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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 the Close-Job operation and some new Operation attributes for use in Job Creation and Document Creation operations. The Printer copies the Job 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. Corresponding "xxx-default" and "xxx-supported" Printer attributes are defined. 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 OPTIONAL for a Printer to support.



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The Printer Working Group (PWG)

Standard for

The Internet Printing Protocol (IPP):

Job Extensions

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1 Introduction and Summary

This IPP specification extends the Job semantics of the IPP Model and Semantics [rfc2911] object model. This specification defines the Close-Job operation and some new Operation attributes for use in Job Creation and Document Creation operations. The Printer copies the Job 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. Corresponding "xxx-default" and "xxx-supported" Printer attributes are defined. 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 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 which 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 new operations defined in this specification.

Table 1 - Summary of operations

Operation Name	Printer support	Brief Description
Close-Job	OPTIONAL	Closes a multi-document Job.

Table 2 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 2 - 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. Defined in [rfc2911] section 3.2.1.2 and 15.
job-mandatory-attributes (1setOf type2 keyword)	MAY	Allows the client to list which Job Template attributes that the Printer MUST support.

Table 3 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 object¹.

¹ For Document Description attributes that correspond to the Operation attributes defined for Document Creation operations, see the Document object defined in [ippdoc].

Table 3 - Summary of Document Creation Operation Attributes

Operation attribute	Printer support	Description
document-charset (charset)	CMUST ²	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 ³	The details of the Document Content, including when its package of files (zip, multipart/related), such as application and operating system that created the document, the intended device type (when the format is device-dependent), the natural languages of the document.
document-format-target (documentFormat)	MAY	The document format that the Printer is to convert to for Printers that convert document formats.
document-format-version (text(127))	MAY	The version of the document format.
document-format-version-target (text(127))	MAY	The document format level or version that the Printer is to convert to for Printers that convert document formats.
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.

Table 4 summarizes the Job Template attributes defined in this specification for use with Job Creation operations. These Job Template attributes are defined to apply to the Job as a whole, independent of the value of the "multiple-document-handling" Job Template attribute ([rfc2911] section 4.2.4) whose 'separate-documents-collated-copies' and 'separate-documents-uncollated-copies' which cause the Printer to produce separate Output Documents.

Table 4 - 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.

2 Terminology

This section defines terminology used throughout this document.

² 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 4.2.1).

³ 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 document means “**MUST** if this **OPTIONAL** operation or attribute 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**”, “**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:

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

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

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

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

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.

3 New Job operations

This section defines the new Close-Job operation.

3.1 Close-Job

This **OPTIONAL** operation closes the Job⁵. The Printer **MUST** support this operation. The client **SHOULD** issue this operation to close the job, instead of supplying the “last-document” Operation attribute with a ‘true’ value in a

⁴ [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]. None the less, the intent is as in [rfc2911]: a Printer is an object that **MAY** be hosted in the device or in a server as in [rfc2911].

⁵ Close-Job is a new operation defined by this Document object specification and is not defined in [rfc2911].

289 Document Creation operation (or a Send-Document operation with no data - see [rfc2911] section 3.3.1). The Printer
290 MUST support both means of closing jobs for backward compatibility with [rfc2911].

291 If the Job has already been closed (either by a Close-Job operation or by the client supplying the "last-document"
292 operation attribute with a 'true' value), the Printer MUST reject the request and return the 'client-error-not-possible'
293 (see [rfc2911] section 13.1.4.5) status code.

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

298 3.1.1 Close-Job Request

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

300 Group 1: Operation Attributes

301 Natural Language and Character Set:

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

305 Target:

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

309 Requesting User Name:

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

312 3.1.2 Close-Job Response

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

314 Group 1: Operation Attributes

315 Status Message:

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

319 Natural Language and Character Set:

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

321 Group 2: Unsupported Attributes

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

Group 3: Job Object Attributes

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

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

The Printer MAY return:

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

4 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. .
 Note: As in [rfc2911] Operation attributes relate to the operation and do not depend on the printing capabilities of the Printer.

Table 5 lists the Operation attributes and their attributes 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 a "xxx-default" or "xxx-supported" Printer Description attribute.

Table 5 - 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	documentFormat	documentFormat	1setOf documentFormat
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-target	documentFormat	documentFormat	1setOf DocumentFormat
document-format-version	text(127)	text(127)	1setOf text(127)
document-format-version-target	text(127)	text(127)	1setOf text(127)
document-natural-language	naturalLanguage	naturalLanguage	1setOf naturalLanguage
job-mandatory-attributes	1setOf type2 keyword	-	-
output-device-requested	name(127)	-	1setOf name(127)

⁶ There is also a "document-format-details-implemented" (1setOf collection), see section 8.7.

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345 Table 6 lists the Operation attributes that clients supply in Job and Document Creation operations and whether the
 346 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 MAY copy this Operation attribute. See Table 5 for whether there are corresponding “xxx-default” and “xxx-supported” Printer Description attribute 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.
“Section”	column indicates where the Operation attribute is defined in this spec.

