

Working Draft, May 30, 2003
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The Printer Working Group (PWG) Standard for The Internet Printing Protocol (IPP): Job Extensions

Abstract: This IPP specification extends the Job semantics of the IPP Model and Semantics [rfc2911] object model. This specification defines some new Operation attributes for use in Job Creation and Document Creation operations. The Printer copies these Operation attributes to the corresponding Job Description attributes, which the clients may query. The Document Creation Operation attributes describe the Document Content and permit the Printer to reject requests that it cannot process correctly. Some corresponding "xxx-default" and "xxx-supported" Printer attributes are defined. This specification defines some Job Template attributes that apply to a multi-document Job as a whole and a Job Template attribute for sub-dividing the input print-stream pages into separate Page Subsets. This specification also defines some additional values for the "job-state-reasons" Job Description attribute. Each of the operations and attributes defined in this specification are independent of each other and are OPTIONAL for a Printer to support.



Working Draft, May 30, 2003

The Printer Working Group (PWG) Standard for The Internet Printing Protocol (IPP): Job Extensions

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Standard, the resulting PWG Candidate Standard will be available electronically at: <ftp://ftp.pwg.org/pub/pwg/cs/>. After approval by the PWG (by a Last Call) to transition a PWG Candidate Standard to a PWG Standard, the resulting PWG Standard will be available electronically at: <ftp://ftp.pwg.org/pub/pwg/standards/>.

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48 Operation extensions

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Contents

110	Contents	
111	1 Introduction and Summary	8
112	1.1 Scope	8
113	2 Terminology	9
114	2.1 Conformance Terminology	10
115	2.2 Other Terminology	10
116	3 Operation Attributes for Job Creation and Document Creation operations	11
117	3.1 Operation attributes for Job Creation operations	13
118	3.1.1 ipp-attribute-fidelity (boolean) ([rfc2911] section 3.2.1 and 15)	13
119	3.1.1.1 What there are no "ipp-attribute-fidelity-default" and "ipp-attribute-fidelity-supported" attributes	14
120	3.1.2 job-mandatory-attributes (1setOf type2 keyword)	14
121	3.1.2.1 What there are no "job-mandatory-attributes-default" and "job-mandatory-attributes-supported"	
122	attributes	14
123	3.1.3 output-device-requested (name(127))	15
124	3.1.3.1 Why there is no "output-device-requested-default" attribute	15
125	3.2 Operation attributes for Document Creation operations	15
126	3.2.1 document-charset (charset)	15
127	3.2.2 document-digital-signature (type2 keyword)	16
128	3.2.3 document-format (mimeMediaType)	17
129	3.2.4 document-format-details (1setOf collection)	17
130	3.2.4.1 document-source-application-name (name(MAX))	19
131	3.2.4.2 document-source-application-version (text(127))	19
132	3.2.4.3 document-source-os-name (name(40))	19
133	3.2.4.4 document-source-os-version (text(40))	20
134	3.2.4.5 document-format (mimeMediaType)	20
135	3.2.4.6 document-format-device-id (text(127))	20
136	3.2.4.7 document-format-version (text(127))	20
137	3.2.4.8 document-natural-language (1setOf naturalLanguage)	20
138	3.2.5 document-format-version (text(127))	21
139	3.2.5.1 Why no "document-format-version-default"	21
140	3.2.6 document-natural-language (naturalLanguage)	22
141	4 Job Template attributes	22
142	4.1 Job Template attributes defined for Job-wide effect in multi-document jobs	23
143	4.1.1 job-copies (integer(1:MAX))	23
144	4.1.1.1 job-copies-default (integer(1:MAX))	23
145	4.1.1.2 job-copies-supported (rangeOfInteger(1:MAX))	23
146	4.1.2 job-cover-back (collection)	24
147	4.1.2.1 job-cover-back-default (collection)	24
148	4.1.2.2 job-cover-back-supported (1setOf type2 keyword)	24
149	4.1.3 job-cover-front (collection)	24
150	4.1.3.1 job-cover-front-default (collection)	24
151	4.1.3.2 job-cover-front-supported (1setOf type2 keyword)	24
152	4.1.4 job-finishings (1setOf type2 enum)	24
153	4.1.4.1 job-finishings-default (1setOf type2 enum)	24
154	4.1.4.2 job-finishings-ready (1setOf type2 enum)	25
155	4.1.4.3 job-finishings-supported (1setOf type2 keyword)	25
156	4.1.5 job-finishings-col (1setOf collection)	25
157	4.1.5.1 job-finishings-col-default (collection)	25
158	4.1.5.2 job-finishings-col-ready (collection)	25

159	4.1.5.3 job-finishings-col-supported (1setOf type2 keyword)	25
160	4.2 pages-per-subset (1setOf integer)	25
161	4.2.1 Effect of “multiple-document-handling” and “copies” attributes on Page Subsets	26
162	4.2.2 Examples of the “pages-per-subset” attribute	27
163	4.2.2.1 A single 11-page document with a single “pages-per-subset” value: ‘3’	27
164	4.2.2.2 A single 11-page document with four “pages-per-subset” values: ‘3’, ‘2’, ‘4’, ‘2’	27
165	4.2.2.3 A single 11-page document with two “pages-per-subset” values: ‘3’, ‘2’	28
166	4.2.2.4 A two 5-page documents with one “pages-per-subset” value: ‘3’	28
167	4.2.2.5 Two 5-page documents with one “pages-per-subset” value: ‘3’, “copies” = ‘2’, “multiple-document-handling” = ‘separate-documents-uncollated-copies’	29
168	4.2.2.6 Two 5-page documents with one “pages-per-subset” value: ‘3’, “copies” = ‘2’, “multiple-document-handling” = ‘separate-documents-collated-copies’ or ‘single-document’ or ‘single-document-new-sheet’	30
169	4.2.3 Why no “pages-per-subset-default” Printer attribute?	31
170	4.2.4 pages-per-subset-supported (boolean)	31
173	5 Job Description attributes	32
174	5.1 ipp-attribute-fidelity (boolean)	32
175	5.2 job-errors-count (integer(0:MAX))	33
176	5.3 job-mandatory-attributes (1setOf type2 keyword)	33
177	5.4 job-warnings-count (integer(0:MAX))	33
178	5.5 output-device-requested (name(127))	33
179	6 New values to existing attributes	33
180	6.1 New job-state-reasons(1setOf type2 keyword) Values	33
181	6.2 New media (type 3 keyword name(MAX)) Values	34
182	7 New Printer Description attributes	35
183	7.1 document-charset-default (charset)	36
184	7.2 document-charset-supported (1setOf charset)	37
185	7.3 document-digital-signature-default (type2 keyword)	37
186	7.4 document-digital-signature-supported (1setOf type2 keyword)	37
187	7.5 document-format-details-default (collection)	37
188	7.6 document-format-details-supported (1setOf type2 keyword)	37
189	7.7 document-format-details-implemented (1setOf collection)	38
190	7.8 document-format-version-default (text(127))	39
191	7.9 document-format-version-supported (1setOf text(127))	39
192	7.10 document-natural-language-default (naturalLanguage)	39
193	7.11 document-natural-language-supported (1setOf naturalLanguage)	39
194	7.12 output-device-requested-supported (1setOf name(127))	39
195	8 Conformance Requirements	40
196	8.1 Printer conformance requirements	40
197	8.2 Client conformance requirements	40
198	9 Normative References	40

199	10	Informative References	42
200	11	IANA Considerations	43
201	11.1	Attribute Registrations.....	43
202	11.2	Keyword attribute values.....	45
203	11.3	Enum Attribute Values	46
204	12	Internationalization Considerations	47
205	13	Security Considerations	47
206	14	Contributors	47
207	15	Acknowledgments	47
208	16	Author's Address	47
209	17	Annex B: Differences between the "pages-per-subset" defined in [pwg5100.4] and this specification [ippjobx]	48
210	18	Annex C: Change Log (informative - to be removed before publication)	48
211			

212 Table of Tables

213	Table 2 - Summary of Job Creation Operation attributes	8
214	Table 3 - Summary of Document Creation Operation attributes.....	9
215	Table 4 - Summary of Job Template Attributes.....	9
216	Table 5 - Operation, Default, and Supported Attributes.....	11
217	Table 6 - Operation Attributes supplied in Job and Document Creation Requests	12
218	Table 7 - "document-format-details" member Operation attributes.....	18
219	Table 8 - Job Template attributes	22
220	Table 9 - Effect of "multiple-document-handling" attribute on Page Subsets when "copies" > 1	26
221	Table 10 - Job Description attributes	32
222	Table 11 - New "job-state-reasons" attribute values	34
223	Table 12 - New Printer Description attributes	36
224	Table 13 - Keyword values of "document-format-details-supported Printer attribute	37
225	Table 14 - Member attributes of the "document-format-details-implemented" Printer attribute.....	38
226		
227		

1 Introduction and Summary

This IPP specification extends the Job semantics of the IPP Model and Semantics [rfc2911] object model. This specification defines some new Operation attributes for use in Job Creation and Document Creation operations. The Printer copies these Operation attributes to the corresponding Job Description attributes, which the clients may query. The Document Creation Operation attributes describe the Document Content and permit the Printer to reject requests that it cannot process correctly. Some corresponding "xxx-default" and "xxx-supported" Printer attributes are defined. This specification defines some Job Template attributes that apply to a multi-document Job as a whole. This specification also defines the "pages-per-subset" Job Template attribute which partitions the input print-stream pages into separate Page Subsets which are treated as Finished Documents in order to provide a subset finishing capability¹. This specification also defines some additional values for the "job-state-reasons" Job Description attribute. Each of the operations and attributes defined in this specification are independent of each other and are OPTIONAL for a Printer to support.

The intent is to propose this specification as an IPP extension and which will be referenced as part of the PWG Semantic Model. The purpose for these extensions is so that the print industry can have a common semantic specification for use in IPP, the PWG Semantic Model [pwg-sm], the PWG Print Service Interface (PSI) project [pwg-psi], the PWG IPP Fax (IPPFAX) project [ippfax], and the Free Standards Group Job Ticket API [fsg-jt]. Note: There are a number of footnotes that relate this IPP specification to the PWG Semantic model and other PWG projects, such as the Print Service Interface (PSI) [pwg-psi].

1.1 Scope

Table 1 summarizes the Operation attributes defined in this specification for use with Job Creation operations. The Printer copies these Operation attributes to corresponding Job Description attributes defined in this specification.

Table 1 - Summary of Job Creation Operation attributes

Operation attribute	Printer support	Description
ipp-attribute-fidelity (boolean)	MUST	Allows the client to indicate whether or not the Printer MUST support all Job Template attributes supplied in Job Creation operations or MUST reject the job. Defined in [rfc2911] section 3.2.1.2 and 15.
job-mandatory-attributes (1setOf type2 keyword)	MAY	Allows the client to list the Job Template attributes that the Printer MUST support when supplied in Job Creation operations or MUST reject the job.

Table 2 summarizes the Operation attributes defined in this specification for use with Document Creation operations. These Operation attributes allow the client to supply descriptions of the Document Content to the Printer about individual Document Contents at request time. This specification does *not* define corresponding Document Description attributes, since this specification does not include or depend on a Document object².

¹ The "pages-per-subset" Job Template attribute was specified in the IEEE-ISTO 5100.4 Trial Use standard [pwg5100.4] approved in February 2001. That specification is being revised to contain only a simplified "overrides" Job Template attribute [ippOverride]. The somewhat simplified "pages-per-subset" Job Template attribute defined in this [ippjobx] specification is intended to obsolete the "pages-per-subset" attribute defined in [pwg5100.4].
² For Document Description attributes that correspond to the Operation attributes defined for Document Creation operations, see the Document object defined in [ippdoc].

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Table 2 - Summary of Document Creation Operation attributes

Operation attribute	Printer support	Description
document-charset (charset)	CMUST ³	The charset of the Document content
document-digital-signature (type2 keyword)	MAY	The type of digital signature, if any used in the Document Content.
document-format-details (1setOf collection)	CMUST ⁴	The details of the Document Content, including when its a package of files (e.g., zip, multipart/related). The details include information, such as the application and the operating system that created the document, the intended device type (when the format is device-dependent), and the natural languages of the document.
document-format-version (text(127))	MAY	The version of the document format.
document-format-natural-language (naturalLanguage)	MAY	The primary natural language of the Document Content.
job-mandatory-attributes (1setOf type2 keywords)	MAY	The Job Template attributes that the client is requesting that the Printer MUST support or reject the Job.
output-device-requested (name(127))	MAY	The output device that the client is requesting for a Printer that represents multiple output devices.

256 Table 3 summarizes the Job Template attributes defined in this specification for use with Job Creation operations.
257 These Job Template attributes are defined to apply to the Job as a whole, independent of the value of the "multiple-
258 document-handling" Job Template attribute ([rfc2911] section 4.2.4) whose 'separate-documents-collated-copies' and
259 'separate-documents-uncollated-copies' which cause the Printer to produce separate Output Documents.
260

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Table 3 - Summary of Job Template Attributes

Job Template attribute	Printer support	Description
job-copies (integer(1:MAX))	MAY	The number of copies of the entire Job.
job-cover-back (collection)	MAY	The cover for the back of the entire Job.
job-cover-front (collection)	MAY	The cover for the front of the entire Job.
job-finishings (1setOf type2 enum)	MAY	The finishing for the entire Job.
job-finishings-col (1setOf collection)	MAY	The finishing characteristics for the entire Job.
pages-per-subset	MAY	The Page counts for subsets of the input print-stream Pages called Page Subsets.

