQUIRED "job-state-reasons" and the REQUIRED "document-state-reasons" attributes provide additional
486 information about the job's and each document's current state, i.e., information that augments the value of the job's
487 "job-state" attribute and each Document's "document-state" attribute, respectively. The Printer SHOULD support the
488 same values for both the "job-state-reasons" and the "document-state-reasons" attribute for those attributes that are
489 defined for both as indicated in the "Job" and "Doc" columns in Table 8.

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

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

501 The following standard keyword values are defined for the "job-state-reasons" and/or "document-state-reasons"
502 attributes as shown in Table 8. In Table 8 the keywords are listed in alphabetic order (ignoring the "[job-]"
503 prefix), while in their descriptions following, they are listed in the most likely order of occurrence.

504 When the Document object is supported, the Printer implementation SHOULD still support the corresponding Job
 505 level "job-state-reasons", so that clients that do not support the Document object will receive the same information.
 506 Also it is usually more convenient for the client to obtain just the Job level status.

507 **Notation:**

508 [job-] indicates a state reason keyword value that shouldn't have had a "job-" prefix in its name in [RFC2911], so
 509 that the same value could also apply at the Document level as a "document-state-reasons" attribute value.
 510 Note: For the PWG Semantic Model, the "job-" prefix will be dropped. For purposes of sorting in Table 8, the
 511 "[job-]" prefix is ignored, since the PWG Semantic Model name is proposed without the prefix.

513 **ISSUE 07:** Should we sort the attributes values including the [job-]? Currently the "job-" is ignored in the sort
 514 for attribute values.

516 **ISSUE 08:** How will we register these attribute values with IANA, since they will be registered for IPP use,
 517 with the "job-" prefix. Do we add the ones without "job-" as aliases to the IANA registry for as is done for
 518 charset registrations?

521 "-" indicates that the Job or Document value is *not* defined.
 522

523 **Table 8 - "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	⁻²⁰	MUST	[RFC2911] §4.3.8
document-state-reasons	1setOf type2 keyword	-	y	MUST	[this spec] §6.5
	'aborted-by-system'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]canceled-at-device'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]canceled-by-operator'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]canceled-by-user'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]completed-successfully'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]completed-with-errors'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]completed-with-warnings'	y	y	MAY	[RFC2911] §4.3.8
	'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-]incoming'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]interpreting'	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-queued'	y	-	MAY	[RFC2911] §4.3.8
	'job-restartable'	y	-	MAY	[RFC2911] §4.3.8
	'job-resuming'	y	-	MAY	[RFC2911] §4.3.8
	'job-suspended'	y	-	MAY	[adm-ops] §9.1
	'none'	y	y	MUST	[RFC2911] §4.3.8
	'[job-]outgoing'	y	y	MAY	[RFC2911] §4.3.8
	'printer-stopped'	y	-	MAY	[RFC2911] §4.3.8

²⁰ 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
	'printer-stopped-partly'	y	-	MAY	[RFC2911] §4.3.8
	'[job-]printing'	y	y	MAY	[RFC2911] §4.3.8
	'processing-to-stop-point'	y	-	MAY	[RFC2911] §4.3.8
	'queued-in-device'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]queued-for-marker'	y	y	MAY	[RFC2911] §4.3.8
	'resources-are-not-ready'	y	y	MAY	[RFC2911] §4.3.8
	'resources-are-not-supported'	y	y	MAY	[prod-print] §6.1
	'service-off-line'	y	-	MAY	[RFC2911] §4.3.8
	'submission-interrupted'	y	y	MAY	[RFC2911] §4.3.8
	'[job-]transforming'	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
	'[job-]warnings-detected'	y	y	MAY	[override] §7.1

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For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely to occur (if implemented), starting with the 'none' value. Note: The order is improved over that in [RFC2911]. The (JD), (J), and (D) notation is identical to the "Job" and "Doc" columns in Table 8 indicating whether the keyword is defined for the "job-state-reasons" and/or "document-state-reasons" attributes:

529

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

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

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

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

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

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'job-data-insufficient' (J): The Create-Job operation has been accepted by the Printer, but the Printer is expecting additional document data before it can move the job into the 'processing' state. If a Printer starts processing before it has received all data, the Printer removes the 'job-data-insufficient'