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Table 6 - 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	§4.2.1
document-digital-signature	type2 keyword	-	y	y	MAY	MAY	§4.2.2
document-format	documentFormat	-	y	y	MAY	MUST	§4.2.3
document-format-details	1setOf collection	-	y	y	MAY	CMUST ⁹	§4.2.4
document-source-application-name	name(MAX)	-	y	y	MAY	MAY	§4.2.4.1
document-source-application-version	text(127)	-	y	y	MAY	MAY	§4.2.4.2
document-source-os-name	name(40)	-	y	y	MAY	MAY	§4.2.4.3
document-source-os-version	text(40)	-	y	y	MAY	MAY	§4.2.4.4
document-format	mimeMediaType	-	y	y	MUST	MUST	§4.2.4.5
document-format-device-id	text(127)	-	y	y	MAY	MAY	§4.2.4.6
document-format-version	text(127)	-	y	y	SHOULD	MUST	§4.2.4.7
document-natural-language	naturalLanguage	-	y	y	MAY	MAY	§4.2.4.8
document-format-target	documentFormat	-	y	y	MAY	MAY	§4.2.5
document-format-version	text(127)	-	y	y	MAY	MAY	§4.2.6
document-format-version-target	text(127)	-	y	y	MAY	MAY	§4.2.7
document-natural-language	naturalLanguage	-	y	y	MAY	MAY	§4.2.8
ipp-attribute-fidelity	boolean	y⇒ ¹⁰	y⇒ ¹⁰	-	MAY	MUST	§4.1.1,

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/Document Description attributes, if the Printer supports a charset-ambiguous document format (see section 4.2.1).

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

Operation attribute name for Job and Document Creation requests	Attribute Syntax	Creation operations			Conformance		Section
		CJ	PJ, PU	SD, SU	Client supply	Printer support	
job-mandatory-attributes	1setOf type2 keyword	y⇒	y⇒		MAY	MUST	§4.1.2
output-device-requested	name(127)	y⇒	y⇒		MAY	MAY	§4.1.3

4.1 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).

4.1.1 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 value 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 6.1).

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

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 this attribute in a Job Creation operation. If the Printer supports the "job-mandatory-attributes" Operation attribute, the Printer MUST support this attribute in Job Creation operations and the Validate-Job operation.

The Printer MUST copy this attribute to the corresponding "job-mandatory-attributes" Job Description attribute (see section 6.3) 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 5.1.4), '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

¹⁰ The Printer MAY copy the "ipp-attribute-fidelity" Operation attribute to the corresponding (new) Job Description attribute defined in this specification, if supported.

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.

¹² The Printer uses the "job-mandatory-attributes" Job Description attribute for validating subsequent Document Creation operations for this job when also supporting [ippdoc].

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 the 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 that the client is submitting the Job Creation operation, thereby, simplifying client use of this attribute.

4.1.3 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 8.16).

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 4.2 below for more details.

4.2 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. The following statements apply to all of these 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:

1. support the corresponding "xxx-default" and "xxx-supported" Printer Description attributes as well, if defined (see Table 5 and section 8) and vice versa.
2. 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 8). If the values do not validate, the Printer MUST perform one of the actions indicated for that Operation, unless specified otherwise, 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).

4.2.1 document-charset (charset)

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

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

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

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

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

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

441 If the Printer supports the "document-charset" Operation attribute, it MUST also support the corresponding
 442 "document-charset-default" and "document-charset-supported" Printer Description attributes as well and vice versa
 443 (see sections 8.1 and 8.2).

444 **4.2.2 document-digital-signature (type2 keyword)**

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

446 If a client supplies this "document-digital-signature" Operation attribute in a Document Creation operation with a
 447 value that the Printer doesn't support, the Printer MUST perform one of the following actions depending on
 448 implementation: (1) reject the request OR (2) accept the request, set the Job's "job-state-reasons" attribute to
 449 'digital-signature-type-not-supported' (see section 7.1), and either (a) put the Job in the 'pending-held' state or (b)
 450 process the job ignoring the attribute. See section 4.2 above for more details.

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

- 455 1. ignore the signature (and MAY indicate on the printed output some how) and MUST set the Job's "job-state-
 456 reasons" Job Description attribute to the 'digital-signature-did-not-verify' value (see section 7.1).

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 7.1), 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 7.1).

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].

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

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

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

'xmldsig' XML Digital Signature [xmldsig].

4.2.3 document-format (mimeMediaType)

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

The standard values for this attribute are Internet Media types (sometimes called MIME types). For some MIME types, such as 'text/plain' [rfc2046], the "; charset=" parameter is defined which specifies the charset of the Document content. The Printer MUST support the charset MIME parameter as well as the "document-charset" Operation attribute (section 4.2.1) if the Printer supports any text MIME type, such as 'text/plain' or 'text/html'. For further details see the description of the 'mimeMediaType' attribute syntax in [rfc2911] section 4.1.9 and [rfc2046] and the "document-charset" Operation attribute (section 4.2.1).

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

Note: It is proposed that CIP4 [cip4] register the YYY document formats with IANA as 'application/vnd.CIP4-YYY' that CIP4 is using that don't have a registered MIME Media type. For example, TIFF/IT [iso12639] would be

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'.

498 registered as: 'application/vnd.CIP4-TIFF-IT'. Then CIP4 would keep a list of TIFF/IT versions. For example:
 499 'TIFF/IT-CT/P1:1998' to use with the "document-format-version" attribute (and the CIP4 JDF equivalent
 500 MimeTypeVersion attribute).

501 ACTION ITEM (Tom): Get CIP4 buy-in to use the same flat file (which will require an additional field for the
 502 JDF FileType attribute. ACTION ITEM (Tom and Ira): Propose a format for the file.

503 See also the "document-format-version" Operation attribute in section 4.2.6 and the "document-format-details"
 504 Operation attribute in section 4.2.4.

505 4.2.4 document-format-details (1setOf collection)

506 This CONDITIONALLY REQUIRED Operation attribute supplied in Document Creation operations summarizes the
 507 details of the Document content, including any files contained in the Document. See Table 7 for a list of the member
 508 attributes along with the client and Printer conformance requirements.