262

263 **2 Terminology**

264 This section defines terminology used throughout this document.

³ The Printer MUST support the “document-charset” operation attribute if the Printer supports a document-format in which the charset may be ambiguous in the Document content, such as ‘application/vnd.hp-PCL’ where the charset escape sequence MAY be omitted from the data (see section 3.2.1).
⁴ The Printer MUST support the “document-format-details” operation attribute if the Printer supports a packaging document format, such as ‘application/zip’ or ‘multipart/related’.

2.1 Conformance Terminology

Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, and **OPTIONAL**, have special meaning relating to conformance as defined in RFC 2119 [rfc2119]. All of the operations and attributes defined in the specification are independently **OPTIONAL**. If an implementation supports an operation or attribute extension described in this specification, then these terms apply to the implementation of that operation or attribute; otherwise, they do not. For example, the term **MUST** in this specification means "MUST if the operation or attribute being described is implemented".

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

2.2 Other Terminology

This document uses the same terminology as [rfc2911], such as "client", "Printer"⁵, "attribute", "attribute value", "keyword", "Job Template attribute", "Operation attribute", "operation", "request", "response", and "support" with the same meaning. In addition, the following terms are defined for use in this document:

Best Effort - a Printer is said to perform Best Effort semantics for a supplied attribute if the Printer accepts the attribute and either (1) supports the attribute and its supplied value, (2) supports the attribute and substitutes another value, or (3) ignores the attribute all together. In other words, with Best Effort semantics for an attribute, the Printer never rejects the job for any value supplied.

Document Creation operation - operations that accept Document Content. Specifically: Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are both **Job Creation** and **Document Creation** operations.

Finished Document - The result that the Printer produces on **Sheets** after the operations of printing, folding, cutting, finishing, etc. are completed.

Honor - a Printer is said to **Honor** an attribute supplied by the client, if the Printer **supports** that attribute and its supplied value by performing the indicated semantics (see [rfc2911] section 12.2.3 for the definition of **support**).

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

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

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

Page - a synonym for the term "print-stream page" as defined in [rfc2911] section 12.2.4. A **Page** is a page according to the definition of a page in the language used to express the document data (PDL). Usually a **Page** contains a single page as intended by the author of the source document. However, if the application that generates the PDL places multiple author pages on a single **Page**, they are still considered a single **Page** as far as the Printer and this specification is concerned.

⁵ [rfc2911] uses the terms "Printer object" and "Printer" interchangeably to mean the same thing. For simplicity, this document uses the term "Printer" exclusively, except for definitions copied directly from [rfc2911]. Nonetheless, the intent is as in [rfc2911]: a Printer is an object that MAY be hosted in the device or in a server.

Page Subset - a grouping of consecutive **Pages** to which the client can request the Printer to apply Job Template attributes as a whole. For example, the client can request the Printer to divide the **Pages** into **Page Subsets** of 10 **Pages** each and request the Printer to staple each **Page Subset** separately.

Sheet - the unit of media that a printer puts marks on. A **Sheet** is the most basic unit of output from a Printer. A printer may mark on one side or on both sides of a **Sheet**.

3 Operation Attributes for Job Creation and Document Creation operations

This section defines Operation attributes for use in Job Creation operations and/or Document Creation operations and as such describe characteristics of the Job and Document, rather than instructions to the Printer. For some of these Operation attributes there are corresponding "xxx-default" and "xxx-supported" Printer Description attributes (see section 7).

Table 4 lists the Operation attributes and their attribute syntaxes supplied in Job Creation and Document Creation operations and the attribute syntaxes of their corresponding "xxx-default" and "xxx-supported" Printer Description attributes, if any. A "-" indicates that there isn't an "xxx-default" or "xxx-supported" Printer Description attribute.

Table 4 - Operation, Default, and Supported Attributes

Operation attribute: attribute name "xxx"	Operation attribute syntax	Printer: Default Value attribute syntax "xxx-default"	Printer: Supported Values attribute syntax "xxx-supported"
document-charset	charset	charset	1setOf charset
document-digital-signature	type2 keyword	type2 keyword	1setOf type2 keyword
document-format	mimeMediaType	mimeMediaType	1setOf mimeMediaType
document-format-details	1setOf collection	1setOf collection	1setOf type2 keyword ⁶
document-source-application-name	name(MAX)	name(MAX)	-
document-source-application-version	text(127)	text(127)	-
document-source-os-name	name(40)	name(40)	-
document-source-os-version	text(40)	text(40)	-
document-format	mimeMediaType	mimeMediaType	-
document-format-device-id	text(127)	text(127)	-
document-format-version	text(127)	text(127)	-
document-natural-language	naturalLanguage	naturalLanguage	-
document-format-version	text(127)	text(127)	1setOf text(127)
document-natural-language	naturalLanguage	naturalLanguage	1setOf naturalLanguage
ipp-attribute-fidelity	boolean	-	-
job-mandatory-attributes	1setOf type2 keyword	-	- See ISSUE 01 below
output-device-requested	name(127)	- See ISSUE 02 below	1setOf name(127)

ISSUE: OK that the "job-mandatory-attributes" Operation attribute has nothing to do with guaranteeing (that the attribute will supersede the PDL), but only with whether the Printer will accept the job with unsupported attributes requested - TNH

ISSUE 02: From DMC: It seems like it might be possible, for certain implementations, to have a default output-device. The problem is that normally the "xxx-default" is REQUIRED [TH: not for operation attributes, so we say a

⁶ There is also a "document-format-details-implemented" (1setOf collection), see section 7.7.

321 Printer MAY support the “output-device-default”], whereas my idea would be more to allow a Printer to advertise a
 322 default only if it matched its actual implementation.

323 Table 5 lists the Operation attributes that clients supply in Job and Document Creation operations and whether the
 324 Printer copies (indicated by “⇒”) the supplied value to the corresponding Job Description⁷ attribute.

Legend:	
“Creation operations”	column indicates which operations the Operation attribute can be supplied in: PJ=Print-Job, PU=Print-URI, CJ=Create-Job, SD=Send-Document, and SU=Send-URI.
“y”	the Operation attribute is defined for use with the indicated operations.
“y⇒”	the Operation attribute is defined for use with the indicated operations and has a corresponding Job Description attribute (see Table 9) defined to which the Printer MUST support and copy this Operation attribute, if it supports the Operation attribute. See Table 4 for whether there are corresponding “xxx-default” and “xxx-supported” Printer Description attributes defined.
“-”	the Operation attribute is <i>not</i> defined for the indicated operation.
“Conformance”	column indicates the conformance requirements for what the client supplies in a request and the Printer supports in a request. For (indented) member attributes, a MUST means if the collection attribute is supplied or supported.
“Section”	column indicates where the Operation attribute is defined in this spec.

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Table 5 - Operation Attributes supplied in Job and Document Creation Requests

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Creation operations			Conformance		Section
		CJ	PJ, PU	SD, SU	Client supply	Printer support	
document-charset	charset	-	y	y	MAY	CMUST ⁸	§3.2.1
document-digital-signature	type2 keyword	-	y	y	MAY	MAY	§3.2.2
document-format	mimeMediaType	-	y	y	MAY	MUST	§3.2.3
document-format-details	1setOf collection	-	y	y	MAY	CMUST ⁹	§3.2.4
document-source-application-name	name(MAX)	-	y	y	MAY	MAY	§3.2.4.1
document-source-application-version	text(127)	-	y	y	MAY	MAY	§3.2.4.2
document-source-os-name	name(40)	-	y	y	MAY	MAY	§3.2.4.3
document-source-os-version	text(40)	-	y	y	MAY	MAY	§3.2.4.4
document-format	mimeMediaType	-	y	y	MUST	MUST	§3.2.4.5
document-format-device-id	text(127)	-	y	y	MAY	MAY	§3.2.4.6
document-format-version	text(127)	-	y	y	SHOULD	MUST	§3.2.4.7
document-natural-language	naturalLanguage	-	y	y	MAY	MAY	§3.2.4.8
document-format-version	text(127)	-	y	y	MAY	MAY	§3.2.5
document-natural-language	naturalLanguage	-	y	y	MAY	MAY	§3.2.6

⁷ The operations defined for Document Creation operations do not have corresponding Document Description attributes defined in this specification, since this specification does not assume that there is a Document object. See [ippdoc] for the corresponding Document Description attributes.

⁸ The Printer MUST support the “document-charset” Operation attribute, if the Printer supports a charset-ambiguous document format (see section 3.2.1).

⁹ The Printer MUST support the “document-format-details” Operation attribute if the Printer supports a *packaging* MIME type document format, such as ‘application/zip’ or ‘multipart/related’.

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Creation operations			Conformance		Section
		CJ	PJ, PU	SD, SU	Client supply	Printer support	
ipp-attribute-fidelity	boolean	y⇒ ¹⁰	y⇒ ¹⁰	-	MAY	MUST	§3.1.1,
job-mandatory-attributes	1setOf type2 keyword	y⇒	y⇒	-	MAY	MAY	§3.1.2
output-device-requested	name(127)	y⇒	y⇒	-	MAY	MAY	§3.1.3

3.1 Operation attributes for Job Creation operations

This section defines additional operation attributes that the client MAY supply in Job Creation operations (Print-Job, Print-URI, and Create-Job).

The following statements apply to all Operation attributes and are *not* repeated in each attribute Description:

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

If the Printer supports the "xxx" Operation attribute, the Printer MUST also:

- support the corresponding "xxx-default" and "xxx-supported" Printer Description attributes as well, if defined (see Table 4 and section 7). If the Printer supports either of the "xxx-default" or "xxx-supported" Printer Description attributes, then the Printer MUST also support the corresponding Operation attributes.
- validate the values supplied by the client in the "xxx" Operation attribute against the values indicated in the Printer's corresponding "xxx-supported" Printer Description attribute (see section 7). If the values do not validate, the Printer MUST perform one of the actions indicated for that Operation, unless explicitly specified otherwise in the Description, such as (1) reject the request, (2) accept the request and either (a) hold the job for operator intervention or (b) print the Job ignoring the attribute. In all of these cases, the Printer MUST return the Operation attribute with the unsupported value in the Unsupported Attributes group in the response (see [rfc2911] section 3.1.7).

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

This REQUIRED Operation attribute specifies the policy for the Printer to use (see [rfc2911] §3.2.1.1) when the client supplies unsupported Job Template attributes¹¹ or values in a Job Creation operation. The value 'true' indicates that total fidelity to client-supplied Job Template attributes and values is required for this Job Creation operation. If the client supplies the value 'false' or omits the attribute, then the Printer MUST accept the Job Creation operation.

The Printer MUST copy this attribute to the corresponding (new) Job Description attribute (see section 5.1).

¹⁰ The Printer MAY copy the "ipp-attribute-fidelity" Operation attribute to the corresponding (new) Job Description attribute defined in this specification, if supported. **DMC ISSUE: What is the need for this footnote?**

¹¹ The value of the "ipp-attribute-fidelity" Operation attribute has no effect on other Operation attributes supplied by the client, only on Job Template attributes supplied by the client.

3.1.1.1 What there are no “ipp-attribute-fidelity-default” and “ipp-attribute-fidelity-supported” attributes

Because [rfc2911] defines the default value to be ‘false’ there is no point to define an “ipp-attribute-fidelity-default” Printer Description attribute. Because [rfc2911] REQUIRES a Printer to support the “ipp-attribute-fidelity” Operation attribute there is no need for an “ipp-attribute-fidelity-supported” Printer Description attribute.

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

This OPTIONAL Operation attribute identifies which Job Template attributes the Printer MUST Honor in this Job Creation request. The Printer MUST reject this Job Creation operation if the client supplies an unsupported Job Template attribute or value in the request that is also identified in this list. The client MAY supply the “job-mandatory-attributes” Operation attribute in a Job Creation operation or Validate-Job operation and MUST NOT supply this attribute in any other operation. If the Printer supports the “job-mandatory-attributes” Operation attribute, the Printer MUST support this attribute in all Job Creation operations that it supports and in the Validate-Job operation.

The Printer MUST copy this attribute to the corresponding “job-mandatory-attributes” Job Description attribute (see section 5.3) for auditing and trouble-shooting purposes¹².

The values of the “job-mandatory-attributes” attribute are the keyword attribute names that identify Job Template attributes; for example, ‘job-hold-until’, ‘job-finishings’ (see section 4.1.4), ‘copies’ and ‘media’. In order to identify a member attribute of a collection attribute, the keyword names of both the collection attribute and the member attribute are given separated by a period (.) character. For example, to make the “media” attribute of the “cover-front” collection attribute mandatory, supply the keyword value: ‘cover-front.media’.

The Printer MUST accept *any* keyword values whether or not the corresponding Job Template attributes are supported by the Printer and MUST NOT return those unsupported keywords in the Unsupported Attributes Group in the response. If the client supplies this “job-mandatory-attributes” Operation attribute in a Job Creation operation with values that represent Job Template attributes that the Printer doesn't support, the Printer MUST otherwise accept the attribute anyway. The Printer MUST reject this Job Creation only if the client *actually supplies* any of the identified Job Template attributes that the Printer doesn't support. Because the Printer doesn't reject when the “job-mandatory-attributes” Operation attribute has unsupported attribute keyword names, the client MAY supply all of the attribute keyword names that the client supports without having to tailor the list to the particular Printer to which the client is submitting the Job Creation operation, thereby, simplifying client use of this attribute.