- 558 reason, but the 'job-incoming' remains. If a Printer starts processing after it has received all data, the
559 Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at the same time.
- 560 'unsupported-compression' (JD): The job/document was aborted by the system because the Printer
561 determined while attempting to decompress the document-data's that the compression is actually not
562 among those supported by the Printer. This value MUST be supported, since "compressions is a
563 REQUIRED operation attribute.
- 564 'compression-error' (JD): The job/document was aborted by the system because the Printer encountered an
565 error in the document-data while decompressing it. If the Printer posts this reason, the document-
566 data has already passed any tests that would have led to the 'unsupported-compression' job-state-
567 reason/document-state-reason.
- 568 'document-access-error' (JD): After accepting a Print-URI or Send-URI request, the Printer could not access
569 one or more documents passed by reference. This reason is intended to cover any file access
570 problem, including file does not exist and access denied because of an access control problem. The
571 Printer MAY also indicate the document access error using the "job-document-access-errors" Job
572 Description attribute (see the description of "job-document-access-errors" above). Whether the
573 Printer aborts the job/document and moves the job/document to the 'aborted' job state or prints all
574 documents that are accessible and moves the job/document to the 'completed' job/document state
575 and adds the 'completed-with-errors' value in the job's "job-state-reasons" or document's "document-
576 state-reasons" attribute depends on implementation and/or site policy. This value SHOULD be
577 supported if the Print-URI or Send-URI operations are supported.
- 578 'unsupported-document-format' (JD): The job/document was aborted by the system because the document-
579 data's document-format is not among those supported by the Printer. If the client specifies the
580 document-format as 'application/octet-stream', the printer MAY abort the job/document and post this
581 reason even though the format is a member of the "document-format-supported" printer attribute, but
582 not among the auto-sensed document-formats. This value MUST be supported, since "document-
583 format" is a REQUIRED operation attribute.
- 584 'document-format-error' (JD): The job/document was aborted by the system because the Printer encountered
585 an error in the document-data while processing it. If the Printer posts this reason, the document-data
586 has already passed any tests that would have led to the 'unsupported-document-format' job-state-
587 reason/document-state-reason.
- 588 'submission-interrupted' (JD): The job or document was not completely submitted for some unforeseen
589 reason, such as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or
590 the document transfer method has crashed in some non-recoverable way before the document data
591 was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the time-
592 out period. See the description of the "multiple-operation-time-out" Printer attribute in [RFC2911]
593 Section 4.4.31.
- 594 '[job-]outgoing' (JD): The Printer is transmitting the job/document to the output device.
- 595 'job-queued' (J): Job is in the 'processing' state, but more specifically, the Printer has queued the document
596 data.
- 597 '[job-]transforming' (JD): Job/document is in the 'processing' state, but more specifically, the Printer is
598 interpreting document data and producing another electronic representation.
- 599 '[job-]interpreting' (JD): Job/document is in the 'processing' state, but more specifically, the Printer is
600 interpreting the document data.
- 601 '[job-]queued-for-marker' (JD): Job/document is in any of the 'pending-held', 'pending', or 'processing' states,
602 but more specifically, the Printer has completed enough processing of the document to be able to
603 start marking and the job/document is waiting for the marker. Systems that require human
604 intervention to release jobs using the Release-Job operation, put the job into the 'pending-held' job
605 state. Systems that automatically select a job to use the marker put the job into the 'pending' job
606 state or keep the job in the 'processing' job state while waiting for the marker, depending on

- 607 implementation. All implementations put the job/document into (or back into) the 'processing' state
608 when marking does begin.
- 609 '[job-]printing' (JD): The output device is marking media. This value is useful for Printers which spend a great
610 deal of time processing (1) when no marking is happening and then want to show that marking is
611 now happening or (2) when the job/document is in the process of being canceled or aborted while
612 the job/document remains in the 'processing' state, but the marking has not yet stopped so that
613 impression or sheet counts are still increasing for the job/document.
- 614 'printer-stopped-partly' (J): The value of the Printer's "printer-state-reasons" attribute contains the value
615 'stopped-partly'.
- 616 'printer-stopped' (J): The value of the Printer's "printer-state" attribute is 'stopped'.
- 617 'job-suspended' (J): The job has been suspended while processing using the Suspend-Current-Job operation
618 and other jobs can be processed on the Printer. The Job can be resumed using the Resume-Job
619 operation which removes this value. Note: Documents cannot be suspended and there is no
620 Suspend-Current-Document operation.
- 621 '[job-]canceled-by-user' (JD): The job/document was canceled by the owner of the job using the Cancel-
622 Job/Cancel-Document request, i.e., by a user whose authenticated identity is the same as the value
623 of the originating user that created the Job object, or by some other authorized end-user, such as a
624 member of the job owner's security group. This 'job-canceled' value SHOULD be supported. The
625 'canceled-by-user' value SHOULD be supported for the "document-state-reasons" attributes if the
626 Cancel-Document operation is supported.
- 627 '[job-]canceled-by-operator' (JD): The job/document was canceled by the operator using the Cancel-
628 Job/Cancel-Document request, i.e., by a user who has been authenticated as having operator
629 privileges (whether local or remote). If the security policy is to allow anyone to cancel anyone's
630 job/document, then these values may be used when the job/document is canceled by other than the
631 owner of the job. For such a security policy, in effect, everyone is an operator as far as canceling
632 jobs/documents is concerned. These values SHOULD be supported if the implementation permits
633 canceling by other than the owner of the job.
- 634 '[job-]canceled-at-device' (JD): The job/document was canceled by an unidentified local user, i.e., a user at a
635 console at the device. This value SHOULD be supported if the implementation supports canceling
636 jobs/documents at the console.
- 637 'aborted-by-system' (JD): The job/document (1) is in the process of being aborted, (2) has been aborted by
638 the system and placed in the 'aborted' state, or (3) has been aborted by the system and placed in the
639 'pending-held' state, so that a user or operator can manually try the job/document again. This value
640 SHOULD be supported.
- 641 'processing-to-stop-point' (J): The requester has issued a Cancel-Job/Cancel-Document operation or the
642 Printer object has aborted the job/document, but is still performing some actions on the job/document
643 until a specified stop point occurs or job/document termination/cleanup is completed.
644 If the implementation requires some measurable time to cancel the job/document in the 'processing'
645 or 'processing-stopped' job/document states, the IPP object MUST use this value to indicate that the
646 Printer object is still performing some actions on the job/document while the job/document remains in
647 the 'processing' or 'processing-stopped' state. After all the job's/document's job/document
648 description attributes have stopped incrementing, the Printer object moves the job/document from
649 the 'processing' state to the 'canceled' or 'aborted' job/document states.
- 650 'service-off-line' (J): The Printer is off-line and accepting no jobs. All 'pending' jobs are put into the 'pending-
651 held' state. This situation could be true if the service's or document transform's input is impaired or
652 broken.
- 653 '[job-]warnings-detected' (JD): If the Printer supports these values, the Printer MUST add the value to "job-
654 state-reasons" / "document-state-reasons" when it generates the first warning message. That is, a