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

514 If a client supplies the "document-format-details" Operation attribute in a Document Creation request with member
 515 attributes and/or values that the Printer doesn't support, the Printer MUST perform one of the following actions
 516 depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the
 517 'pending-held' state or (b) process the job ignoring the attribute. See section 4.2 above for more details. However, if
 518 the "document-charset" or the "document-format" member attributes are the ones in question, the Printer MUST
 519 reject the request, same as for the "document-charset" and "document-format" Operation attributes (see sections
 520 4.2.1 and 4.2.3) and return the 'client-error-charset-not-supported' (see [rfc2911] section 13.1.4.16) or the 'client-
 521 error-document-format-not-supported' (see [rfc2911] section 13.1.4.11), respectively.

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

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

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

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

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

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 as a separate Document object. Note: the client can re-compress each file before sending, so the compression isn't lost when sending each document separately.

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

538 **Table 7 - "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	4.2.4.1	N/A
document-source-application-version	text(127)	MAY	MAY	4.2.4.2	N/A
document-source-os-name	name(40)	MAY	MAY	4.2.4.3	N/A
document-source-os-version	text(40)	MAY	MAY	4.2.4.4	N/A
document-format	mimeMediaType	MUST	MUST	4.2.4.5	4.2.3
document-format-device-id	text(127)	MAY	MAY	4.2.4.6	N/A
document-format-version	text(127)	SHOULD	MUST	4.2.4.7	4.2.6
document-natural-language	1setOf naturalLanguage	MAY	MAY	4.2.4.8	4.2.8

539
540 The client can determine which member attributes of the “document-format-details” are supporter by querying the
541 Printer’s “document-format-details-supported” (1setOf type2 keyword) Printer Description attribute (see section 8.6).
542 The client can determine a supported set of document details by querying the Printer’s “document-format-details-
543 implemented” (1setOf collection) Printer Description attribute (see section 8.7).

544 Table 7 shows that three of the member attributes also have comparable top level Operation attributes defined with
545 the same names. See the sections listed in the rightmost column. These three high level attributes have
546 corresponding “xxx-default” and “xxx-supported” Printer Description attributes. These values are also for use with
547 the corresponding three member attributes. The remaining member attributes do not have any corresponding “xxx-
548 default” and “xxx-supported” Printer Description attribute. The client MAY query the Printer’s “document-format-
549 details-implemented” Printer Description attribute to determine what values the Printer has implemented. However,
550 the Printer MAY accept other values, such as later or earlier versions.

551 If a client supplies this “document-format-details” Operation attribute with a member attribute with a value that the
552 Printer doesn’t support, the Printer MUST perform one of the following actions: (1) reject the request OR (2) accept
553 the request and either (a) put the Job in the ‘pending-held’ state or (b) process the job ignoring the attribute. See
554 section 4.2 above for more details.

555 **4.2.4.1 document-source-application-name (name(MAX))**

556 This OPTIONAL member Operation attribute identifies the application that generated the document. The
557 version number MUST NOT be included (see the “document-source-application-version” attribute).
558 Examples: “Photoshop”, “Microsoft Word”.

559 **4.2.4.2 document-source-application-version (text(127))**

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

563 “8.1 (4331)” for Winzip®, “5.0.5 10/26/2001” for Acrobat®, “2000 (9.0.4119 SR-1)” for Microsoft® Word

564 When populating the “document-source-application-version-implemented” member attribute of the
565 “document-format-details-implemented” Printer Description attribute, some of the trailing information MAY be
566 omitted, so that a substring match of the Printer’s value with the value supplied by the client is sufficient for a

567 match. For example, the Printer's value MAY be "8.1", "5.0", and "2000", respectively, as compared to the
 568 corresponding example values above that MAY be supplied by the client.

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

571 **4.2.4.3 document-source-os-name (name(40))**

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

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

579 **4.2.4.4 document-source-os-version (text(40))**

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

584 Example values for the indicated "document-source-os-name" value are:

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

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

587 For 'MVS': 'SP'

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

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

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

591 For 'WINDOWS': '95', '98', 'CE', 'NT', 'NT-2', 'NT-3', 'NT-3.5', 'NT-3.51', 'NT-4', 'NT-5', '2000', 'XP'
 592 [not registered yet]
 593

594 **4.2.4.5 document-format (mimeMediaType)**

595 This REQUIRED member Operation attribute identifies the document format (see [rfc2911] §3.2.1.1) of the
 596 collection value of which it is a member. The client MUST supply and the Printer MUST support this member
 597 attribute in each collection value. The values for this member attribute are Internet Media types (sometimes
 598 called MIME types) and have the same values and semantics as for the top level "document-format"
 599 Operation attribute with the same name (see section 4.2.3 for the semantics).

600 **4.2.4.6 document-format-device-id (text(127))**

601 This OPTIONAL member Operation attribute identifies the type of device for which the document was
 602 formatted, including manufacturer and model. This attribute is intended to identify document formats that are
 603 not portable, e.g., PDLs that are device dependent. The value of this variable MUST exactly match the IEEE
 604 1284-2000 Device ID string (see [IEEE1284] clause 6), except the length field MUST NOT be specified. See
 605 the Microsoft Universal Plug and Play [upnp] section 2.2.6 DeviceId parameter for details and examples.
 606 Here is an example showing only the required fields for a PostScript document:

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.

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

608 **4.2.4.7 document-format-version (text(127))**

609 This REQUIRED member Operation attribute identifies the level or version of the document format identified
610 by the "document-format" member attribute. The client MAY supply and the Printer MUST support this
611 member attribute if the Printer supports the "document-format-details" Operationattribute. The semantics
612 and supported values of this "document-format-version" member attribute MUST be the same as for the top
613 level "document-format-version" Operation attribute with the same name (see section 4.2.6 for the
614 semantics).