3.1.2.1 What there are no “job-mandatory-attributes-default” and “job-mandatory-attributes-supported” attributes

By definition, omission of the “job-mandatory-attributes” Operation attribute means that the client is requesting that all attributes be Best Effort, i.e., the Printer MUST NOT reject the job because of any unsupported Job Template attributes. So the default is an empty list, so there is no point to have a “job-mandatory-attributes-default” Printer attribute.

By definition, the client can supply any Job Template attribute in the value list of the “job-mandatory-attributes” Operation attribute, whether or not the Printer actually supports that Job Template attribute. Therefore, it is not possible to have a “job-mandatory-attributes-supported” list, since all possible keywords would have to be expressed.

Note: the client MAY query the Printer's “job-creation-attributes-supported” (see [ippsave] section 7.1) and “document-creation-attributes-supported” (see [ippdoc] section 10.1) to see which Job Template and Document Template attributes the Printer actually supports.

¹² The Printer uses the “job-mandatory-attributes” Job Description attribute for validating subsequent Document Creation operations for this job when also supporting [ippdoc]. **DMC ISSUE: Why only when supporting [ippdoc]?**

3.1.3 output-device-requested (name(127))

This OPTIONAL Operation attribute specifies the name of the target output device for a Printer that fans-out to multiple devices (see [rfc2911] section 2.1). This allows the client to control which output device the Printer selects. If this attribute is omitted, the Printer selects whichever output device seems best for the job in an implementation dependent manner. The client can discover which output devices the Printer supports by querying the Printer's "output-device-requested-supported" Printer attribute (see section 7.12).

If the Printer supports this Operation attribute, the Printer MUST support it only on Job Creation operations, not subsequent Document Creation operations for this Job.

If the Printer supports this Operation attribute, the Printer MUST support the "output-device-assigned" Job Description attribute with the same values (see [rfc2911] section 4.3.13).

If a client supplies this "output-device-requested" Operation attribute with a value that the Printer doesn't support, the Printer MUST perform one of the following actions depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 3 above for more details.

3.1.3.1 Why there is no "output-device-requested-default" attribute

ISSUE 02 (repeat): From DMC: Should we add an "output-device-requested-default" Printer Description attribute that a Printer MAY support when it supports the "output-device-requested" Operation attribute?

3.2 Operation attributes for Document Creation operations

This section defines the semantics for the Operation attributes that a client MAY supply in a Document Creation operation (Print-Job, Print-URI, Send-Document and Send-URI). Note: Print-Job and Print-URI are both Job Creation and Document Creation operations.

3.2.1 document-charset (charset)

This CONDITIONALLY REQUIRED Operation attribute identifies the charset of the Document Content.

If a client supplies the "document-charset" Operation attribute in a Document Creation operation with a value that the Printer doesn't support, the Printer MUST reject the job and return the status code: 'client-error-charset-not-supported' (see [rfc2911] section 3.1.4.14), since the interpretation of the content will be mis-understood by the Printer..

The standard values for these attributes are Internet Media types (sometimes called MIME types). For further details see the description of the 'mimeType' attribute syntax in [rfc2911] section 4.1.9.

The Printer MUST support this attribute if it supports a document format for which the Document Content can be ambiguous with respect to the charset being used to encode the data. For example, the 'application/vnd.hp-PCL' MAY omit the charset escape sequence. Although [rfc2854] strongly RECOMMENDS that 'text/html', include a "charset=charset" parameter in the MIME type itself (that is, explicitly in the value of the "document-format" attribute), often the charset= parameter is not present in the MIME type and the Printer MUST assume a charset. Thus a Printer that supports the text/html MIME type MUST support the "document-charset" operation attributes. Also many text files use the various 8-bit ISO 8859 charsets in which the lower half is US-ASCII and the upper half is various Latin sets (about 8 or 9), Greek, Cyrillic, Hebrew, and Arabic. Shift JIS is another example where the left half is US-ASCII, but the right half can be one of a number of things. But if the data doesn't contain the charset escape sequences, this attribute can help the Printer know what the charset is in the Document. Such document formats are

called "charset-ambiguous" document formats. Finally, even though [rfc2046] REQUIRES the "; charset=" MIME type parameter if the file contains other than US-ASCII, in practice, the "; charset=" MIME type parameter is often omitted, thus making 'text/plain' a charset-ambiguous document format. See the discussion in [rfc2911] section 4.1.9 and [rfc2046].

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

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

If the Printer supports the "document-charset" Operation attribute, it MUST also support the corresponding "document-charset-default" and "document-charset-supported" Printer Description attributes as well and vice versa (see sections 7.1 and 7.2).

3.2.2 document-digital-signature (type2 keyword)

This OPTIONAL Operation attribute identifies the technology of digital signature in the Document content.

If a client supplies this "document-digital-signature" Operation attribute in a Document Creation operation with a value that the Printer doesn't support, the Printer MUST perform one of the following actions depending on implementation: (1) reject the request OR (2) accept the request, set the Job's "job-state-reasons" attribute to 'digital-signature-type-not-supported' (see section 6.1), and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 3.2 above for more details.

If the Printer supports this attribute and the value supplied by the client, the Printer MAY verify the signature according to the rule for that signature format and "document-format". If the signature does not verify, then the Printer MUST perform one of the following actions depending on implementation (which MAY depend on the "document-format" and a site-established policy):

1. ignore the signature (and MAY indicate on the printed output some how) and MUST set the Job's "job-state-reasons" Job Description attribute to the 'digital-signature-did-not-verify' value (see section 6.1).
2. put the job on hold and wait for human intervention and MUST set the Job's "job-state-reasons" Job Description attribute to the 'job-digital-signature-wait' and 'digital-signature-did-not-verify' values (see section 6.1), OR
3. abort the job depending on implementation and/or site configuration and MUST set the Job's "job-state-reasons" Job Description attribute to the 'job-aborted-by-system' and 'digital-signature-did-not-verify' values (see section 6.1).

Different PDLs have different techniques of embedding the signature. If the Printer supports the "document-digital-signature" attribute and the supplied "document-format", the Printer MUST accept the document. However, if the Printer either doesn't support the value of the "document-digital-signature" Operation attribute or doesn't support the technique used by the supplied "document-format" attribute, the Printer MUST either (1) ignore the signature or (2) put the job on hold and wait for human intervention, depending on implementation. If the Printer doesn't support the supplied value, the Printer MUST return the "document-digital-signature" attribute with its value as unsupported in the Unsupported attributes group as specified in [rfc2911] section 3.1.7.

The following standard keyword values are defined:

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

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

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

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

476 'xmldsig' XML Digital Signature [xmldsig].

477 3.2.3 document-format (mimeMediaType)

478 This REQUIRED Operation attribute (see [rfc2911] section 3.2.1.1) indicates the document format of the supplied
479 Document Content. If a client supplies the "document-format" Operation attribute with a value that the Printer doesn't
480 support, the Printer MUST reject the job and return the status code: 'client-error-document-format-not-supported'
481 (see [rfc2911] section 3.1.4.11), since the Printer cannot process the data.

482 The standard values for this attribute are Internet Media types (sometimes called MIME types). For some MIME
483 types, such as 'text/plain' [rfc2046], the "; charset=" parameter is defined which specifies the charset of the Document
484 content. The Printer MUST support the charset MIME parameter as well as the "document-charset" Operation
485 attribute (section 3.2.1) if the Printer supports any text MIME type, such as 'text/plain' or 'text/html'. For further
486 details see the description of the 'mimeMediaType' attribute syntax in [rfc2911] section 4.1.9 and [rfc2046] and the
487 "document-charset" Operation attribute (section 3.2.1).

488 Many printer languages in the Printer MIB do not have a MIME type registered with IANA.¹³ It is the intent of the
489 PWG to registers all of the Printer MIB v2 XXX Printer Languages as 'application/vnd.PWG-XXX'. If a Printer
490 Language already has a registered MIME Media type or gets a registration in the future, then that MIME Type MUST
491 be used in preference to the 'application/vnd.PWG-XXX' MIME Type. For example, PostScript® has the MIME
492 Media type: 'application/postscript' and PCL has the MIME Media Type: 'application/vnd.HP-PCL', so those MIME
493 Media types MUST be used instead of 'application/vnd.PWG-PS' and 'application/vnd.PWG-PCL'. For example, the
494 NEC NPDL printer language from the Printer MIB does not have a MIME type registered with IANA. Therefore, the
495 "document-format" = 'application/vnd.PWG-NPDL' MUST be used.

496 Note: CIP4 did not agree to register MIME types for other organizations and standards. Instead, CIP4 will just add
497 values to the flat file that aren't MIME types. The values will not start with any of the MIME type roots: application/
498 audio/, image/, message/, model/, multipart/, test/, or video.

499 ACTION ITEM (Tom and Ira): Propose a format for the file.

500 See also the "document-format-version" Operation attribute in section 3.2.5 and the "document-format-details"
501 Operation attribute in section 3.2.4.

502 3.2.4 document-format-details (1setOf collection)

503 This CONDITIONALLY REQUIRED Operation attribute supplied in Document Creation operations summarizes the
504 details of the Document content, including any files contained in the Document. See Table 6 for a list of the member
505 attributes along with the client and Printer conformance requirements.

506 If a Printer supports a *packaging* MIME type, such as 'multipart/related' or 'application/zip', the Printer MUST support
507 this "document-format-details" Operation attribute. If a Printer does not support a packaging MIME type, it MAY omit
508 support of the "document-format-details" Operation attribute and Description attribute. The purpose of the
509 "document-format-details" Operation attribute is to describe the details of the document format or formats in the
510 supplied Document, including the packaging format itself, so that the Printer knows what to expect.

¹³ Companies are urged to register there Printer languages with IANA using the 'application/vnd.XX-yyy vendor tree. There has also been a long standing PWG proposal to register all of these as 'application/vnd.pwg-yyy'.

511 If a client supplies the “document-format-details” Operation attribute in a Document Creation request with member
 512 attributes and/or values that the Printer doesn’t support, the Printer MUST perform one of the following actions
 513 depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the
 514 ‘pending-held’ state or (b) process the job ignoring the attribute. See section 3.2 above for more details. However, if
 515 the “document-charset” or the “document-format” member attributes are the ones in question, the Printer MUST
 516 reject the request, same as for the “document-charset” and “document-format” Operation attributes (see sections
 517 3.2.1 and 3.2.3) and return the ‘client-error-charset-not-supported’ (see [rfc2911] section 13.1.4.16) or the ‘client-
 518 error-document-format-not-supported’ (see [rfc2911] section 13.1.4.11), respectively.

519 For a packaging format, the “document-format-details” attribute does not provide means to associate each collection
 520 value with particular document in the archive file, so it does not provide a “manifest”¹⁴ of the packaging. One of the
 521 packaging collection values MAY describe the packaging format itself, in which case that collection value MUST be
 522 the first collection value. The remaining collection values provides the summary of the details of the contained files in
 523 any order.

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

526 (1) MAY have one collection value with the “document-format” member attribute = ‘application/zip’ MIME type
 527 value and MAY have additional member attributes that give details about the .zip file itself and

528 (2) MUST have one collection value containing a “document-format” member attribute =
 529 ‘application/postscript’ and MAY have additional member attributes that give the details about the PostScript
 530 files.

531 If a file in a packaging file is itself a packaging file, the single “document-format-details” (1setOf collection) Operation
 532 attribute SHOULD contain the flattened distinct collection values for all files at all nested levels. Therefore, the
 533 “document-format-details” collection attribute is not recursively defined and MUST NOT contain the “document-
 534 format-details” attribute as a member attribute.

535 **Table 6 - "document-format-details" member Operation attributes**

Member Attribute Name	Attribute Syntax	Client supplies	Printer Support	Member Attribute Section	Top Level Attribute Section
document-source-application-name	name(MAX)	MAY	MAY	3.2.4.1	N/A
document-source-application-version	text(127)	MAY	MAY	3.2.4.2	N/A
document-source-os-name	name(40)	MAY	MAY	3.2.4.3	N/A
document-source-os-version	text(40)	MAY	MAY	3.2.4.4	N/A
document-format	mimeMediaType	MUST	MUST	3.2.4.5	3.2.3
document-format-device-id	text(127)	MAY	MAY	3.2.4.6	N/A
document-format-version	text(127)	SHOULD	MUST	3.2.4.7	3.2.5
document-natural-language	1setOf naturalLanguage	MAY	MAY	3.2.4.8	3.2.6

536
 537 The client can determine which member attributes of the “document-format-details” are supporter by querying the
 538 Printer’s “document-format-details-supported” (1setOf type2 keyword) Printer Description attribute (see section 7.6).
 539 The client can determine a supported set of document details by querying the Printer’s “document-format-details-
 540 implemented” (1setOf collection) Printer Description attribute (see section 7.7).

¹⁴ If the client wants to achieve a “manifest”, that is a complete list of each file in a packaging, then the client needs to extract each file from the package and submit each one in a separate Document Creation operation. Note: the client can re-compress each file before sending, so the compression isn’t lost when sending each document separately.

541 Table 6 shows that three of the member attributes also have comparable top level Operation attributes defined with
 542 the same names. See the sections listed in the rightmost column. These three high level attributes have
 543 corresponding "xxx-default" and "xxx-supported" Printer Description attributes. These values are also for use with
 544 the corresponding three member attributes. The remaining member attributes do not have any corresponding "xxx-
 545 default" and "xxx-supported" Printer Description attribute. The client MAY query the Printer's "document-format-
 546 details-implemented" Printer Description attribute to determine what values the Printer has implemented. However,
 547 the Printer MAY accept other values, such as later or earlier versions.