655 single occurrence of this value is present in the "job-state-reasons" / "document-state-reasons" if the
 656 Printer has generated one or more warnings.

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

659 '[job-]completed-with-warnings' (JD): The job/document completed with warnings. This value SHOULD be
 660 supported if the implementation detects warnings.

661 '[job-]completed-with-errors' (JD): The job/document completed with errors (and possibly warnings too) .
 662 This value SHOULD be supported if the implementation detects errors.

663 'job-restartable' (J): This job is retained (see the description of "job-state" above, specifically "Partitioning of
 664 Job States") and is currently able to be restarted using the Restart-Job operation (see [RFC2911]
 665 Section 3.3.7). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the IPP
 666 object MUST accept a Restart-Job operation for that job. This value SHOULD be supported if the
 667 Restart-Job operation is supported.

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

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

675 **7 Printer attributes**

676 This section lists *all* of the Printer attributes defined in other IPP documents. Printer attributes are divided into three
 677 disjoint groups:
 678

Job Template attributes (JT)	These Printer attributes are related directly to the "xxx" Job Template attributes that a client can supply in a Job Creation request as follows: 1. "xxx-supported" indicate the supported values 2. "xxx-default" indicate the values that will be used if the client and the PDL omit the attribute. 3. "xxx-ready" indicate the supported values that are available without human intervention, for those few attributes that require human intervention, such as "media" and possibly "finishing".
Printer Description attributes (PD)	These Printer attributes describe the Printer, such as "printer-name" and "printer-location". Some of them are "xxx-supported" and "xxx-default" for Operation attributes that the client can supply in a Job Creation request.
neither (-)	These Printer attributes describe supported and defaults for member attributes of collection Job Template attributes.

679 In a Get-Printer-Attributes request, a client can request all of the Printer attributes in the Job Template (JT) or Printer
 680 Description (PD) groups by supplying the 'job-template' or 'printer-description' group name, respectively. The column
 681 labeled "attribute syntax" indicates the attribute syntax (see [RFC2911] section 4.1). Many "xxx-default" and "xxx-
 682 supported" attributes have the 'collection' syntax which consists of a number of member attributes. These member
 683 attributes are not listed in this table when they are the same as the corresponding "xxx" attribute in Table 5. Only
 684 those few Printer attribute collection attributes that do not have a corresponding Job Template attributes show the
 685 member attributes in this table. The column labeled "Grp" indicates to which group the attribute belongs. The
 686 column labeled "Printer Conf." indicates the IPP/1.1 Printer conformance requirements for supporting the attribute.
 687 Those attributes labeled as "MAY" may have conditional requirements that require their support, if the Printer
 688 supports a related attribute, operation, or feature. For example, all Job Template attributes are OPTIONAL for a
 689

690 Printer to support. However, if a Printer supports Job Template attribute “xxx”, then it MUST also support the
 691 corresponding “xxx-default” and “xxx-supported” attributes. Similarly, if Event Notification is supported, then some of
 692 the attributes indicated as “MAY” in this table become MUST. The Reference and Section columns list the IETF or
 693 IEEE-ISTO specification which defines the semantics of the attribute.

694 **ISSUE 09: What other Printer Description attributes are needed, if any?**

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Table 9 - Printer attributes (Job Template and Printer Description)