615 **4.2.4.8 document-natural-language (naturalLanguage)**

616 This OPTIONAL member Operation attribute specifies the natural language(s) of the collection value of
617 which it is a member. The values for this attribute are natural language codes (with optional country codes)
618 and have the same values and semantics as for the top level "document-natural-language"
619 (naturalLanguage) operation attribute with the same name (see section 4.2.8 for the semantics).

620 **4.2.5 document-format-target (mimeMediaType)**

621 This OPTIONAL Operation attribute specified the document format that the Printer is to produce.

622 If a client supplies the "document-format-target" Operation attribute with a value that the Printer doesn't support as
623 indicated by the Printer's "document-format-target-supported" attribute (see section 8.9), the Printer MUST reject the
624 job and return the status code: 'client-error-document-format-not-supported' (see [rfc2911] section 3.1.4.11), since
625 the Printer cannot produce the requested data. For this error, the Printer MUST also return the "document-format-
626 target" attribute with its unsupported value in the Unsupported Attributes group in the response in order to distinguish
627 this case from the "document-format" Operation attribute value being unsupported..

628 The values of this attribute are MIME Media Types as defined for the "document-format" Operation attribute (see
629 section 4.2.3). Support of this Operation attribute is intended for Printers that perform document format conversion
630 as part of their service.

631 ISSUE 01: OK that we defined the "document-format-target" and "document-format-version-target" attributes to be
632 Operation attributes (SM Description attributes) instead of Job Template attributes (SM Document Processing
633 attributes), so that the Printer MUST perform the requested action without the client having to use the "ipp-attribute-
634 fidelity" or "job-mandatory-attributes" operation attribute and so the client can supply different values for different
635 documents without requiring the Document Object [ippdoc]?

636 **4.2.6 document-format-version (text(127))**

637 This OPTIONAL Operation attribute identifies the level or version of the document format of the Document content
638 identified by the "document-format" Operation attribute (section 4.2.3).

639 If the client supplies this "document-format-version" Operation attribute, the client MUST also supply the "document-
640 format" Operation attribute (section 4.2.3), so that the Printer does not need to parse the "document-format-version"
641 string in order to determine the document format and version.

642 If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support as
643 indicated by the Printer's "document-format-version-supported" attribute (see section 8.11), the Printer MUST
644 perform one of the following actions, depending on implementation: (1) reject the request OR (2) accept the request
645 and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 4.2
646 above for more details.

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

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

656 Example values:

657 ‘PS/3’: For Postscript level 3 [rfc1759].
 658 ‘PCL/5e’: For PCL 5e [rfc1759].
 659 ‘PDF/1.4’: For PDF version 1.4 [pdf]
 660 ‘PDF/X-1a:2001’: For PDF/X-1a [iso15930]
 661 ‘TIFF/IT-FP:1998’: TIFF/IT [iso12639] - Full Page - baseline.
 662 ‘TIFF/IT-CT:1998’: TIFF/IT [iso12639] - Continuous Tone picture data - baseline
 663 ‘TIFF/IT-FP/P1:1998’: TIFF/IT [iso12639] - Full Page - profile 1
 664 ‘TIFF/IT-CT/P1:1998’: TIFF/IT [iso12639] - Continuous Tone picture data - profile 1
 665 ‘Automatic’: auto sense the format [rfc1759]. Is use in combination with the ‘application/octet-stream’ (see
 666 [rfc2911] section 4.1.9.1) value of the “document-format” attribute (section 4.2.3).
 667

668 If a client supplies this “document-format-version” Operation attribute with a value that the Printer doesn’t support as
 669 indicated by the Printer’s “document-format-version-supported” attribute (see section 8.11), the Printer MUST
 670 perform one of the following actions, depending on implementation: (1) reject the request OR (2) accept the request
 671 and either (a) put the Job in the ‘pending-held’ state or (b) process the job ignoring the attribute. See section 4.2
 672 above for more details. **ISSUE 02: Or should we require the Printer to always reject a request for an unsupported**
 673 **target version?**

674 The Printer produces the value indicated by its “document-format-version-default” Printer attribute only if the client
 675 does not supply the “document-format-version” Operation attribute and the “document-format” Operation attribute. If
 676 the client supplies the “document-format” Operation attribute, but not the “document-format-version” Operation
 677 attribute, the Printer applies an appropriate default version for the supplied document format.

678 **ISSUE 03: OK *not* to have a “document-format-col-default” (collection) which is pairs of “document-format” and**
 679 **“document-format-version” values, since the “document-format-version” is self-describing which includes short**
 680 **abbreviation of the document format?**

681 **ISSUE 04: Or should the “document-format-version-default” be a 1setOf since the version string is self-identifying**
 682 **with the PDL? Then the different defaults could be indicated for each document format?**

683 4.2.7 document-format-version-target (text(127))

684 This OPTIONAL Operation attribute specifies the document format level or version that the Printer is to produce.

685 If the client supplies this “document-format-version-target” Operation attribute, the client MUST also supply the
 686 “document-format-target” Operation attribute (section 4.2.7), so that the Printer does not need to parse the
 687 “document-format-version-target” string in order to determine the document format and version.

688 If a client supplies this “document-format-version-target” Operation attribute with a value that the Printer doesn’t
 689 support as indicated by the Printer’s “document-format-version-target-supported” attribute (see section 8.13), the
 690 Printer MUST perform one of the following actions, depending on implementation: (1) reject the request OR (2)

691 accept the request and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute.
 692 See section 4.2 above for more details. **ISSUE 05: Or should we require the Printer to always reject a request for**
 693 **an unsupported target version?**

694 The values are the document format version strings as defined for the "document-format-version" Operation attribute
 695 (see section 4.2.6). Support of this Job Template attribute is intended for Printers that perform document format
 696 conversion as part of their service.