548 If a client supplies this "document-format-details" Operation attribute with a member attribute with a value that the
 549 Printer doesn't support, the Printer MUST perform one of the following actions: (1) reject the request OR (2) accept
 550 the request and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See
 551 section 3.2 above for more details.

552 **3.2.4.1 document-source-application-name (name(MAX))**

553 This OPTIONAL member Operation attribute identifies the application that generated the document. The
 554 version number MUST NOT be included (see the "document-source-application-version" attribute).
 555 Examples: "Photoshop", "Microsoft Word".

556 **3.2.4.2 document-source-application-version (text(127))**

557 This OPTIONAL member Operation attribute identifies the version number of the application that created the
 558 document. The intent of this attribute is for purposes of affecting the interpreting by the Printer for any
 559 formats for which the source application version might have different semantics. Examples:

560 "8.1 (4331)" for Winzip®, "5.0.5 10/26/2001" for Acrobat®, "2000 (9.0.4119 SR-1)" for Microsoft® Word

561 When populating the "document-source-application-version-implemented" member attribute of the
 562 "document-format-details-implemented" Printer Description attribute, some of the trailing information MAY be
 563 omitted, so that a substring match of the Printer's value with the value supplied by the client is sufficient for a
 564 match. For example, the Printer's value MAY be "8.1", "5.0", and "2000", respectively, as compared to the
 565 corresponding example values above that MAY be supplied by the client.

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

568 **3.2.4.3 document-source-os-name (name(40))**

569 This OPTIONAL member Operation attribute identifies the name of the operating system on which the
 570 document was generated. Valid values are the operating system names defined in the IANA Operating
 571 System name registry [os-names] with the version number portion removed (see the "document-source-os-
 572 version" attribute). IANA Operating System Names are consist of up to 40 *uppercase* US-ASCII letters,
 573 hyphen ("-"), period ("."), and slash ("/") characters. The zero length string represents unknown¹⁵.

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

¹⁵ The IANA Registry of OS Names does have an "UNKNOWN" value. However, that value is not being used for the
 "document-creator-os-name" and "document-creator-os-version" attributes. Instead, a zero length string indicates
 unknown, so that clients don't have to make a special case check for the UNKNOWN token and localize UNKNOWN
 to the language of the user while the client is not localizing any other OS name or version values.

3.2.4.4 document-source-os-version (text(40))

This OPTIONAL member Operation attribute identifies the version of the operating system on which the document was generated. Valid values include the version portion of any of the operating system names defined in the IANA Registry [os-names]. The value MUST NOT include the name portion of the registered OS name (see “document-source-os-name” attribute). The zero length string represents unknown¹⁵.

Example values for the indicated “document-source-os-name” value are:

For ‘AIX’: ‘370’, ‘PS/2’

For ‘LINUX’: ‘1.0’, ‘1.2’, ‘2.0’, ‘2.2’, ‘2.4’

For ‘MVS’: ‘SP’

For ‘NETWARE’: ‘3’, ‘3.11’, ‘4.0’, ‘4.1’, ‘5.0’

For ‘SUN-OS’: ‘3.5’, ‘4.0’

For ‘UNIX’: ‘BSD’, ‘V’, ‘V.1’, ‘V.2’, ‘V.3’, ‘PC’

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

3.2.4.5 document-format (mimeMediaType)

This REQUIRED member Operation attribute identifies the document format (see [rfc2911] §3.2.1.1) of the collection value of which it is a member. The client MUST supply and the Printer MUST support this member attribute in each collection value. The values for this member attribute are Internet Media types (sometimes called MIME types) and have the same values and semantics as for the top level “document-format” Operation attribute with the same name (see section 3.2.3 for the semantics).

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

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

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

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

This REQUIRED member Operation attribute identifies the level or version of the document format identified by the “document-format” member attribute. The client MAY supply and the Printer MUST support this member attribute if the Printer supports the “document-format-details” Operation attribute. The semantics and supported values of this “document-format-version” member attribute MUST be the same as for the top level “document-format-version” Operation attribute with the same name (see section 3.2.5 for the semantics).

3.2.4.8 document-natural-language (1setOf naturalLanguage)

This OPTIONAL member Operation attribute specifies the natural language(s) of the collection value of which it is a member. The values for this attribute are natural language codes (with optional country codes) and have the same values and semantics as for the top level “document-natural-language” (naturalLanguage) operation attribute with the same name (see section 3.2.6 for the semantics). If the document contains multiple natural languages, then the first value MUST be the primary language of the document.

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

This OPTIONAL Operation attribute identifies the level or version of the document format of the Document content identified by the "document-format" Operation attribute (section 3.2.3).

If the client supplies this "document-format-version" Operation attribute, the client MUST also supply the "document-format" Operation attribute (section 3.2.3), so that the Printer does not need to parse the "document-format-version" string in order to determine the document format and version.

If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support as indicated by the Printer's "document-format-version-supported" attribute (see section 7.9), the Printer MUST perform one of the following actions, depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 3.2 above for more details.

The defined values are taken from the Printer MIB [rfc1759] langTC values (after removing the "lang") used in the prtInterpreterLangFamily and the prtInterpreterLangLevel attributes (SNMP calls them "objects") separated by the "/" character. If there is no version, just the langTC prefix without the "/" is used. Note: the Printer MIB prtInterpreterLangVersion attribute is not used, since no standard values are given in the Printer MIB.

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

Example values:

- 'PS/3': For Postscript level 3 [rfc1759].
- 'PCL/5e': For PCL 5e [rfc1759].
- 'PDF/1.4': For PDF version 1.4 [pdf]
- 'PDF/X-1a:2001': For PDF/X-1a [iso15930]
- 'DCS/2.0' For Document Color Separation (DCS), version 2.0. [dcs2.0]
- 'TIFF-IT/FP:1998': TIFF/IT [iso12639] - Full Page - baseline.
- 'TIFF-IT/CT:1998': TIFF/IT [iso12639] - Continuous Tone picture data - baseline
- 'TIFF-IT/FP/P1:1998': TIFF/IT [iso12639] - Full Page - profile 1
- 'TIFF-IT/CT/P1:1998': TIFF/IT [iso12639] - Continuous Tone picture data - profile 1
- 'Automatic': auto sense the format [rfc1759]. Is use in combination with the 'application/octet-stream' (see [rfc2911] section 4.1.9.1) value of the "document-format" attribute (section 3.2.3).

If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support as indicated by the Printer's "document-format-version-supported" attribute (see section 7.9), the Printer MUST perform one of the following actions, depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 3.2 above for more details.

3.2.5.1 Why no "document-format-version-default"

There is no "document-format-version-default" since to meaningful, the default would have to depend on the "document-format". Currently, there are no "xxx-default" attributes whose values depend on the value of other attributes. Thus an implementation is free to supply its own defaults the depend on the "document-format".

ISSUE 03: (Thought up while writing up the reason for no default): [rfc2911] does have the concept of attribute coloring that causes the values of Printer attributes to depend on the "document-format". Thus, we could have

664 "document-format-version-default" whose value depends on the value of the "document-format". Do we want to have
665 "document-format-version-default", which, if supported, the Printer MUST color the value depending on the
666 "document-format" Operation attribute supplied in the Get-Printer-Attributes request?

667 **3.2.6 document-natural-language (naturalLanguage)**

668 This OPTIONAL Operation attribute specifies the natural language of the Document content (see [rfc2911] section
669 3.2.1.1 and section 4.1.8).

670 If the client supplies this "document-natural-language" Operation attribute with a value that the Printer doesn't
671 support, the Printer MUST perform one of the following actions: (1) reject the request OR (2) accept the request and
672 either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 3.2 above
673 for more details.

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

- 677 'en': for English
- 678 'en-us': for US English
- 679 'fr': for French
- 680 'de': for German
- 681

682 **4 Job Template attributes**

683 Table 7 lists the new Job Template attributes defined in this specification. These Job Template attributes can be
684 supplied in the Job Creation operations: Print-Job, Print-URI, and Create-Job operations and the Validate-Job
685 operation.

686 Job Template attributes are OPTIONAL for a Printer to support and for a client to supply in a Job Creation request. If
687 a Printer supports a Job Template attribute, then it MUST copy the supplied attribute to the Job object, respectively
688 so that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs operations (see [rfc2911] section
689 4.2).

690 If a Job Template collection attribute is supported (see [rfc3382]), then there are conformance requirements for which
691 member attributes MUST be supported and which member attributes a client MUST supply as indicated in the
692 Conformance column for each collection member attribute in Table 7.

693 **Table 7 - Job Template attributes**

Job Template attribute name "xxx"	Attribute Syntax	Printer: Default Value attribute syntax "xxx-default"	Printer: Supported Values attribute syntax "xxx-supported"
job-copies	integer(1:MAX)	integer(1:MAX)	rangeOfInteger(1:MAX)

Job Template attribute name "xxx"	Attribute Syntax	Printer: Default Value attribute syntax "xxx-default"	Printer: Supported Values attribute syntax "xxx-supported"
job-cover-back	collection	collection	1setOf type2 keyword
cover-type	type2 keyword	-	1setOf type2 keyword
media	type3 keyword name(MAX)	-	1setOf (type3 keyword name(MAX))
media-col	collection	-	1setOf type2 keyword
<i>member attributes</i> [pwg5100.3]	See [pgw5100.3]	-	-
job-cover-front	collection	collection	1setOf type2 keyword
<i>member attributes -</i> <i>same as job-cover-back</i>	see job-cover-back		
job-finishings	1setOf type2 enum	1setOf type2 enum ¹⁶	1setOf type2 enum
job-finishings-col	collection	collection ¹⁶	1setOf type2 keyword
finishing-template	name(MAX)	-	1setOf name(MAX)
stitching	collection		1setOf type2 keyword
stitching-reference- edge	type2 keyword	-	1setOf type2 keyword
stitching-offset	integer (0:MAX)	-	1setOf (integer(0:MAX) rangeOfInteger(0:MAX))
stitching-locations	1setOf integer(0:MAX)	-	1setOf (integer(0:MAX) rangeOfInteger(0:MAX))
pages-per-subset	1setOf integer(1:MAX)	-	boolean

4.1 Job Template attributes defined for Job-wide effect in multi-document jobs

This section defines additional Job Template attributes that have Job-wide effect and so are intended for use in the creation of multi-document Jobs. These Job Template attributes have the "job-" prefix to indicate their Job wide scope. When Clients supply these job-wide Job Template attributes, Client MUST supply these attributes in Job Creation and Validate-Job operations only. Clients MUST NOT supply these Job Template attributes as Document Template attributes in the Send-Document and Send-URI operations ([ippdoc]) or in any other operations. Clients MUST NOT supply these attributes as member attributes of the "overrides" Job Template attribute [ippOverride].

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

This OPTIONAL Job Template attribute specifies the number of job copies, i.e., with all of the Documents taken together. Its interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the "copies" Job Template attribute defined in [rfc2911] section 4.2.5 which switches between job copies and document copies depending on the value of the "multiple-document-handling" Job Template attribute ([rfc2911] section 4.2.4). The "job-copies" Job Template attribute is equivalent to "copies" with "multiple-document-handling" = 'single-document-new-sheet'.

4.1.1.1 job-copies-default (integer(1:MAX))

This OPTIONAL Job Template Printer attribute specifies the default number of copies for the job as a whole. The Printer MUST support this attribute if it supports the "job-copies" Job Template attribute.

4.1.1.2 job-copies-supported (rangeOfInteger(1:MAX))

This OPTIONAL Job Template Printer attribute specified the supported range of the number of copies for the job as a whole. The Printer MUST support this attribute if it supports the "job-copies" Job Template attribute.

¹⁶ The "job-finishings" and "job-finishings-col" Job Template attributes also include corresponding "job-finishings-ready" (1setOf enum) and "job-finishings-col-ready" (1setOf collection).

714 **4.1.2 job-cover-back (collection)**

715 This OPTIONAL Job Template attribute specifies the cover for the back of the job, i.e., with all of the Documents
716 taken together and is independent of the value of the "multiple-document-handling" Job Template attribute. The
717 member attributes are the same as "cover-back" (see [pwg5100.3] section 3.1). However, the "cover-back" Job
718 Template attribute switches between a job back cover and a document back cover depending on the value of the
719 "multiple-document-handling" Job Template attribute ([rfc2911] section 4.2.4). The "job-cover-back" Job Template
720 attribute is equivalent to "cover-back" with "multiple-document-handling" = 'single-document-new-sheet'.

721 **4.1.2.1 job-cover-back-default (collection)**

722 This OPTIONAL Job Template Printer attribute specifies the default the cover for the back of the job. The Printer
723 MUST support this attribute if it supports the "job-cover-back" Job Template attribute.

724 **4.1.2.2 job-cover-back-supported (1setOf type2 keyword)**

725 This OPTIONAL Job Template Printer attribute specified the supported member attributes of the "job-cover-back"
726 Job Template collection attributes. The Printer MUST support this attribute if it supports the "job-cover-back" Job
727 Template attribute.

728 **4.1.3 job-cover-front (collection)**

729 This OPTIONAL Job Template attribute specifies the cover for the front of the job, i.e., with all of the Documents
730 taken together and is independent of the value of the "multiple-document-handling" Job Template attribute. The
731 member attributes are the same as the "cover-front" Job Template attribute (see [pwg5100.3] section 3.2). However,
732 the "cover-front" Job Template attribute switches between a job front cover and a document front cover depending on
733 the value of the "multiple-document-handling" Job Template attribute ([rfc2911] section 4.2.4). The "job-cover-front"
734 Job Template attribute is equivalent to "cover-front" with "multiple-document-handling" = 'single-document-new-
735 sheet'.