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
charset-configured	charset	PD	MUST	[RFC2911] §4.4.17
charset-supported	1setOf charset	PD	MUST	[RFC2911] §4.4.18
color-supported	boolean	PD	MAY	[RFC2911] §4.4.26
compression-supported	type3 keyword	PD	MUST	[RFC2911] §4.4.32
copies-default	integer(1:MAX)	JT	MAY	[RFC2911] §4.2.5
copies-supported	rangeOfInteger(1:MAX)	JT	MAY	[RFC2911] §4.2.5
cover-back-default	collection	JT	MAY	[prod-print] §3.1.3
cover-back-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.1.4
cover-front-default	collection	JT	MAY	[prod-print] §3.1.3
cover-front-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.1.4
cover-type-supported	1setOf type2 keyword	-	MAY	[prod-print] §3.1.2.1
document-format-default	mimeMediaType	PD	MUST	[RFC2911] §4.4.21
document-format-supported	1setOf mimeMediaType	PD	MUST	[RFC2911] §4.4.22
document-format-varying-attributes	1setOf type2 keyword	PD	MAY	[set-ops] §6.3
document-overrides-supported	1setOf type2 keyword		MAY	[override] §5.1.14
finishings-col-default	collection	JT	MAY	[prod-print] §3.2.3
finishings-col-ready	1setOf collection	JT	MAY	[prod-print] §3.2.4
finishings-col-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.2.5
finishings-default	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.6
finishings-ready	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.6
finishings-supported	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.6
finishing-template-supported	1setOf name(MAX)	-	MAY	[prod-print] §3.2.1.1
force-front-side-default	1setOf integer(1:MAX)	JT	MAY	[prod-print] §3.3
force-front-side-supported	rangeOfInteger(1:MAX)	JT	MAY	[prod-print] §3.3
generated-natural-language-supported	1setOf naturalLanguage	PD	MUST	[RFC2911] §4.4.20
imposition-template-default	type3 keyword name(MAX)	-	MAY	[prod-print] §3.4
imposition-template-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.4
insert-after-page-number-supported	rangeOfInteger(0:MAX)	-	MAY	[prod-print] §3.5.1.1
insert-count-supported	rangeOfInteger(0:MAX)	-	MAY	[prod-print] §3.5.2.1
insert-sheet-default	1setOf collection	JT	MAY	[prod-print] §3.5.4
insert-sheet-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.5.5
ippget-event-life	integer(15:MAX)	PD	MAY	[get-method] §8.1
ipp-versions-supported	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.20
job-account-id-default	name(MAX)	JT	MAY	[prod-print] §3.6
job-account-id-supported	boolean	JT	MAY	[prod-print] §3.6
job-accounting-output-bin-default	type3 keyword name(MAX)	-	MAY	[prod-print] §3.8.3.1
job-accounting-output-bin-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.8.3.2

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
job-accounting-sheets-default	collection	JT	MAY	[prod-print] §3.8.4
job-accounting-sheets-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.8.5
job-accounting-sheets-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.8.1.1
job-accounting-user-id-default	name(MAX)	JT	MAY	[prod-print] §3.7
job-accounting-user-id-supported	boolean	JT	MAY	[prod-print] §3.7
job-error-sheet-default	collection	JT	MAY	[prod-print] §3.7
job-error-sheet-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.9.5
job-error-sheet-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.9.1.1
job-error-sheet-when-supported	1setOf type2 keyword	-	MAY	[prod-print] §3.9.2.1
job-hold-until-default	type3 keyword name(MAX)	JT	MAY	[RFC2911] §4.2.2
job-hold-until-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[RFC2911] §4.2.2
job-impressions-supported	rangeOfInteger(0:MAX)	PD	MAY	[RFC2911] §4.4.34
job-k-octets-supported	rangeOfInteger(0:MAX)	PD	MAY	[RFC2911] §4.4.33
job-media-sheets-supported	rangeOfInteger(0:MAX)	PD	MAY	[RFC2911] §4.4.35
job-message-to-operator-default	text(MAX)	JT	MAY	[prod-print] §3.12
job-message-to-operator-supported	boolean	JT	MAY	[prod-print] §3.12
job-priority-default	integer(1:100)	JT	MAY	[RFC2911] §4.2.1
job-priority-supported	1setOf integer(1:100)	JT	MAY	[RFC2911] §4.2.1
job-settable-attributes-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.2
job-sheet-message-default	text(MAX)		MAY	[prod-print] §3.12
job-sheet-message-supported	boolean		MAY	[prod-print] §3.12
job-sheets-col-default	collection	JT	MAY	[prod-print] §3.11.3
job-sheets-col-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.11.4
job-sheets-default	type3 keyword name(MAX)	JT	MAY	[RFC2911] §4.2.3
job-sheets-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[RFC2911] §4.2.3
max-stitching-locations-supported	integer(1:MAX)	PD	MAY	[prod-print] §5.2
media-back-coating-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.13.10.2
media-col-default	collection	JT	MAY	[prod-print] §3.13.12
media-color-supported	1setOf type2 keyword	-	MAY	[prod-print] §3.13.4.1
media-col-ready	1setOf collection	JT	MAY	[prod-print] §3.13.13
media-col-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.13.14
media-default	type3 keyword name(MAX)	JT	MAY	[RFC2911] §4.2.11
media-front-coating-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.13.10.1
media-hole-count-supported	1setOf rangeOfInteger(0:MAX)	-	MAY	[prod-print] §3.13.6.1
media-info-supported	boolean	-	MAY	[prod-print] §3.13.3.1
media-input-tray-check-default	type3 keyword name(MAX)	JT	MAY	[prod-print] §3.14
media-input-tray-check-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[prod-print] §3.14
media-key-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.13.1.1
media-order-count-supported	1setOf rangeOfInteger(1:MAX)	-	MAY	[prod-print] §3.13.7.1
media-pre-printed-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.13.5.1
media-ready	1setOf (type3 keyword	JT	MAY	[RFC2911] §4.2.11