697 The Printer produces the value indicated by its "document-format-version-target-default" Printer attribute (see section
 698 8.8) only if the client does not supply the "document-format-target-version" Operation attribute and the "document-
 699 format-target" Operation attribute. If the client supplies the "document-format-target" Operation attribute, but not the
 700 "document-format-version-target" Operation attribute, the Printer applies an appropriate default version for the
 701 supplied document format.

702 **ISSUE 06: Does it make sense to have a "document-format-target-default" or not?**

703 4.2.8 document-natural-language (naturalLanguage)

704 This OPTIONAL Operation attribute specifies the natural language of the Document content (see [rfc2911] section
 705 3.2.1.1 and section 4.1.8).

706 If the client supplies this "document-natural-language" Operation attribute with a value that the Printer doesn't
 707 support, the Printer MUST perform one of the following actions: (1) reject the request OR (2) accept the request and
 708 either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 4.2 above
 709 for more details.

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

713 'en': for English
 714 'en-us': for US English
 715 'fr': for French
 716 'de': for German
 717

718 5 Job Template attributes

719 Table 8 lists the new Job Template attributes defined in this specification. The Job Template attributes can be
 720 supplied in the Job Creation operations: Print-Job, Print-URI, and Create-Job operations.

721 Job Template attributes are OPTIONAL for a Printer to support and for a client to supply in a Job Creation request. If
 722 a Printer supports a Job Template attribute, then it MUST copy the supplied attribute to the Job object, respectively
 723 so that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs operations

724 If a Job Template collection attribute is supported (see [rfc3382]), then there are conformance requirements for which
 725 member attributes MUST be supported and which member attributes a client MUST supply as indicated in the
 726 Conformance column for each collection member attribute in Table 8.

Table 8 - 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-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 [pwg5100.3]</i>	See [pwg5100.3]	-	-
job-cover-front	collection	collection	1setOf type2 keyword
<i>member attributes - 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))

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

This section defines additional Job Template attributes for use with multi-document Jobs. These Job Template attributes MUST be supplied in Job Creation operations only. They have the "job-" prefix to indicate this scope. This Job Template attribute MUST NOT be supplied in the "page-overrides" Job Template attribute [override]. Unless specified otherwise, each Job Template attribute has a corresponding "xxx-default" and "xxx-supported Job Template Printer attribute. See Table 11 for the attribute syntax.

5.1.1 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'.

5.1.1.1 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.

5.1.1.2 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).

747 **5.1.2 job-cover-back (collection)**

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

754 **5.1.2.1 job-cover-back-default (collection)**

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

757 **5.1.2.2 job-cover-back-supported (1setOf type2 keyword)**

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

761 **5.1.3 job-cover-front (collection)**

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

769 **5.1.3.1 job-cover-front-default (collection)**

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

772 **5.1.3.2 job-cover-front-supported (1setOf type2 keyword)**

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

776 **5.1.4 job-finishings (1setOf type2 enum)**

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

783 **5.1.4.1 job-finishings-default (1setOf type2 enum)**

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

786 **5.1.4.2 job-finishings-ready (1setOf type2 enum)**

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

790 **5.1.4.3 job-finishings-supported (1setOf type2 keyword)**

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

793 **5.1.5 job-finishings-col (1setOf collection)**

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

800 **5.1.5.1 job-finishings-col-default (collection)**

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

803 **5.1.5.2 job-finishings-col-ready (collection)**

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

807 **5.1.5.3 job-finishings-col-supported (1setOf type2 keyword)**

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

811 **6 Job Description attributes**

812 Table 9 lists the new Job Description defined in this IPP specification. Job Description attributes are Job object
813 attributes that are filled in by the Printer. Some Job Description attribute values are supplied by the client in the Job
814 operation using corresponding Operation attributes as indicated with "⇒y". The Printer MUST NOT support
815 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 6 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] §6.1
job-errors-count	integer(0:MAX)	Printer	MAY	[this spec] §6.2
job-mandatory-attributes	1setOf type2 keyword	client	MAY	[this spec] §6.3
job-warnings-count	integer(0:MAX)	Printer	MAY	[this spec] §6.4
output-device-requested	name(127)	client	MAY	[this spec] §6.5
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.

6.1 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.

6.2 job-errors-count (integer(0:MAX))

This OPTIONAL Job Description attribute counts the number of errors encountered processing the job as a whole. An error where some portion of the printed output is not present, such as a glyph encountered which isn't in the 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 overall document format.

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].

837 **6.3 job-mandatory-attributes (1setOf type2 keyword)**

838 This OPTIONAL Job Description attribute indicates which Job Template attributes that the client required that the
 839 Printer Honor in order to accept the Job Creationrequest. The Printer populates this attribute with the value of the
 840 corresponding "job-mandatory-attributes" Operation attribute (see section 4.1.2) supplied by the client in the Job
 841 Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation
 842 operation has been accepted¹⁸. However, this Job Description attribute does provide an audit capability of the Job
 843 object in the Job History (see [rfc2911] section 4.3.7.2) to the user and service desk for comparing unexpected
 844 printed results with what was submitted. See section 4.1.2 for additional details of the semantics of this "job-
 845 mandatory-attributes" Operation attribute that are not repeated here.