736 **4.1.3.1 job-cover-front-default (collection)**

737 This OPTIONAL Job Template Printer attribute specifies the default the cover for the front of the job. The Printer
738 MUST support this attribute if it supports the "job-cover-front" Job Template attribute.

739 **4.1.3.2 job-cover-front-supported (1setOf type2 keyword)**

740 This OPTIONAL Job Template Printer attribute specified the supported member attributes of the "job-cover-front" Job
741 Template attributes. The Printer MUST support this attribute if it supports the "job-cover-front" Job Template
742 collection attribute.

743 **4.1.4 job-finishings (1setOf type2 enum)**

744 This OPTIONAL Job Template attribute specifies the job finishings, i.e., with all of the Documents taken together. Its
745 interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the
746 "finishings" Job Template attribute defined in [rfc2911] section 4.2.6 which switches between job finishings and
747 document finishings depending on the value of the "multiple-document-handling" Job Template attribute ([rfc2911]
748 section 4.2.4). The "job-finishings" Job Template attribute is equivalent to "finishings" with "multiple-document-
749 handling" = 'single-document-new-sheet'.

750 **4.1.4.1 job-finishings-default (1setOf type2 enum)**

751 This OPTIONAL Job Template Printer attribute specifies the default job finishings. The Printer MUST support this
752 attribute if it supports the "job-finishings" Job Template attribute.

4.1.4.2 job-finishings-ready (1setOf type2 enum)

This OPTIONAL Job Template Printer attribute specifies the ready job finishings, that is, the job finishings that maybe used without operation intervention. The Printer MUST support this attribute if it supports the "job-finishings" Job Template attribute.

4.1.4.3 job-finishings-supported (1setOf type2 keyword)

This OPTIONAL Job Template Printer attribute specified the supported job finishings values. The Printer MUST support this attribute if it supports the "job-finishings" Job Template attribute.

4.1.5 job-finishings-col (1setOf collection)

This OPTIONAL Job Template attribute specifies the job finishings collection, i.e., with all of the Documents taken together. Its interpretation is independent of the value of the "multiple-document-handling" Job Template attribute. See the "finishings-col" Job Template attribute defined in [pwg5100.3] section 3.2 which switches between job finishings collection and document finishings collection depending on the value of the "multiple-document-handling" Job Template attribute ([rfc2911] section 4.2.4). The "job-finishings-col" Job Template attribute is equivalent to "finishings-col" with "multiple-document-handling" = 'single-document-new-sheet'.

4.1.5.1 job-finishings-col-default (collection)

This OPTIONAL Job Template Printer attribute specifies the default job finishings collection. The Printer MUST support this attribute if it supports the "job-finishings-col" Job Template attribute.

4.1.5.2 job-finishings-col-ready (collection)

This OPTIONAL Job Template Printer attribute specifies the ready job finishings collection, that is, the job finishings collection that maybe used without operation intervention. The Printer MUST support this attribute if it supports the "job-finishings-col" Job Template attribute.

4.1.5.3 job-finishings-col-supported (1setOf type2 keyword)

This OPTIONAL Job Template Printer attribute specified the supported member attributes of the "job-finishings-col" Job Template collection attribute. The Printer MUST support this attribute if it supports the "job-finishings-col" Job Template attribute.

4.2 pages-per-subset (1setOf integer)

This OPTIONAL Job Template attribute partitions all of the input Pages of the Job into separate Page Subsets. The Printer MUST apply all other supplied Job Template attributes that separately affect Documents to each of the Page Subsets instead to Documents. So the Printer produces each Page Subset and Page Subset copy as a separate Finished Document. As a consequence, the Printer MUST start each Page Subset on a new Sheet. For example, if the "finishings" Job Template attribute is also supplied with a value of 'staple', the Printer MUST staple each Page Subset separately.

If the Printer supports an 'xxx' Job Template attribute that affects Documents, such as "finishings" or "media" (as opposed to affecting Jobs as a whole, such as "job-priority" or "job-finishings") and supports the "pages-per-subset" attribute, the Printer MUST support that 'xxx' Job Template attribute in combination with the "pages-per-subset" Job Template attribute as well. For example, if the Printer supports the "finishings" = 'staple' Job Template attribute and the "pages-per-subset" Job Template attribute, the Printer MUST support "finishings" = 'staple' in combination with "pages-per-subset" attribute as well.

791 For Job Template attributes that affect the Job as a whole, such as “job-priority”, “job-hold”, and “job-finishings” (see
792 section 4.1.4), the Printer MUST affect the Job as a whole even when “pages-per-subset” is supplied.

793 The value of the “pages-per-subset” attribute specifies the number of Pages that the Printer MUST produce in each
794 Page Subset and Page Subset copy. When the number of integers in this attribute is 1, the Printer divides the Pages
795 into separate Page Subsets containing that number of Pages. When the number of integers in this attribute exceeds
796 1, the first integer specifies the number of Pages in the first Page Subset; the second integer specifies the number of
797 Pages in the second Page Subset and so on.

798 If the integer sequence of values of the “pages-per-subset” Job Template attribute are exhausted before partitioning
799 all of the Pages of the Job, the Printer MUST start over at the beginning of the sequence and continue until all Pages
800 are partitioned. The last Page Subset does not have to coincide with the last value in this attribute. Furthermore, the
801 last Page Subset does not have to have a full number of Pages. Neither condition is considered a warning or an
802 error.

803 If the client supplies more integer values for the “pages-per-subset” attribute than the Printer supports, the Printer
804 MUST treat the remaining values as Unsupported Attribute values as follows (see [rfc2911] section 3.1.7):

805 If the client supplies the “attribute-fidelity” Operation attribute with a ‘false’ value (see section 3.1.1) or omits
806 the attribute altogether, the Printer MUST (1) otherwise accept the Job, (2) return the ‘successful-ok-
807 attributes-ignored-or-substituted’ status code, and (3) return in the Unsupported Attribute Group the
808 additional values not supported.

809 If the client supplies either the “attribute-fidelity” Operation attribute with a ‘true’ value or the “job-mandatory-
810 attributes” Operation attribute with the ‘pages-per-subset’ keyword value (see section 3.1.2), the Printer
811 MUST reject the job.

812 ISSUE 04: PWG 5100.4 was silent on whether a Printer MUST support any number of integer values for “pages-per-
813 subset” or whether the number was implementation dependent. Is supporting only a single value considered a
814 conforming implementation so that the above error handling is sufficient?

815 **4.2.1 Effect of “multiple-document-handling” and “copies” attributes on Page Subsets**

816 The Printer MUST treat the sequence of input Pages from all of the Documents in the Job as a single sequence of
817 consecutive Pages, independent of the value of the “multiple-document-handling” Job Template attribute (see
818 [rfc2911] section 4.2.4). In other words, when partitioning the input Pages of the Job, the Printer MUST NOT
819 observe Document boundaries. So some Page Subsets may have Pages belonging to more than one Document.

820 If the “copies” Job Template attribute is ‘1’, the resulting Page Subsets are the same for all values of the “multiple-
821 document-handling” Job Template attribute. When the “copies” Job Template attribute is greater than ‘1’, Table 8
822 show the effect on the Page Subsets of the “multiple-document-handling” Job Template (if supplied or defaulted).
823 Assume that the partitioning of the Pages into Page Subsets 1, 2, 3 and that “copies” = ‘4’.

824 **Table 8 - Effect of “multiple-document-handling” attribute on Page Subsets when “copies” > 1**

“multiple-document-handling” value	Effect on Page Subsets 1,2,3 when “copies” = ‘4’
‘separate-documents-uncollated-copies’	1,1,1,1 2,2,2,2 3,3,3,3
‘separate-documents-collated-copies’	1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3
‘single-document’	1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3
‘single-document-new-sheet’	1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3

825

4.2.2 Examples of the “pages-per-subset” attribute

This subsection gives various examples to show normal and corner cases involving the “pages-per-subset” attribute in order of increasing complexity.

4.2.2.1 A single 11-page document with a single “pages-per-subset” value: ‘3’

A single document consisting of 11 Pages: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 is partitioned into Page Subsets consisting of 3 Pages each which are stapled:

```
Print-Job
  job attribute group:
    "finishings" = 'staple'
    "sides" = 'two-sided-long'
    "pages-per-subset" = '3'
```

The result is 4 separately stapled Page Subsets (subsets with only 1 sheet SHOULD NOT be stapled):

```
Page Subset 1:
  Page 1 on the front side of the first Sheet
  Page 2 on the back side of the first Sheet
  Page 3 on the front side of the second Sheet
Page Subset 2:
  Page 4 on the front side of the first Sheet
  Page 5 on the back side of the first Sheet
  Page 6 on the front side of the second Sheet
Page Subset 3:
  Page 7 on the front side of the first Sheet
  Page 8 on the back side of the first Sheet
  Page 9 on the front side of the second Sheet
Page Subset 4:
  Page 10 on the front side of the first Sheet
  Page 11 on the back side of the first Sheet
```

4.2.2.2 A single 11-page document with four “pages-per-subset” values: ‘3’, ‘2’, ‘4’, ‘2’

A single document consisting of 11 Pages: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 is partitioned into 4 Page Subsets consisting of 3, 2, 4, and 2 Pages each which are stapled:

```
Print-Job
  job attribute group:
    "finishings" = 'staple'
    "sides" = 'two-sided-long'
    "pages-per-subset" = '3', '2', '4', '2'
```

The result is 4 separately stapled Page Subsets (subsets with only 1 sheet SHOULD NOT be stapled):

865 Page Subset 1:
 866 Page 1 on the front side of the first Sheet
 867 Page 2 on the back side of the first Sheet
 868 Page 3 on the front side of the second Sheet
 869 Page Subset 2:
 870 Page 4 on the front side of the first Sheet
 871 Page 5 on the back side of the first Sheet
 872 Page Subset 3:
 873 Page 6 on the front side of the first Sheet
 874 Page 7 on the back side of the first Sheet
 875 Page 8 on the front side of the second Sheet
 876 Page 9 on the front side of the first Sheet
 877 Page Subset 4:
 878 Page 10 on the front side of the first Sheet
 879 Page 11 on the back side of the first Sheet
 880

881 4.2.2.3 A single 11-page document with two “pages-per-subset” values: ‘3’, ‘2’

882 A single document consisting of 11 Pages: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 is partitioned into Page Subsets consisting
 883 of 3 and 2 Pages each which are stapled.

884 Print-Job
 885 job attribute group:
 886 “finishings” = ‘staple’
 887 “sides” = ‘two-sided-long’
 888 “pages-per-subset” = ‘3’, ‘2’
 889

890 The result is 5 separately stapled Page Subsets (subsets with only 1 sheet SHOULD NOT be stapled):

891 Page Subset 1:
 892 Page 1 on the front side of the first Sheet
 893 Page 2 on the back side of the first Sheet
 894 Page 3 on the front side of the second Sheet
 895 Page Subset 2:
 896 Page 4 on the front side of the first Sheet
 897 Page 5 on the back side of the first Sheet
 898 Page Subset 3:
 899 Page 6 on the front side of the first Sheet
 900 Page 7 on the back side of the first Sheet
 901 Page 8 on the front side of the second Sheet
 902 Page Subset 4:
 903 Page 9 on the front side of the first Sheet
 904 Page 10 on the back side of the first Sheet
 905 Page Subset 5:
 906 Page 11 on the front side of the first Sheet
 907

908 4.2.2.4 A two 5-page documents with one “pages-per-subset” value: ‘3’

909 A two document consisting of 5 Pages each where Document 1 has Pages: 1, 2, 3, 4, 5 and Document 2 has Pages:
 910 6, 7, 8, 9, 10 is partitioned into Page Subsets consisting of 3 Pages each which are stapled:

```

911 Create-Job
912   job attribute group:
913     "finishings" = 'staple'
914     "sides" = 'two-sided-long'
915     "pages-per-subset" = '3'
916 Send-Document
917 Send-Document
918

```

919 The result is 4 separately stapled Page Subsets (subsets with only 1 sheet SHOULD NOT be stapled):

```

920 Page Subset 1:
921   Page 1 (1st Page of Document 1) on the front side of the first Sheet
922   Page 2 on the back side of the first Sheet
923   Page 3 on the front side of the second Sheet
924 Page Subset 2:
925   Page 4 on the front side of the first Sheet
926   Page 5 on the back side of the first Sheet
927   Page 6 (1st Page of Document 2) on the front side of the second Sheet
928 Page Subset 3:
929   Page 7 on the front side of the first Sheet
930   Page 8 on the back side of the first Sheet
931   Page 9 on the front side of the second Sheet
932 Page Subset 4:
933   Page 10 on the front side of the first Sheet
934

```

935 4.2.2.5 Two 5-page documents with one "pages-per-subset" value: '3', "copies" = '2', "multiple-document- 936 handling" = 'separate-documents-uncollated-copies'

937 A two document consisting of 5 Pages each where Document 1 has Pages: 1, 2, 3, 4, 5 and Document 2 has Pages:
938 6, 7, 8, 9, 10 is partitioned into Page Subsets consisting of 3 Pages each which are stapled. In addition, "copies" =
939 '2' and "multiple-document-handling" = 'separate-documents-uncollated-copies':

```

940 Create-Job
941   job attribute group:
942     "copies" = '2'
943     "multiple-document-handling" = 'separate-documents-uncollated-copies'
944     "finishings" = 'staple'
945     "sides" = 'two-sided-long'
946     "pages-per-subset" = '3'
947 Send-Document
948 Send-Document
949