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
	name(MAX))			
media-recycled-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.13.11.1
media-size-supported	1setOf collection	-	MAY	[prod-print] §3.13.8.3
media-supported	1setOf (type3 keyword name(MAX))	JT	MAY	[RFC2911] §4.2.11
media-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.13.2.1
media-weight-metric-supported	1setOf rangeOfInteger(1:MAX)	-	MAY	[prod-print] §3.13.9.1
multiple-document-handling-default	type2 keyword	JT	MAY	[RFC2911] §4.2.4
multiple-document-handling-supported	1setOf type2 keyword	JT	MAY	[RFC2911] §4.2.4
multiple-document-jobs-supported	boolean	PD	MAY	[RFC2911] §4.4.16
multiple-operation-time-out	integer(1:MAX)	PD	MAY	[RFC2911] §4.4.31
natural-language-configured	naturalLanguage	PD	MUST	[RFC2911] §4.4.19
notify-attributes-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.4
notify-events-default	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.3
notify-events-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.3
notify-lease-duration-default	integer(0:67108863)	PD	MAY	[ntfy] §5.3.8
notify-lease-duration-supported	1setOf (integer(0: 67108863) rangeOfInteger(0:67108863))	PD	MAY	[ntfy] §5.3.8
notify-lease-expiration-time	integer(0:MAX)	PD	MAY	[ntfy] §5.4.3
notify-max-events-supported	integer(2:MAX)	PD	MAY	[ntfy] §5.3.3
notify-pull-method-supported	1setOf type2 keyword	PD	MAY	[ntfy] §5.3.2
notify-schemes-supported	1setOf uriScheme	PD	MAY	[ntfy] §5.3.1
number-up-default	integer(1:MAX)	JT	MAY	[RFC2911] §4.2.9
number-up-supported	1setOf (integer(1:MAX) rangeOfInteger(1:MAX))	JT	MAY	[RFC2911] §4.2.9
operations-supported	1setOf type2 enum	PD	MUST	[RFC2911] §4.4.15
orientation-requested-default	type2 enum	JT	MAY	[RFC2911] §4.2.10
orientation-requested-supported	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.10
output-bin-default	type2 keyword name(MAX)	JT	MAY	[output-bin] §2.1
output-bin-supported	1setOf (type2 keyword name(MAX))	JT	MAY	[output-bin] §2.1
page-delivery-default	type2 keyword	JT	MAY	[prod-print] §3.15
page-delivery-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.15
page-order-received-default	type2 keyword	JT	MAY	[prod-print] §3.16
page-order-received-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.16
page-overrides-supported	1setOf type2 keyword	PD	MAY	[override] §5.2.9
page-ranges-supported	boolean	JT	MAY	[RFC2911] §4.2.7
pages-per-minute	integer(0:MAX)	PD	MAY	[RFC2911] §4.4.36
pages-per-minute-color	integer(0:MAX)	PD	MAY	[RFC2911] §4.4.37
pages-per-subset-supported	boolean	PD	MAY	[override] §5.3.2
parent-printers-supported	1setOf uri	PD	MAY	[ops-set2] §7.2
pdl-override-supported	type2 keyword	PD	MUST	[RFC2911] §4.4.28
presentation-direction-number-up-default	type2 keyword	JT	MAY	[prod-print] §3.17
presentation-direction-number-up-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.17
printer-current-time	dateTime	PD	MAY	[RFC2911] §4.4.30

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
printer-driver-installer	uri	PD	MAY	[RFC2911] §4.4.8
printer-info	text(127)	PD	MAY	[RFC2911] §4.4.6
printer-is-accepting-jobs	boolean	PD	MUST	[RFC2911] §4.4.23
printer-location	text(127)	PD	MAY	[RFC2911] §4.4.5
printer-make-and-model	text(127)	PD	MAY	[RFC2911] §4.4.9
printer-message-date-time	dateTime	PD	MAY	[set-ops] §6.5
printer-message-from-operator	text(127)	PD	MAY	[RFC2911] §4.4.25
printer-message-time	integer(MIN:MAX)	PD	MAY	[set-ops] §6.4
printer-more-info	uri	PD	MAY	[RFC2911] §4.4.7
printer-more-info-manufacturer	uri	PD	MAY	[RFC2911] §4.4.10
printer-name	name(127)	PD	MUST	[RFC2911] §4.4.4
printer-resolution-default	resolution	JT	MAY	[RFC2911] §4.2.12
printer-resolution-supported	1setOf resolution	JT	MAY	[RFC2911] §4.2.12
printer-settable-attributes-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.1
printer-state	type1 enum	PD	MUST	[RFC2911] §4.4.11
printer-state-change-date-time	dateTime	PD	MAY	[ntfy] §6.2
printer-state-change-time	integer(1:MAX)	PD	MAY	[ntfy] §6.1
printer-state-message	text(MAX)	PD	MAY	[RFC2911] §4.4.13
printer-state-reasons	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.12
printer-up-time	integer(1:MAX))	PD	MUST	[RFC2911] §4.4.29
printer-uri-supported	1setOf uri	PD	MUST	[RFC2911] §4.4.1
printer-xri-supported	1setOf collection	PD	MAY	[set-ops] §6.6
xri-uri	uri	PD	MUST	[set-ops] §6.6
xri-authentication	1setOf type2 keyword	PD	MUST	[set-ops] §6.6
xri-security	1setOf type2 keyword	PD	MUST	[set-ops] §6.6
print-quality-default	type2 enum	JT	MAY	[RFC2911] §4.2.13
print-quality-supported	1setOf type2 enum	JT	MAY	[RFC2911] §4.2.13
queued-job-count	integer(0:MAX)	PD	MUST	[RFC2911] §4.4.24
reference-uri-schemes-supported	1setOf uriScheme	PD	MAY	[RFC2911] §4.4.27
separator-sheets-default	collection	JT	MAY	[prod-print] §3.18.3
separator-sheets-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.18.4
separator-sheets-type-supported	1setOf (type3 keyword name(MAX))	-	MAY	[prod-print] §3.18.1.1
sheet-collate-default	type2 keyword	JT	MAY	[job-prog] §3.1
sheet-collate-supported	1setOf type2 keyword	JT	MAY	[job-prog] §3.1
sides-default	type2 keyword	JT	MAY	[RFC2911] §4.2.8
sides-supported	1setOf type2 keyword	JT	MAY	[RFC2911] §4.2.8
stitching-locations-supported	1setOf (integer(0:MAX) rangeOfInteger(0:MAX))	-	MAY	[prod-print] §3.2.2.3.1
stitching-offset-supported	1setOf (integer (0:MAX) rangeOfInteger(0:MAX))	-	MAY	[prod-print] §3.2.2.2.1
stitching-reference-edge-supported	1setOf type2 keyword		MAY	[prod-print] §3.2.2.1.1
subordinate-printers-supported	1setOf uri	PD	MAY	[ops-set2] §7.1
uri-authentication-supported	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.2
uri-security-supported	1setOf type2 keyword	PD	MUST	[RFC2911] §4.4.3
user-defined-values-supported	1setOf type2 keyword	PD	MAY	[prod-print] §5.1
x-image-position-default	type2 keyword	JT	MAY	[prod-print] §3.19.2
x-image-position-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.19.2
x-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.3
x-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.3