846 **6.4 job-warnings-count (integer(0:MAX))**

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

849 **6.5 output-device-requested (name(127))**

850 This OPTIONAL Job Description attribute indicates the name of the output device that the client has supplied in the
 851 "output-device-requested" Operation attribute (see section 4.1.3), if any, in the Job Creation operation. The Printer
 852 sets the Job's "output-device-assigned" Job Description attribute (see [rfc2911] section) to the name of the actual
 853 device assigned.

854 **7 New values to existing attributes**

855 This section defines new values to existing attributes.

856 **7.1 New job-state-reasons(1setOf type2 keyword) Values**

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

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

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

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

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] §7.1
	digital-signature-type-not-supported	MAY	[this spec] §7.1
	job-digital-signature-wait	MAY	[this spec] §7.1

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

- 'digital-signature-type-not-supported':** The Job contains a digital signature type that is not supported. Implementation or site policy determines the state of the Job once this condition is detected.
- 'job-digital-signature-wait':** The Job is currently being held because the Job was submitted with a "document-digital-signature" attribute value that is not supported. The operator MAY either cancel the job or release it to be processed.
- 'digital-signature-did-not-verify':** The Job contains a digital signature type that is supported (see section 4.2.2), but the signature did not verify when the Printer attempted to verify the signature.

8 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 that the client can supply in a Job 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 8. 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.

889

Table 11 - New Printer Description attributes

Printer Description attribute name	Attribute Syntax	Printer Conf.	Reference
document-charset-default	charset	CMUST ¹⁹	[this-spec] §8.1
document-charset-supported	1setOf charset	CMUST ¹⁹	[this-spec] §8.2
document-digital-signature-default	type2 keyword	MAY	[this-spec] §8.3
document-digital-signature-supported	1setOf type2 keyword	MAY	[this-spec] §8.4
document-format-details-default	collection	CMUST ²⁰	[this-spec] §8.5
document-format-details-supported	1setOf type2 keyword	CMUST ²⁰	[this-spec] §8.6
document-format-details-implemented	1setOf collection	CMUST ²⁰	[this-spec] §8.7
document-format-target-default	mimeMediaType	MAY	[this spec] §8.8
document-format-target-supported	1setOf mimeMediaType	MAY	[this spec] §8.9
document-format-version-default	text(127)	MAY	[this-spec] §8.10
document-format-version-supported	1setOf text(127)	MAY	[this-spec] §8.11
document-format-version-target-default	mimeMediaType	MAY	[this spec] §8.12
document-format-version-target-supported	1setOf mimeMediaType	MAY	[this spec] §8.13
document-natural-language-default	naturalLanguage	MAY	[this-spec] §8.14
document-natural-language-supported	1setOf naturalLanguage	MAY	[this-spec] §8.15
output-device-requested-supported	1setOf name(127)	MAY	[this spec] §8.16

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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.

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8.1 document-charset-default (charset)

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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 4.2.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 4.2.1)

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8.2 document-charset-supported (1setOf charset)

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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 4.2.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 4.2.1).

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

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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 4.2.2). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

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 4.2.1).

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.

8.4 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 4.2.2). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

8.5 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 §4.2.4). The Printer MUST support this attribute if it supports the “document-format-details” Operation attribute.

8.6 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

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

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. 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 4.2.4) as indicated in the Printer’s “document-format-details-supported” Printer Description attribute (section 8.6). Each “xxx-implemented” member attribute is multi-valued with the same attribute syntax as the corresponding “document-format-details” attribute.

ISSUE 07: Bob's issue about truth in advertising. Don't penalize truth. Does allowing these Operation attribute keyword names in the “user-defined-attributes-supported” Printer attribute allow the Printer to accept any values without returning the attribute in the Unsupported Attributes group?

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.

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))	4.2.4.1
document-source-application-version-implemented (1setOf text(127))	4.2.4.2
document-source-os-name-implemented (1setOf name(40))	4.2.4.3
document-source-os-version-implemented (1setOf text(40))	4.2.4.4
document-format-implemented (1setOf mimeType)	4.2.4.5
document-format-device-id-implemented (1setOf text(127))	4.2.4.6
document-format-version-implemented (1setOf text(127))	4.2.4.7
document-natural-language-implemented (1setOf naturalLanguage)	4.2.4.8

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

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

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

8.8 document-format-target-default (text(127))

This OPTIONAL Printer Description attribute indicates the default document format version that the Printer will assume when the client omits the "document-format-target" Operation attribute (section 4.2.5). The Printer MUST support this attribute if it supports the "document-format-target" Operation attribute.

- ISSUE 06 repeat: Does it make sense to have a "document-format-target-default" or not?
- ISSUE 08: OK *not* to have a "document-format-target-col-default" (collection) which is pairs of "document-format-target" and "document-format-version-target" values, since the "document-format-version" is self-describing which includes short abbreviation of the document format?
- ISSUE 09: Or should the "document-format-version-target-default" be a 1setOf since the version string is self-identifying with the PDL? Then the different defaults could be indicated for each document format?

8.9 document-format-target-supported (1setOf text(127))

This OPTIONAL Printer Description attribute indicates the target document format that the Printer supports for converting Document Content, that is, supports as values of the "document-format-target" Operation attribute (section 4.2.5). The Printer MUST support this attribute if it supports the "document-format-target" Operation and Job Description attributes.

963 **8.10 document-format-version-default (text(127))**

964 This OPTIONAL Printer Description attribute indicates the default document format version that the Printer will
965 assume when the client omits the “document-format-version” Operation attribute (section 4.2.6). The Printer MUST
966 support this attribute if it supports the “document-format-version” Operation attribute.

967 **8.11 document-format-version-supported (1setOf text(127))**

968 This OPTIONAL Printer Description attribute indicates the document format versions that the Printer supports for
969 Document Contents, that is, supports as values of the “document-format-version” Operation attribute (section 4.2.6).
970 The Printer MUST support this attribute if it supports the “document-format-version” Operation attribute.