```

950 The result is 8 separately stapled Page Subsets (subsets with only 1 sheet SHOULD NOT be stapled):

951 Page Subset 1:
 952 Page 1 (1st Page of Document 1) on the front side of the first Sheet
 953 Page 2 on the back side of the first Sheet
 954 Page 3 on the front side of the second Sheet
 955 Page Subset 2 (copy of Page Subset 1):
 956 Page 1 (1st Page of Document 1) on the front side of the first Sheet
 957 Page 2 on the back side of the first Sheet
 958 Page 3 on the front side of the second Sheet
 959 Page Subset 3:
 960 Page 4 on the front side of the first Sheet
 961 Page 5 on the back side of the first Sheet
 962 Page 6 (1st Page of Document 2) on the front side of the second Sheet
 963 Page Subset 4 (copy of Page Subset 3):
 964 Page 4 on the front side of the first Sheet
 965 Page 5 on the back side of the first Sheet
 966 Page 6 (1st Page of Document 2) on the front side of the second Sheet
 967 Page Subset 5:
 968 Page 7 on the front side of the first Sheet
 969 Page 8 on the back side of the first Sheet
 970 Page 9 on the front side of the second Sheet
 971 Page Subset 6 (copy of Page Subset 5):
 972 Page 7 on the front side of the first Sheet
 973 Page 8 on the back side of the first Sheet
 974 Page 9 on the front side of the second Sheet
 975 Page Subset 7:
 976 Page 10 on the front side of the first Sheet
 977 Page Subset 8 (copy of Page Subset 7):
 978 Page 10 on the front side of the first Sheet
 979

980 **4.2.2.6 Two 5-page documents with one “pages-per-subset” value: ‘3’, “copies” = ‘2’, “multiple-document-**
 981 **handling” = ‘separate-documents-collated-copies’ or ‘single-document’ or ‘single-document-new-**
 982 **sheet’**

983 This example is the same as example 4.2.2.5, but with the other values of “multiple-document-handling”. A two
 984 document consisting of 5 Pages each where Document 1 has Pages: 1, 2, 3, 4, 5 and Document 2 has Pages: 6, 7,
 985 8, 9, 10 is partitioned into Page Subsets consisting of 3 Pages each which are stapled. In addition, “copies” = ‘2’ and
 986 “multiple-document-handling” = ‘separate-documents-uncollated-copies’:

```

987 Create-Job
988   job attribute group:
989     "copies" = '2'
990     "multiple-document-handling" = 'separate-documents-collated-copies'
991                                   OR 'single-document'
992                                   OR 'single-document-new-sheet'
993     "finishings" = 'staple'
994     "sides" = 'two-sided-long'
995     "pages-per-subset" = '3'
996 Send-Document
997 Send-Document
998
999
  
```

999 The result is 8 separately stapled Page Subsets (subsets with only 1 sheet SHOULD NOT be stapled):

1000 Page Subset 1:
 1001 Page 1 (1st Page of Document 1) on the front side of the first Sheet
 1002 Page 2 on the back side of the first Sheet
 1003 Page 3 on the front side of the second Sheet
 1004 Page Subset 2:
 1005 Page 4 on the front side of the first Sheet
 1006 Page 5 on the back side of the first Sheet
 1007 Page 6 (1st Page of Document 2) on the front side of the second Sheet
 1008 Page Subset 3:
 1009 Page 7 on the front side of the first Sheet
 1010 Page 8 on the back side of the first Sheet
 1011 Page 9 on the front side of the second Sheet
 1012 Page Subset 4:
 1013 Page 10 on the front side of the first Sheet
 1014
 1015 Page Subset 5 (copy of Page Subset 1):
 1016 Page 1 (1st Page of Document 1) on the front side of the first Sheet
 1017 Page 2 on the back side of the first Sheet
 1018 Page 3 on the front side of the second Sheet
 1019 Page Subset 6 (copy of Page Subset 2):
 1020 Page 4 on the front side of the first Sheet
 1021 Page 5 on the back side of the first Sheet
 1022 Page 6 (1st Page of Document 2) on the front side of the second Sheet
 1023 Page Subset 7 (copy of Page Subset 3):
 1024 Page 7 on the front side of the first Sheet
 1025 Page 8 on the back side of the first Sheet
 1026 Page 9 on the front side of the second Sheet
 1027 Page Subset 8 (copy of Page Subset 4):
 1028 Page 10 on the front side of the first Sheet
 1029

1030 4.2.3 Why no “pages-per-subset-default” Printer attribute?

1031 There is no “pages-per-subset-default” Printer attribute because it isn’t clear that users would find it useful to use the
 1032 same partitioning over and over. Furthermore, if there were a “pages-per-subset-default” Printer attribute that the
 1033 Printer applied when the client omits the “pages-per-subset” Job Template attribute there would be no simple way for
 1034 the client to indicate the most likely case that no Page Subsets were wanted.

1035 4.2.4 pages-per-subset-supported (boolean)

1036 This attribute specifies whether or not the Printer supports the “pages-per-subset” Job Template attribute.

1037 ISSUE 05: PWG 5100.4 had the “pages-per-subset-supported” attribute specified as a boolean. MUST a Printer
 1038 support any number of integer values for the “pages-per-subset” (1setOf integer(1:MAX)) Job Template attribute? If
 1039 supporting a maximum number, even as low as ‘1’, is considered conforming, should we change the attribute syntax
 1040 of the “pages-per-subset-supported” to integer(1:MAX) to indicate the maximum number of values supported by the
 1041 Printer? Or is it sufficient for the Printer to return in the Unsupported Attributes group the remaining values of the
 1042 “pages-per-subset” (integer(1:MAX)) attribute that aren’t supported?

1043 ISSUE 06: What about the maximum number of pages in a Page Subset? MUST a Printer support any number up
 1044 to MAX in any Page Subset?

5 Job Description attributes

Table 9 lists the new Job Description defined in this IPP specification. Job Description attributes are Job object attributes that are filled in by the Printer. Some Job Description attribute values are supplied by the client in the Job operation using corresponding Operation attributes as indicated with “⇒y”. The Printer MUST NOT support modification of any of these Job Description attributes using the Set-Job-Attributes operation ([rfc3380]).

Legend:	
IPP attribute syntax	the attribute syntax (see [rfc2911] section 4.1).
Set by	indicates whether the value is set by the client or Printer in the Job Creation operation: client - means that the Printer MUST populate this Job Description attribute by copying <i>from</i> the corresponding Operation attribute that the client MAY supply in the Job Creation operation. See Table 5 for the corresponding Operation attribute. Printer - means that the Printer sets the value based on the state of the Printer.
Printer conformance	indicates MUST or MAY for Printer conformance.
Reference	references to the sub-section in this document if there is significant information there. Those subsections that are only references to other specifications contain only that reference in the Reference column.

Table 9 - Job Description attributes

Job Description attribute name	IPP Attribute Syntax	Set by	Printer conformance	Reference
ipp-attribute-fidelity	boolean	client	MAY	[this spec] §5.1
job-errors-count	integer(0:MAX)	Printer	MAY	[this spec] §5.2
job-mandatory-attributes	1setOf type2 keyword	client	MAY	[this spec] §5.3
job-warnings-count	integer(0:MAX)	Printer	MAY	[this spec] §5.4
output-device-requested	name(127)	client	MAY	[this spec] §5.5
output-device-assigned	name(127)	Printer	MAY	[rfc2911] §4.3.7.2

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

5.1 ipp-attribute-fidelity (boolean)

This OPTIONAL Job Description attribute indicates the value of the corresponding “ipp-attribute-fidelity” Operation attribute ([rfc2911] section 3.2.1.1)¹⁷ that the client supplied in the Job Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation operation has been accepted¹⁸. However, this attribute does provide an audit capability to the user and service desk for comparing unexpected printed results with what was submitted.

¹⁷ The “ipp-attribute-fidelity” attribute is defined only as an Operation attribute in [rfc2911]. This specification is defining it as a Job Description attribute as well which the Printer MAY support.
¹⁸ The “ipp-attribute-fidelity” and “job-mandatory-attributes” Operation attributes do have effect after the Job Creation operation when the Document Object is supported [ippdoc].

1066 **5.2 job-errors-count (integer(0:MAX))**

1067 This OPTIONAL Job Description attribute counts the number of errors encountered processing the job as a whole.
 1068 An error where some portion of the printed output is not present, such as a glyph encountered which isn't in the
 1069 Printer's font or an image in a page was in a format that the Printer didn't support, though the Printer did support the
 1070 overall document format.

1071 **5.3 job-mandatory-attributes (1setOf type2 keyword)**

1072 This OPTIONAL Job Description attribute indicates which Job Template attributes that the client required that the
 1073 Printer Honor in order to accept the Job Creation request. The Printer populates this attribute with the value of the
 1074 corresponding "job-mandatory-attributes" Operation attribute (see section 3.1.2) supplied by the client in the Job
 1075 Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation
 1076 operation has been accepted¹⁸. However, this Job Description attribute does provide an audit capability of the Job
 1077 object in the Job History (see [rfc2911] section 4.3.7.2) to the user and service desk for comparing unexpected
 1078 printed results with what was submitted. See section 3.1.2 for additional details of the semantics of this "job-
 1079 mandatory-attributes" Operation attribute that are not repeated here.

1080 **5.4 job-warnings-count (integer(0:MAX))**

1081 This OPTIONAL Job Description attribute counts the number of warnings encountered processing the job as a whole.
 1082 A warning is where no information is lost, but the appearance of the printed output MAY not be as expected.

1083 **5.5 output-device-requested (name(127))**

1084 This OPTIONAL Job Description attribute indicates the name of the output device that the client has supplied in the
 1085 "output-device-requested" Operation attribute (see section 3.1.3), if any, in the Job Creation operation. The Printer
 1086 sets the Job's "output-device-assigned" Job Description attribute (see [rfc2911] section) to the name of the actual
 1087 device assigned.

1088 **6 New values to existing attributes**

1089 This section defines new values to existing attributes.

1090 **6.1 New job-state-reasons(1setOf type2 keyword) Values**

1091 The REQUIRED "job-state-reasons" Job Description attributes ([rfc2911] section 4.3.8) provide additional information
 1092 about the job's current state, i.e., information that augments the value of the job's "job-state" attribute.

1093 These new values MAY be used with any job state for which the reason makes sense. When implemented, the
 1094 Printer MUST return these values when the reason applies and MUST NOT return them when the reason no longer
 1095 applies whether the value of the Job's "job-state" attribute changed or not. When the Job does not have any reasons
 1096 for being in its current state, the value of the Job's "job-state-reasons" attribute MUST be 'none'.

1097 Note: While values cannot be added to the "job-state" attributes without impacting deployed clients that take actions
 1098 upon receiving "job-state" values, it is the intent that additional "job-state-reasons" values can be defined and
 1099 registered without impacting such deployed clients. In other words, the "job-state-reasons" attribute are intended to
 1100 be extensible.

1101 Table 10 lists the new keyword values for the "job-state-reasons" attribute defined in this specification as indicated in
 1102 the References column. In Table 10 the keywords are listed in alphabetic order, while in their descriptions following
 1103 Table 10, they are listed in the most likely order of occurrence to help understanding.

1104 **Table 10 - New "job-state-reasons" attribute values**

IPP Job Description attribute name	IPP Attribute Syntax plus Values	Printer conformance	Reference
job-state-reasons	1setOf type2 keyword	MUST	[rfc2911] §4.3.8
	digital-signature-did-not-verify	MAY	[this spec] §6.1
	digital-signature-type-not-supported	MAY	[this spec] §6.1
	errors-detected	MAY	[this spec] §6.1
	job-digital-signature-wait	MAY	[this spec] §6.1
	warnings-detected	MAY	[this spec] §6.1

1105
 1106 For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely
 1107 to occur (if implemented):

1108 **'digital-signature-type-not-supported'**: The Job contains a digital signature type that is not supported.
 1109 Implementation or site policy determines the state of the Job once this condition is detected.

1110 **'job-digital-signature-wait'**: The Job is currently being held because the Job was submitted with a
 1111 "document-digital-signature" attribute value that is not supported. The operator MAY either cancel
 1112 the job or release it to be processed.

1113 **'digital-signature-did-not-verify'**: The Job contains a digital signature type that is supported (see section
 1114 3.2.2), but the signature did not verify when the Printer attempted to verify the signature.

1115 **'errors-detected'**: If the Printer supports this value, the Printer MUST add this value to "job-state-reasons"
 1116 when the Printer generates the first error message. That is, a single occurrence of this value is
 1117 present in the "job-state-reasons" Job Description attribute if the Printer has generated one or more
 1118 errors. An error indicates loss of information, such as a page not imaged. See also the 'warnings-
 1119 detected' value.

1120 **'warnings-detected'**: If the Printer supports this value, the Printer MUST add this value to "job-state-
 1121 reasons" when the Printer generates the first warning message. That is, a single occurrence of this
 1122 value is present in the "job-state-reasons" Job Description attribute if the Printer has generated one
 1123 or more warnings. A warning indicates something did not go as expected, but there was no loss of
 1124 information. For example, a font substitution. See also the 'errors-detected' value.