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Grp	Printer Conf.	Reference
xri-authentication-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.8
xri-security-supported	1setOf type2 keyword	PD	MAY	[set-ops] §6.9
xri-uri-scheme-supported	1setOf uriScheme	PD	MAY	[set-ops] §6.7
x-side1-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.4
x-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.4
x-side2-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.5
x-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.5
y-image-position-default	type2 keyword	JT	MAY	[prod-print] §3.19.6
y-image-position-supported	1setOf type2 keyword	JT	MAY	[prod-print] §3.19.6
y-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.7
y-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.7
y-side1-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.8
y-side1-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.8
y-side2-image-shift-default	integer(MIN:MAX)	JT	MAY	[prod-print] §3.19.9
y-side2-image-shift-supported	rangeOfInteger(MIN:MAX)	JT	MAY	[prod-print] §3.19.9

696

697 8 New Values for Existing Printer Description Attributes

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

699 8.1 operations-supported (1setOf type2 enum)

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

701

Table 10 – Operation-id assignments

Value	Operation Name	Reference
0x0032	Cancel-Current-Document	[this-doc] §2
0x0033	Cancel-Document	[this-doc] §2
0x0034	Get-Document-Attributes	[this-doc] §2
0x0035	Get-Documents	[this-doc] §2
0x0036	Delete-Document	[this-doc] §2
0x0037	Set-Document-Attributes	[this-doc] §2
0x0038	Validate-Document	[this-doc] §2

702 9 Conformance Requirements

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

704 9.1 Printer conformance requirements

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

- 706 1. MUST meet the conformance requirements for Printers specified in [RFC2911].
- 707 2. MUST support the Document operations that section 3 REQUIRES a Printer to support.

- 708 3. MUST support the operation attributes in the Send-Document operation and, if supported, the Send-URI
709 operation that section 4 REQUIRES a Printer to support.
- 710 4. MAY support any of the Document Template attributes in Document Creation operations as indicated in
711 section 5 and MUST NOT support them for contexts for where they are not defined as indicated in the Table
712 6 with an "n".
- 713 5. MUST support the Document Description attributes that section 6 REQUIRES a Printer to support.
- 714 6. MUST support the Printer attributes that section 7 REQUIRES a Printer to support.
- 715 7. MUST support the values of Printer Descriptions attribute that section 8 REQUIRES a Printer to support.

716 9.2 Client conformance requirements

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

- 718 1. MUST meet the conformance requirements for clients specified in [RFC2911]
- 719 2. MAY support any of the Document operations defined in section 3. **ISSUE 10: Or should the client be**
720 **REQUIRED to support some of the Document operations?**
- 721 3. MUST supply the operation attributes that section 4 REQUIRES a client to supply in operation requests.
- 722 4. MUST supply any Document Template attributes in the format that section 5 REQUIRES a client to supply in
723 Document Creation operations and MUST NOT support them for contexts for where they are not defined as
724 indicated in the Table 6 with an "n".
- 725 5. SHOULD support any of the Document Description attributes that section 6 REQUIRES a Printer to support.
- 726 6. MAY support any of the Printer attributes listed in section 7.
- 727 7. MAY support any of the values of the Printer Descriptions attributes in section 8.

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 786 Device Administrative Operations", RFC 3239, February 2002.

787 12 IANA Considerations

788 This section contains the registration information for IANA to add to the various IPP Registries according to the
 789 procedures defined in RFC 2911 [RFC2911] section 6 to cover the definitions in this document.