971 **8.12 document-format-version-target-default (text(127))**

972 This OPTIONAL Printer Description attribute indicates the default document format level and version that the Printer
973 will assume when the client omits the “document-format-version-target” Operation attribute (section 4.2.7). The
974 Printer MUST support this attribute if it supports the “document-format-version-target” Operation attribute.

975 **8.13 document-format-version-target-supported (1setOf text(127))**

976 This OPTIONAL Printer Description attribute indicates the target document format levels and versions that the Printer
977 supports for converting Document Content, that is, supports as values of the “document-format-version-target”
978 Operation attribute (section 4.2.7). The Printer MUST support this attribute if it supports the “document-format-
979 version-target” Operation attribute.

980 **8.14 document-natural-language-default (naturalLanguage)**

981 This OPTIONAL Printer Description attribute indicates the default document natural language that the Printer will
982 assume for Document Content when the client omits the “document-natural-language” Operation attribute ([rfc2911]
983 section 3.2.1.1). The Printer MUST support this attribute if it supports the “document-natural-language” Operation
984 attribute.

985 **8.15 document-natural-language-supported (1setOf naturalLanguage)**

986 This OPTIONAL Printer Description attribute lists the natural languages supported in any of the supported document
987 formats, that is, it is the union of the natural languages. The Printer MUST support this attribute if it supports the
988 “document-natural-language” Operation attribute ([rfc2911] section 3.2.1.1). See the “document-format-details-
989 implemented” (1setOf collection) Printer Description attribute (section 8.7) for how the Printer MAY expose the list of
990 natural languages supported by particular document formats.

991 **8.16 output-device-requested-supported (1setOf name(127))**

992 This OPTIONAL Printer Description attributes lists the names of output devices that the Printer supports. The Printer
993 MUST support this attribute if it supports the “output-device-requested” Operation attribute (see section 4.1.3).

994 **9 New Values for Existing Printer Description Attributes**

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

996 **9.1 operations-supported (1setOf type2 enum)**

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

998 **Table 14 - Operation-id assignments**

Value	Operation Name	Reference
0x000F	Close-Job	[this-spec] §3.1

1000 **10 Conformance Requirements**

1001 This specification contains a number of independent OPTIONAL operations and attributes. This section summarizes
1002 the conformance requirements for Printers and clients.

1003 **10.1 Printer conformance requirements**

1004 In order to claim conformance to this specification, a Vendor MUST explicitly identify the operations and/or attributes
1005 supported by the Printer implementation in any such claim of conformance. In addition, the Vendor's Printer
1006 implementation:

- 1007 1. MUST meet the conformance requirements for Printers specified in [rfc2911].
- 1008 2. MAY support the Close-Job operation according to section 3.1 and the corresponding enum value of the
1009 "operations-supported" Printer Description attribute according to section 9.1.
- 1010 3. MAY support any Operation attribute according to section 4 and the corresponding Job Description
1011 attributes in section 6 and corresponding Printer attributes in section 8.
- 1012 4. MAY support any Job Template attribute according to section 5.
- 1013 5. MAY support any of the "job-state-reasons" values according to section 7.

1014 **10.2 Client conformance requirements**

1015 In order to claim conformance to this specification, a Vendor MUST explicitly identify the operations and/or attributes
1016 supported by the client implementation in any such claim of conformance. In addition, the Vendor's client:

- 1017 1. MUST meet the conformance requirements for clients specified in [rfc2911]
- 1018 2. MAY support the Close-Job operation according to section 3.1.
- 1019 3. MAY support any Operation attribute according to section 4 and the corresponding Job Description attributes
1020 in section 6 and corresponding Printer attributes in section 8.
- 1021 4. MAY support any Job Template attribute according to section 5.

1022 **11 Normative References**

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1104 **13 IANA Considerations**

1105 This section contains the registration information for IANA to add to the various IPP Registries according to the
1106 procedures defined in RFC 2911 [rfc2911] section 6 to cover the definitions in this document. The resulting
1107 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations> registry.

1108 *Note to the PWG Editor: Replace the References below to [this spec] with the IEEE-ISTO standard number*
1109 *for the appropriate document, so that it accurately reflects the content of the information for the IANA Registry.*

1110 **13.1 Attribute Registrations**

1111 The following table lists all the attributes defined in this specification. These are to be registered according to the
1112 procedures in RFC 2911 [rfc2911] section 6.2. If the attribute has a separate sub-section definition in this
1113 specification, that sub-section is listed as the Reference. This table contains the reference to another specification
1114 that completely defines each attribute.

Attribute Name (attribute syntax)	Reference	Section
-----	-----	-----
Job Description attributes:		
job-attribute-fidelity (boolean)	[this spec]	6.1
job-errors-count (integer(0:MAX))	[this spec]	6.2
job-mandatory-attributes (1setOf type2 keyword)	[this spec]	6.3
job-warnings-count (integer(0:MAX))	[this spec]	6.4
output-device-requested(name(127))	[this spec]	6.5
Job Template attributes:		
job-copies (integer(1:MAX))	[this spec]	5.1.1