1125 6.2 New media (type 3 keyword | name(MAX)) Values

1126 This section specifies one new value for the "media" Job Template attribute:

1127 **'choice_iso_a4_210x297mm_na_letter_8.5x11in'**: The client has explicitly allowed a choice of media for
 1128 the Job. The Printer MUST choose physical media of size na_letter_8.5x11in (215.9 x 279.4 mm) or
 1129 iso_a4_210x297mm. The Printer MUST NOT choose physical media of any other size. Applications
 1130 generating document content for such choice media MUST format the document data so that no
 1131 scaling is needed in order to fit on any of the specified choices of media. The Printer MAY scale the
 1132 image to fit, but any scaling MUST be isomorphic scaling and without image content loss.

ISSUE 07: Why even allow the Printer to scale? Lets simplify this choice concept to sizes that are approximately the same, such as A4 and na-letter, rather than allowing a choice, of, say, A4 or A3 which would require scaling. That makes interoperability more difficult.

This section also generalizes the choice mechanism for inclusion in a revision to the PWG IEEE/ISTO 5101.1 Candidate Standard [pwg5101.1]. This specification gives the *outline* of the proposed addition to [pwg5101.1] for information only, in order to agree to the one new value defined for use with IPPFAX, namely, **'choice_iso_a4_210x297mm_na_letter_8.5x11in'**.

The proposed extension to [pwg5101.1] will have the following requirements:

1. The ABNF will be extended to define the **'choice_'** prefix to introduce a list of choices of self describing names.
2. Following the **'choice_'** prefix will be two or more fully self describing names, including all three fields.
3. The order of the list of fully self describing names MUST be in alphabetic order, so that there is only one canonical order for each list of choices.
4. Printer MAY support dynamic combinations of supported values or MAY support the entire choice value as a conventional keyword which it simply matches for validation purposes.
5. Printer MUST map the choice value to a particular supported value when selecting the actual media for marking.
6. If the Printer supports a **'choice_xxx'** "media" attribute value and the "media-ready" Printer attribute, the Printer MUST include the **'choice_xxx'** value in its "media-ready" Printer attribute as well as the currently loaded value(s) when at least one of the members of a choice value is ready. For example, if **'iso_a4_210x297mm'** is loaded, then the "media-ready" Printer attribute MUST include the **'iso_a4_210x297mm'** and the **'choice_iso_a4_210x297mm_na_letter_8.5x11in'** values.

7 New Printer Description attributes

This section lists *the new* Printer Description attributes defined in this document. 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 (see section 3) that the client can supply in a Job Creation or Document Creation request.

The column labels are:

Column Heading	
“Attribute Syntax”	the attribute syntax (see [rfc2911] section 4.1). Many “xxx-default” and “xxx-supported” attributes have the ‘collection’ syntax which consists of a number of member attributes. These member attributes are not listed in this table when they are the same as the corresponding “xxx” attribute in Table 7. Only those few Printer attribute collection attributes that do not have a corresponding Job Template attributes show the member attributes in this table.
“Printer Conf.”	the IPP/1.1 Printer conformance requirements for supporting the attribute. Those attributes labeled as “MAY” may have conditional requirements that require their support, if the Printer supports the corresponding Operation attribute. If a Printer supports the “xxx” Operation attribute, then it MUST also support the corresponding “xxx-default” and “xxx-supported” Printer attributes.
“Reference”	the section which defines the semantics of the attribute.

Table 11 - New Printer Description attributes

Printer Description attribute name	Attribute Syntax	Printer Conf.	Reference
document-charset-default	charset	CMUST ¹⁹	[this-spec] §7.1
document-charset-supported	1setOf charset	CMUST ¹⁹	[this-spec] §7.2
document-digital-signature-default	type2 keyword	MAY	[this-spec] §7.3
document-digital-signature-supported	1setOf type2 keyword	MAY	[this-spec] §7.4
document-format-details-default	collection	CMUST ²⁰	[this-spec] §7.5
document-format-details-supported	1setOf type2 keyword	CMUST ²⁰	[this-spec] §7.6
document-format-details-implemented	1setOf collection	CMUST ²⁰	[this-spec] §7.7
document-format-version-default	text(127)	MAY	[this-spec] §7.8
document-format-version-supported	1setOf text(127)	MAY	[this-spec] §7.9
document-natural-language-default	naturalLanguage	MAY	[this-spec] §7.10
document-natural-language-supported	1setOf naturalLanguage	MAY	[this-spec] §7.11
output-device-requested-supported	1setOf name(127)	MAY	[this spec] §7.12

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

7.1 document-charset-default (charset)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the default charset that the Printer will assume for charset-ambiguous document formats when the client omits the “document-charset” Operation attribute (section 3.2.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 3.2.1)

¹⁹ The Printer MUST support the “document-charset-default” and “document-charset-supported” Printer Description attributes, if the Printer supports a charset-ambiguous document format (see section 3.2.1).
²⁰ The Printer MUST support the “document-format-details-default”, “document-format-details-supported”, and “document-format-details-implemented” Printer attributes if the Printer supports a packaging document format, such as application/zip or multipart/related.

7.2 document-charset-supported (1setOf charset)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the charsets that the Printer supports in Document Content, that is, supports as values of the “document-charset” Operation attribute (section 3.2.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 3.2.1).

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

This OPTIONAL Printer Description attribute indicates the default digital signature, if any, that the Printer will assume when the client omits the “document-digital-signature” Operation attribute (section 3.2.2). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

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

This OPTIONAL Printer Description attribute indicates the digital signature technologies that the Printer supports in Document Contents, that is, supports as values of the “document-digital-signature” Operation attribute (section 3.2.2). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

7.5 document-format-details-default (collection)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the default document format details that the Printer will assume when the client omits the “document-format-details” Operation attribute (section §3.2.4). The member attributes are the same as “document-format-details” (see section 3.2.4). The Printer MUST support this attribute if it supports the “document-format-details” Operation attribute.

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

This CONDITIONALLY REQUIRED Printer Description attribute lists the type2 keyword names of the member attributes of “document-format-details” that the Printer supports. If the Printer supports the “document-format-details” (1setOf collection) Operation attribute, the Printer MUST support this “document-format-details” (1setOf type2 keyword) Printer Description attribute. Table 12 lists the type2 keywords defined for use in the “document-format-details-supported” Printer attribute.

Table 12 - Keyword values of "document-format-details-supported Printer attribute

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

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

ISSUE 08: Who needs the "document-format-details-implemented" attribute? Does PSI? We assume yes. However, if PSI does support Capabilities, then we shouldn't define "document-format-details-implemented" in this spec, since "document-format-details-implemented" is a poor man's capability mechanism. ACTION ITEM (Tom): Ask PSI whether they intend to use "document-format-details-implemented"? If not, should "document-format-details-implemented" be moved to the IPP Futures document, or just deleted and wait for someone to request it?

This CONDITIONALLY REQUIRED²¹ Printer Description attribute lists the combinations of the values of the member attributes of "document-format-details" that the Printer has implemented for a given "document-format". If the Printer supports the "document-format-details" Operation attribute, the Printer MUST support this "document-format-details-implemented" Printer Description attribute with the same member attributes that it supports for the "document-format-details" Operation attribute (section 3.2.4) as indicated in the Printer's "document-format-details-supported" Printer Description attribute (section 7.6). Each "xxx-implemented" member attribute is multi-valued with the same attribute syntax as the corresponding "document-format-details" attribute, with the exception of the "document-format-implemented" member attribute which is single-valued since it is the key attribute.

The client SHOULD NOT assume that other combinations aren't supported or that a document will not be processed correctly if the document content does not contain the values that the document instances uses. For example, for the application/pdf MIME Media Type, if the "document-format-version" member attribute, is '1.3', '1.4', the client SHOULD NOT assume that a PDF/1.5 document cannot be processed.

Table 13 - Member attributes of the "document-format-details-implemented" Printer attribute

"document-format-details-implemented" member attributes	Reference
document-source-application-name-implemented (1setOf name(MAX))	3.2.4.1
document-source-application-version-implemented (1setOf text(127))	3.2.4.2
document-source-os-name-implemented (1setOf name(40))	3.2.4.3
document-source-os-version-implemented (1setOf text(40))	3.2.4.4
document-format-implemented (mimeMediaType)	3.2.4.5
document-format-device-id-implemented (1setOf text(127))	3.2.4.6
document-format-version-implemented (1setOf text(127))	3.2.4.7
document-natural-language-implemented (1setOf naturalLanguage)	3.2.4.8

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

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

The Printer MUST have no more than one collection value with the same value for the "document-format-implemented" member attribute, unless there are different values for different versions of the "document-format". See the following example which has two PostScript collection values because the implemented values are different for different versions of PostScript.

²¹ The Printer MUST support the "document-format-details-implemented" Printer Description attribute if the Printer supports a packaging document format, such as application/zip or multipart/related MIME types.

1233 Example: Suppose that a Printer implements a PostScript™c Level 3 interpreter which also interprets Level 1 and
 1234 Level 2 documents and a PCL interpreter that interprets '5' and '5e' variants. Suppose that the Printer only has fonts
 1235 for French and German for PostScript™ level 3. The value of the "document-format-details-implemented" attribute
 1236 would have the following *three* collection values:

```
1237 { {"document-format-implemented" = 'application/postscript',
1238   "document-format-version-implemented" = 'PS/1', 'PS/2', 'PS/3',
1239   "document-natural-language" = 'en'},
1240   {"document-format-implemented" = 'application/postscript',
1241     "document-format-version-implemented" = 'PS/3',
1242     "document-natural-language-implemented" = 'en', 'fr', 'de'},
1243   {"document-format-implemented" = 'application/vnd.hp-PCL',
1244     "document-format-version-implemented" = 'PCL/5', 'PCL/5e'}
1245   "document-natural-language-implemented" = 'en'}
1246 }
```

1247 7.8 document-format-version-default (text(127))

1248 This OPTIONAL Printer Description attribute indicates the default document format version that the Printer will
 1249 assume when the client omits the "document-format-version" Operation attribute (section 3.2.5). The Printer MUST
 1250 support this attribute if it supports the "document-format-version" Operation attribute.

1251 7.9 document-format-version-supported (1setOf text(127))

1252 This OPTIONAL Printer Description attribute indicates the document format versions that the Printer supports for
 1253 Document Contents, that is, supports as values of the "document-format-version" Operation attribute (section 3.2.5).
 1254 The Printer MUST support this attribute if it supports the "document-format-version" Operation attribute.

1255 7.10 document-natural-language-default (naturalLanguage)

1256 This OPTIONAL Printer Description attribute indicates the default document natural language that the Printer will
 1257 assume for Document Content when the client omits the "document-natural-language" Operation attribute ([rfc2911]
 1258 section 3.2.1.1). The Printer MUST support this attribute if it supports the "document-natural-language" Operation
 1259 attribute.

1260 7.11 document-natural-language-supported (1setOf naturalLanguage)

1261 This OPTIONAL Printer Description attribute lists the natural languages supported in any of the supported document
 1262 formats, that is, it is the union of the natural languages. The Printer MUST support this attribute if it supports the
 1263 "document-natural-language" Operation attribute ([rfc2911] section 3.2.1.1). See the "document-format-details-
 1264 implemented" (1setOf collection) Printer Description attribute (section 7.7) for how the Printer MAY expose the list of
 1265 natural languages supported by particular document formats.

1266 7.12 output-device-requested-supported (1setOf name(127))

1267 This OPTIONAL Printer Description attributes lists the names of output devices that the Printer supports. The Printer
 1268 MUST support this attribute if it supports the "output-device-requested" Operation attribute (see section 3.1.3).

8 Conformance Requirements

This specification contains a number of independent OPTIONAL operations and attributes. This section summarizes the conformance requirements for Printers and clients.

8.1 Printer conformance requirements

In order to claim conformance to this specification, a Vendor MUST explicitly identify the operations and/or attributes supported by the Printer implementation in any such claim of conformance. In addition, the Vendor's Printer implementation:

1. MUST meet the conformance requirements for Printers specified in [rfc2911].
2. MAY support any Operation attribute according to section 3 and the corresponding Job Description attributes in section 5 and corresponding Printer attributes in section 7.
3. MAY support any Job Template attribute according to section 4.
4. MAY support any of the "job-state-reasons" values according to section 6.

8.2 Client conformance requirements

In order to claim conformance to this specification, a Vendor MUST explicitly identify the operations and/or attributes supported by the client implementation in any such claim of conformance. In addition, the Vendor's client:

1. MUST meet the conformance requirements for clients specified in [rfc2911]
2. MAY support any Operation attribute according to section 3 and the corresponding Job Description attributes in section 5 and corresponding Printer attributes in section 7.
3. MAY support any Job Template attribute according to section 4.

9 Normative References

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1315 by (1) a new Page Overrides specification which removes the "document-overrides" Job Template attribute
1316 and Operation attribute in favor of using the Document Object [ippdoc] and (2) this specification [ippjobx]
1317 definition of "pages-per-subset" Job Template attribute.
- 1318 ISSUE 09: The IETF process never revises an RFC, but just updates or obsoletes one with another RFC. On the
1319 other hand most other standards organizations, such as ANSI, ISO, (IEEE?), and POSIX, require that
1320 standards be reviewed and if necessary be "revised". I think that we are "revising" PWG IEEE-ISTO 5100.4,
1321 not "obsoleting" it. This is just a terminology question.
- 1322 The second paragraph of the PWG process section 4.2 says:
- 1323 "Working Drafts and Candidate Standards correspond to a specific version of the Standard they are
1324 defining. Unless the working group is engaged in an effort to revise an existing PWG Standard, the
1325 Working Drafts and Candidate Standards are always defining PWG Standard Version 1.0."
- 1326 and section 4.4.1 says:
- 1327 "Although the maturity level will not appear on PWG Candidate Standards or PWG Standards, if a
1328 Candidate Standard needs to be revised, any resulting PWG Working Drafts will have a maturity level
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1391 **11 IANA Considerations**

1392 This section contains the registration information for IANA to add to the various IPP Registries according to the
1393 procedures defined in RFC 2911 [rfc2911] section 6 to cover the definitions in this document. The resulting
1394 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations> registry.