790 *Note Replace the References below with the RFC number for the appropriate document, so that it accurately*
 791 *reflects the content of the information for the IANA Registry.*

792 12.1 Attribute Registrations

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

795 Document Description attributes:

796 Document Description attributes:	Reference:	Section
797 attributes-charset (charset)	[RFC2911]	4.3.19
798 attributes-natural-language (naturalLanguage)	[RFC2911]	4.3.20
800 compression (type3 keyword)	[RFC2911]	3.2.1.1
801 current-page-order (type2 keyword)	[prod-print]	4.1
802 date-time-at-completed (dateTime)	[RFC2911]	4.3.14.7
803 date-time-at-creation (dateTime)	[RFC2911]	4.3.14.5
804 date-time-at-processing (dateTime)	[RFC2911]	4.3.14.6
805 detailed-status-message (1setOf text (MAX))	[RFC2911]	4.3.10
806 document-access-errors (1setOf text (MAX))	[RFC2911]	4.3.11
807 document-format (documentFormat)	[RFC2911]	3.2.1.1
808 document-name (name (MAX))	[RFC2911]	3.2.1.1
809 document-natural-language (naturalLanguage)	[RFC2911]	3.2.1.1
810 document-number (integer(0:MAX))	[this spec]	6.1

811	document-state (type1 enum)	[this spec]	6.3
812	document-state-reasons (lsetOf type2 keyword)	[this spec]	6.5!
813	impressions (integer(0:MAX))	[RFC2911]	4.3.17.2
814	impressions-completed (integer(0:MAX))	[RFC2911]	4.3.18.2
815	impressions-completed-current-copy	[job-prog]	4.4
816	(integer(0:MAX))		
817	k-octets (integer(0:MAX))	[RFC2911]	4.3.17.1
818	k-octets-processed (integer(0:MAX))	[RFC2911]	4.3.18.1
819	last-document (boolean)	[RFC2911]	4.3.12
820	media-sheets (integer(0:MAX))	[RFC2911]	4.3.17.3
821	media-sheets-completed (integer(0:MAX))	[RFC2911]	4.3.18.3
822	more-info (uri)	[RFC2911]	4.3.4
823	printer-up-time (integer (1:MAX))	[RFC2911]	4.3.14.4
824	sheet-completed-copy-number (integer(0:MAX))	[job-prog]	4.2
825	time-at-completed (integer (MIN:MAX))	[RFC2911]	4.3.14.3
826	time-at-creation (integer (MIN:MAX))	[RFC2911]	4.3.14.1
827	time-at-processing (integer (MIN:MAX))	[RFC2911]	4.3.14.2
828	warnings-count (integer(0:MAX))	[override]	6.1
829			
830			
831	Document Templates attributes:	Reference:	Section:
832	copies (integer(1:MAX))	[RFC2911]	4.2.5
833	cover-back (collection)	[prod-print]	3.1
834	media (type3 keyword name(MAX))	[prod-print]	3.1.1
835	media-col (collection)	[prod-print]	3.1.1
836	cover-front (collection)	[prod-print]	3.1
837	cover-type (type2 keyword)	[prod-print]	3.1.2
838	media (type3 keyword name(MAX))	[prod-print]	3.1.1
839	media-col (collection)	[prod-print]	3.1.1
840	cover-type (type2 keyword)	[prod-print]	3.1.2
841	finishings (lsetOf type2 enum)	[RFC2911]	4.2.6
842		[finish]	2
843	finishings-col (collection)	[prod-print]	3.2
844	finishing-template (name(MAX))	[prod-print]	3.2.1
845	stitching (collection)	[prod-print]	3.2.2
846	stitching-locations (lsetOf integer(0:MAX))	[prod-print]	3.2.2.3
847	stitching-offset (integer (0:MAX))	[prod-print]	3.2.2.2
848	stitching-reference-edge (type2 keyword)	[prod-print]	3.2.2.1
849	force-front-side (lsetOf integer(1:MAX))	[prod-print]	3.3
850	imposition-template (type2 keyword name(MAX))	[prod-print]	3.4
851	insert-sheet (lsetOf collection)	[prod-print]	3.5
852	insert-after-page-number (integer(0:MAX))	[prod-print]	3.5.1
853	insert-count (integer(0:MAX))	[prod-print]	3.5.2
854	media (type3 keyword name(MAX))	[prod-print]	3.5.3
855	media-col (collection)	[prod-print]	3.5.3
856	media (type3 keyword name(MAX))	[RFC2911]	4.2.11