1129	job-copies-default (integer(1:MAX))	[this spec]	5.1.1.1
1130	job-copies-supported (rangeOfInteger(1:MAX))	[this spec]	5.1.1.2
1131	job-cover-back (collection)	[this spec]	5.1.2
1132	<member attributes are the same as "cover-back">		
1133	job-cover-back-default (collection)	[this spec]	5.1.2.1
1134	job-cover-back-supported (1setOf type2 keyword)	[this spec]	5.1.2.2
1135	job-cover-front (collection)	[this spec]	5.1.3
1136	job-cover-front-default (collection)	[this spec]	5.1.3.1
1137	job-cover-front-supported (1setOf type2 keyword)	[this spec]	5.1.3.2
1138	<member attributes are the same as "cover-front">		
1139	job-finishings (1setOf type2 enum)	[this spec]	5.1.4
1140	job-finishings-default (1setOf type2 enum)	[this spec]	5.1.4.1
1141	job-finishings-ready (1setOf type2 enum)	[this spec]	5.1.4.2
1142	job-finishings-supported (1setOf type2 keyword)	[this spec]	5.1.4.3
1143	job-finishings-col (1setOf collection)	[this spec]	5.1.5
1144	<member attributes are the same as "finishings-col">		
1145	job-finishings-col-default (1setOf type2 enum)	[this spec]	0
1146	job-finishings-col-ready (1setOf type2 enum)	[this spec]	5.1.5.2
1147	job-finishings-col-supported (1setOf type2 keyword)		
1148		[this spec]	5.1.5.3
1149			
1150			
1151	Printer Description attributes:		
1152	document-charset-default (charset)	[this spec]	8.1
1153	document-charset-supported (1setOf charset)	[this spec]	8.2
1154	document-digital-signature-default (type2 keyword)	[this spec]	8.3
1155	document-digital-signature-supported (1setOf type2 keyword)		
1156		[this spec]	8.4
1157	document-format-details-default (collection)	[this spec]	8.5
1158	document-format-details-supported (1setOf type2 keyword)		
1159		[this spec]	8.6
1160	document-format-details-implemented (1setOf collection)		
1161		[this spec]	8.7
1162	document-format-target-default (text(127))	[this spec]	8.8
1163	document-format-target-supported (1setOf text(127))	[this spec]	8.9
1164	document-format-version-default (text(127))	[this spec]	8.10
1165	document-format-version-supported (1setOf text(127))	[this spec]	8.11
1166	document-format-version-target-default (text(127))	[this spec]	8.12
1167	document-format-version-target-supported (1setOf text(127))		
1168		[this spec]	8.13
1169	document-natural-language-default (naturalLanguage)	[this spec]	8.14
1170	document-natural-language-supported (1setOf naturalLanguage)		
1171		[this spec]	8.15
1172	output-device-requested-supported (1setOf name(127))	[this spec]	8.16
1173			
1174			

1175	Operation attributes:		
1176	document-charset (charset)	[this spec]	4.2.1
1177	document-digital-signature (type2 keyword)	[this spec]	4.2.2
1178	document-format-details (lsetOf collection)	[this spec]	4.2.4
1179	document-source-application-name (name(MAX))	[this spec]	4.2.4.1
1180	document-source-application-version (text(127))		
1181		[this spec]	4.2.4.2
1182	document-source-os-name (name(40))	[this spec]	4.2.4.3
1183	document-source-os-version (text(40))	[this spec]	4.2.4.4
1184	document-format (mimeMediaType)	[this spec]	4.2.4.5
1185	document-format-device-id (text(127))	[this spec]	4.2.4.6
1186	document-format-version (text(127))	[this spec]	4.2.4.7
1187	document-natural-language (lsetOf naturalLanguage)		
1188		[this spec]	4.2.4.8
1189	document-format-target (mimeMediaType)	[this spec]	4.2.5
1190	document-format-version (text(127))	[this spec]	4.2.6
1191	document-format-version-target (text(127))	[this spec]	4.2.7
1192	document-natural-language (naturalLanguage)	[this spec]	4.2.8
1193	job-mandatory-attributes (lsetOf type2 keyword)	[this spec]	4.1.2
1194	output-device-requested (name(127))	[this spec]	4.1.3

1195 **13.2 Keyword attribute values**

1196	job-state-reasons (lsetOf type2 keyword)	[rfc2911]	4.3.8
1197	digital-signature-did-not-verify	[this spec]	7.1
1198	digital-signature-type-not-supported	[this spec]	7.1
1199	job-digital-signature-wait	[this spec]	7.1

1200

1201 **13.3 Enum Attribute Values**

1202 The following table lists all the new enum attribute values defined in this document as additional type2 enum values.
1203 These are to be registered according to the procedures in RFC 2911 [rfc2911] section 6.1.

1204			
1205	job-finishings (lsetOf type2 enum)	[this spec]	5.1.4
1206	<enum values are the same as "finishings">		
1207			
1208	operations-supported (type2 enum)	[rfc2911]	4.4.15
1209	0x000F Close-Job	[this spec]	3.1

1210

1211 **13.4 Operations**

1212 The following table lists all of the operations defined in this document. These are to be registered according to the
1213 procedures in RFC 2911 [rfc2911] section 6.4.

1214			
1215	Operations	Reference	Section
1216	-----	-----	-----
1217	Close-Job	[this spec]	3.1

1218 **14 Internationalization Considerations**

1219 The internationalization considerations for the extensions defined in this specification are the same as for handling
1220 the Job object in [rfc2911].

1221 **15 Security Considerations**

1222 Printer implementations MUST ensure that the Close-Job operation is being performed by a client with proper
1223 authorization. Otherwise, a malicious user could close other people's jobs, thereby denying the rightful owner from
1224 adding additional documents to his/her Job. See section 3.1.

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1229 **17 Acknowledgments**

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1249 **19 Annex B: Change Log (informative)**

1250 The following summaries of the changes in reverse chronological order:

1251 Version 0.1, 18 May 2003:
1252 1. Split document out of Document Object specification.

- 1253
1254
1255
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1259
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.