1395 *Note to the PWG Editor: Replace the References below to [this spec] with the IEEE-ISTO standard number*
1396 *for the appropriate document, so that it accurately reflects the content of the information for the IANA Registry.*

1397 **11.1 Attribute Registrations**

1398 The following table lists all the attributes defined in this specification. These are to be registered according to the
1399 procedures in RFC 2911 [rfc2911] section 6.2. If the attribute has a separate sub-section definition in this
1400 specification, that sub-section is listed as the Reference. This table contains the reference to another specification
1401 that completely defines each attribute.

Attribute Name (attribute syntax)	Reference	Section
-----	-----	-----
Job Description attributes:		
job-attribute-fidelity (boolean)	[this spec]	5.1

1408	job-errors-count (integer(0:MAX))	[this spec]	5.2
1409	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	5.3
1410	job-warnings-count (integer(0:MAX))	[this spec]	5.4
1411	output-device-requested(name(127))	[this spec]	5.5
1412			
1413	Job Template attributes:		
1414	job-copies (integer(1:MAX))	[this spec]	4.1.1
1415	job-copies-default (integer(1:MAX))	[this spec]	4.1.1.1
1416	job-copies-supported (rangeOfInteger(1:MAX))	[this spec]	4.1.1.2
1417	job-cover-back (collection)	[this spec]	4.1.2
1418	<member attributes are the same as "cover-back"[pwg5100.3] 3.1>		
1419	job-cover-back-default (collection)	[this spec]	4.1.2.1
1420	<member attributes are the same as "cover-back"[pwg5100.3] 3.1>		
1421	job-cover-back-supported (1setOf type2 keyword)	[this spec]	4.1.2.2
1422	job-cover-front (collection)	[this spec]	4.1.3
1423	<member attributes are the same as "cover-front"[pwg5100.3] 3.1>		
1424	job-cover-front-default (collection)	[this spec]	4.1.3.1
1425	<member attributes are the same as "cover-front"[pwg5100.3] 3.1>		
1426	job-cover-front-supported (1setOf type2 keyword)	[this spec]	4.1.3.2
1427	job-finishings (1setOf type2 enum)	[this spec]	4.1.4
1428	job-finishings-default (1setOf type2 enum)	[this spec]	4.1.4.1
1429	job-finishings-ready (1setOf type2 enum)	[this spec]	4.1.4.2
1430	job-finishings-supported (1setOf type2 keyword)	[this spec]	4.1.4.3
1431	job-finishings-col (1setOf collection)	[this spec]	4.1.5
1432	<member attributes are the same as "finishings-col"[pwg5100.3] 3.2>		
1433	job-finishings-col-default (1setOf type2 enum)	[this spec]	4.1.5.1
1434	job-finishings-col-ready (1setOf type2 enum)	[this spec]	4.1.5.2
1435	job-finishings-col-supported (1setOf type2 keyword)	[this spec]	4.1.5.3
1436			
1437	pages-per-subset (1setOf integer(1:MAX))	[this spec]	4.2
1438	pages-per-subset-supported (boolean)	[this spec]	4.2.4
1439			
1440	Printer Description attributes:		
1441	document-charset-default (charset)	[this spec]	7.1
1442	document-charset-supported (1setOf charset)	[this spec]	7.2
1443	document-digital-signature-default (type2 keyword)	[this spec]	7.3
1444	document-digital-signature-supported (1setOf type2 keyword)	[this spec]	7.4
1445			
1446	document-format-details-default (collection)	[this spec]	7.5
1447	<member attributes are the same as "document-format-details"		
1448		[this spec]	3.2.4>
1449	document-format-details-supported (1setOf type2 keyword)	[this spec]	7.6
1450			
1451	document-format-details-implemented (1setOf collection)	[this spec]	7.7
1452			
1453	document-source-application-name-implemented (1setOf name(MAX))		

1454		[this spec]	7.7
1455	document-source-application-version-implemented (1setOf text(127))		
1456		[this spec]	7.7
1457	document-source-os-name-implemented (1setOf name(40))		
1458		[this spec]	7.7
1459	document-source-os-version-implemented (1setOf text(40))		
1460		[this spec]	7.7
1461	document-format-implemented (mimeType)	[this spec]	7.7
1462	document-format-device-id-implemented (1setOf text(127))		
1463		[this spec]	7.7
1464	document-format-version-implemented (1setOf text(127))		
1465		[this spec]	7.7
1466	document-natural-language-implemented (1setOf naturalLanguage)		
1467		[this spec]	7.7
1468	document-format-version-default (text(127))	[this spec]	7.8
1469	document-format-version-supported (1setOf text(127))	[this spec]	7.9
1470	document-natural-language-default (naturalLanguage)	[this spec]	7.10
1471	document-natural-language-supported (1setOf naturalLanguage)		
1472		[this spec]	7.11
1473	output-device-requested-supported (1setOf name(127))	[this spec]	7.12
1474			
1475			
1476	Operation attributes:		
1477	document-charset (charset)	[this spec]	3.2.1
1478	document-digital-signature (type2 keyword)	[this spec]	3.2.2
1479	document-format-details (1setOf collection)	[this spec]	3.2.4
1480	document-source-application-name (name(MAX))	[this spec]	3.2.4.1
1481	document-source-application-version (text(127))		
1482		[this spec]	3.2.4.2
1483	document-source-os-name (name(40))	[this spec]	3.2.4.3
1484	document-source-os-version (text(40))	[this spec]	3.2.4.4
1485	document-format (mimeType)	[this spec]	3.2.4.5
1486	document-format-device-id (text(127))	[this spec]	3.2.4.6
1487	document-format-version (text(127))	[this spec]	3.2.4.7
1488	document-natural-language (1setOf naturalLanguage)		
1489		[this spec]	3.2.4.8
1490	document-format-version (text(127))	[this spec]	3.2.5
1491	document-natural-language (naturalLanguage)	[this spec]	3.2.6
1492	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	3.1.2
1493	output-device-requested (name(127))	[this spec]	3.1.3

11.2 Keyword attribute values

1495	document-digital-signature (type2 keyword)	[this spec]	3.2.2
1496	document-digital-signature-default (type2 keyword)		
1497		[this spec]	7.3
1498	document-digital-signature-supported (1setOf type2 keyword)		

1499		[this spec]	7.4
1500	dss	[this spec]	3.2.2
1501	none	[this spec]	3.2.2
1502	pgp	[this spec]	3.2.2
1503	smime	[this spec]	3.2.2
1504	xmldsig	[this spec]	3.2.2
1505			
1506	document-format-details-supported (1setOf type2 keyword)		
1507		[this spec]	7.6
1508	document-source-application-name	[this spec]	7.6
1509	document-source-application-version	[this spec]	7.6
1510	document-source-os-name	[this spec]	7.6
1511	document-source-os-version	[this spec]	7.6
1512	document-format	[this spec]	7.6
1513	document-format-device-id	[this spec]	7.6
1514	document-format-version	[this spec]	7.6
1515	document-natural-language	[this spec]	7.6
1516			
1517	job-cover-back-supported (1setOf type2 keyword)	[this spec]	4.1.2.2
1518	<same as "cover-back-supported">	[pwg5100.3]	3.1.4
1519	job-cover-front-supported (1setOf type2 keyword)	[this spec]	4.1.2.2
1520	<same as "cover-front-supported">	[pwg5100.3]	3.1.4
1521	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	3.1.2
1522	<any Job Template attribute keyword>		
1523			
1524	job-state-reasons (1setOf type2 keyword)	[rfc2911]	4.3.8
1525	digital-signature-did-not-verify	[this spec]	6.1
1526	digital-signature-type-not-supported	[this spec]	6.1
1527	errors-detected	[this spec]	6.1
1528	job-digital-signature-wait	[this spec]	6.1
1529	warnings-detected	[this spec]	6.1
1530			
1531	media (type2 keyword name(MAX))	[rfc2911]	4.2.11
1532	choice_iso_a4_210x297mm_na_letter_8.5x11in	[this spec]	6.2
1533			

1534 11.3 Enum Attribute Values

1535 The following table lists all the new enum attribute values defined in this document as additional type2 enum values.
 1536 These are to be registered according to the procedures in RFC 2911 [rfc2911] section 6.1.

1537			
1538	job-finishings (1setOf type2 enum)	[this spec]	4.1.4
1539	job-finishings-default (1setOf type2 enum)	[this spec]	4.1.4.1
1540	job-finishings-ready (1setOf type2 enum)	[this spec]	4.1.4.2
1541	job-finishings-supported (1setOf type2 enum)	[this spec]	4.1.4.3
1542	<enum values are the same as "finishings">		
1543			

1544 job-finishings-col-supported (1setOf type2 keyword)
1545 [this spec] 4.1.5.3
1546 <same as for "finishing-col-supported" [pwg5100.3] 3.2.5

1547 12 Internationalization Considerations

1548 The internationalization considerations for the extensions defined in this specification are the same as for handling
1549 the Job object in [rfc2911].

1550 13 Security Considerations

1551 This specification adds no more security burden on Printer implementations than does [rfc2911].

1552 14 Contributors

1553 Don Fullman, Xerox
1554 Ira McDonald, High North
1555 Dennis Carney, IBM

1556 15 Acknowledgments

1557 16 Author's Address

1558 Tom Hastings
1559 Xerox Corporation
1560 737 Hawaii St.
1561 El Segundo, CA 90245
1562
1563 Phone: 310 333-6413
1564 Fax: 310 333-5514
1565 e-mail: hastings@cp10.es.xerox.com
1566

1567 Peter Zehler
1568 Xerox Corporation
1569 MS: 0128-30E
1570 800 Phillips Road
1571 Webster, NY 14580-9701
1572

1573 Phone: 1+585+2658755
1574 Fax:
1575 e-mail: PZehler@crt.xerox.com

17 Annex B: Differences between the “pages-per-subset” defined in [pwg5100.4] and this specification [ippjobx]

This Appendix lists the differences between the “pages-per-subset” Job Template attribute defined in [pwg5100.4] and this specification [ippjobx]:

1. Removed the warning condition that a partial Page Subset is no longer a warning, so that the ‘job-warnings’ value (section 6.1) of the “job-state-reasons” attribute and the Job’s “job-warnings-count” Job Description attribute (section 5.4) are not affected.
2. Clarified that the Printer MUST start each Page Subset and Page Subset copy on a new sheet.
3. Clarified that the Printer MUST support all of the Job Template attributes in combination with “page-per-subset” that it supports separately.
4. Clarified that the Job Template attributes that affect a Job as a whole, also do so when used in combination with “pages-per-subset”.
5. Clarified that the number of integer values of the “pages-per-subset” attribute that the Printer supports depends on implementation.
6. Clarified that the Printer MUST return “successful-ok-ignored-or-substitutes-attributes’ status code and the additional values in the Unsupported Attributes group, if the client supplies more values than the Printer supports.
7. Clarified the interaction of “copies” and “multiple-document-handling”.
8. Added more examples.

18 Annex C: Change Log (informative - to be removed before publication)

The following summaries of the changes in chronological order:

Version 0.1, 18 May 2003:

1. Split document out of Document Object specification.
2. Moved “document-format-target” and “document-format-version-target” from the Job Template section to the Operation Attributes section so that it can be supplied with Document Creation operations and so that it MUST be honored, even if “job-attribute-fidelity” is ‘false’ or omitted.
3. Removed all Document Description attributes and the concept of Job Level and Document Level. That terminology is introduced in the Document Object spec [ippdoc]. Now [ippdoc] is only an Informative Reference, not a Normative Reference.

Version 0.2, 19 May 2003:

1. Did not include the document-format-target and document-format-version-target attributes. PSI has their own definitions and we can avoid the discussion as to whether they should be Document Template attributes or Operation attributes on Document Creation operations and whether there should be a “document-format-target-default” and a “document-format-version-target-default”.

Version 0.3, 28 May 2003:

Agreements reached at the May 28, 2003 telecon:

1. Moved the Close-Job operation to the futures specification.

- 1615 2. Added the “pages-per-subset” Job Template from [pwg5100.4]. See Appendix B section 17 for the minor
1616 differences.
- 1617 3. Added the terms: “Best Effort, Finished Document, Page, Page Subset, and Sheet.
- 1618 4. Clarified the conformance relationships between “xxx” Operation attributes and their corresponding “xxx-
1619 default” and “xxx-supported” Printer attributes.
- 1620 5. Added rationale for each missing “xxx-default” and “xxx-supported” attribute.
- 1621 6. Added ‘errors-detected’ and ‘warnings-detected’ “job-state-reasons” values.
- 1622 7. Added the new ‘choice_iso_a4_210x297mm_na_letter_8.5x11in’ “media” attribute value which is a choice
1623 of two approximately equal media.
- 1624 8. Added the requirements for choice media keyword values for inclusion in a revision of the PWG IEEE-ISTO
1625 5101.1.
- 1626 9. Changed the “document-format-implemented” member attribute from 1setOf mimeType to
1627 mimeType since it is the key attribute value.
- 1628 10. Added another “document-format-implemented” example.
- 1629 11. Updated the IANA section to agree with the additions.
- 1630
- 1631