857	media-col (collection)	[prod-print]	3.13
858	media-back-coating (type3 keyword	[prod-print]	3.13.10
859	name(MAX))		
860	media-color (type3 keyword name(MAX))	[prod-print]	3.13.4
861	media-front-coating (type3 keyword	[prod-print]	3.13.10
862	name(MAX))		
863	media-hole-count (integer(0:MAX))	[prod-print]	3.13.6
864	media-info (text(255))	[prod-print]	3.13.3
865	media-key (type3 keyword name(MAX))	[prod-print]	3.13.1
866	media-order-count (integer(1:MAX))	[prod-print]	3.13.7
867	media-preprinted (type3 keyword name(MAX))	[prod-print]	3.13.5
868	media-recycled (type3 keyword name(MAX))	[prod-print]	3.13.11
869	media-size (collection)	[prod-print]	3.13.8
870	x-dimension (integer(0:MAX))	[prod-print]	3.13.8.1
871	y-dimension (integer(0:MAX))	[prod-print]	3.13.8.2
872	media-type (type3 keyword name(MAX))	[prod-print]	3.13.2
873	media-weight-metric (integer(0:MAX))	[prod-print]	3.13.9
874	media-input-tray-check (type3 keyword	[prod-print]	3.14
875	name(MAX))		
876	number-up (integer(1:MAX))	[RFC2911]	4.2.9
877	orientation-requested (type2 enum)	[RFC2911]	4.2.10
878	output-bin (type2 keyword name(MAX))	[output-bin]	2.1
879	page-delivery (type2 keyword)	[prod-print]	3.15
880	page-order-received (type2 keyword)	[prod-print]	3.16
881	page-overrides (1setOf collection)	[override]	5.2
882	document-copies (1setOf rangeOfInteger(MAX))	[override]	5.2.3
883	input-documents (1setOf rangeOfInteger(MAX))	[override]	5.2.1
884	output-documents (1setOf rangeOfInteger(MAX))	[override]	5.2.2
885	pages (1setOf rangeOfInteger(MAX))	[override]	5.2.4
886	<any other Job Template attributes that		
887	affect pages, such as media or media-col (
888	page-ranges (1setOf rangeOfInteger(1:MAX))	[RFC2911]	4.2.7
889	pages-per-subset (1setOf integer(1:MAX))	[prod-print]	5.3
890	presentation-direction-number-up (type2	[prod-print]	3.17
891	keyword)		
892	print-quality (type2 enum)	[RFC2911]	4.2.13
893	printer-resolution (resolution)	[RFC2911]	4.2.12
894	separator-sheets (collection)	[prod-print]	3.18
895	media (type3 keyword name(MAX))	[prod-print]	3.18.2
896	media-col (collection)	[prod-print]	3.18.2
897	separator-sheets-type (type3 keyword	[prod-print]	3.18.1
898	name(MAX))		
899	sheet-collate (type2 keyword)	[job-prog]	3.1
900	sides (type2 keyword)	[RFC2911]	4.2.8
901	x-image-position (type2 keyword)	[prod-print]	3.19.2
902	x-image-shift (integer(MIN:MAX))	[prod-print]	3.19.3

903	x-side1-image-shift (integer(MIN:MAX))	[prod-print]	3.19.4
904	x-side2-image-shift (integer(MIN:MAX))	[prod-print]	3.19.5
905	y-image-position (type2 keyword)	[prod-print]	3.19.6
906	y-image-shift (integer(MIN:MAX))	[prod-print]	3.19.7
907	y-side1-image-shift (integer(MIN:MAX))	[prod-print]	3.19.8
908	y-side2-image-shift (integer(MIN:MAX))	[prod-print]	3.19.9

909
910

911 Operation attributes:

912	document-number	[this spec]	3
-----	-----------------	-------------	---

914 **12.2 Additional Enum Attribute Value Registrations for the “operations-supported” Printer**
915 **Attribute**

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

919

920	Value	Name	Reference	Section:
921	-----	-----	-----	-----
922	operations-supported (type2 enum):			
923	0x0032	Cancel-Current-Document	[this-doc]	§2
924	0x0033	Cancel-Document	[this-doc]	§2
925	0x0034	Get-Document-Attributes	[this-doc]	§2
926	0x0035	Get-Documents	[this-doc]	§2
927	0x0036	Delete-Document	[this-doc]	§2
928	0x0037	Set-Document-Attributes	[this-doc]	§2
929	0x0038	Validate-Document	[this-doc]	§2

930

931 The resulting enum attribute value registrations will be published in the
932 <http://www.iana.org/assignments/ipp-registrations> file.

933

934 **12.3 Operation Registrations**

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

937

938	Operations:	Reference:	Section:
939	Cancel-Current-Document	[this-doc]	§3
940	Cancel-Document	[this-doc]	§3
941	Get-Document-Attributes	[this-doc]	§3
942	Get-Documents	[this-doc]	§3
943	Delete-Document	[this-doc]	§3
944	Set-Document-Attributes	[this-doc]	§3
945	Validate-Document	[this-doc]	§3

946

947 **13 Internationalization Considerations**

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

950 **14 Security Considerations**

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

953 **15 Contributors**

954 **16 Acknowledgments**

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979 **18 Annex B: Change Log (informative)**

980 Version 0.3, 9 September 2002:

- 981 1. Reformatted as an IEEE-ISTO standard and added the usual sections for a standard.
- 982 2. Added "original-requesting-user-name" Operation attribute to Table 3.
- 983 3. Added "y" to "output-bin" in Table 5 so it MAY be a Document Template attribute.
- 984 4. Clarified the * and ** in Table 6 - Job and Document Description attributes.

- 985 5. Added section 7 all of the Printer attributes defined In any IPP standard.
- 986 6. Allocated operation-id enums in section 8 to the 7 Document operations.
- 987 7. Added the conformance section 9
- 988 8. Completed the IANA Considerations section 12.
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- 990