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

Abstract: This IPP specification extends the IPP Model and Semantics [rfc2911] object model by defining 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 attributes describe the contents of 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" 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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1 Introduction and Summary

This IPP specification extends the IPP Model and Semantics [rfc2911] object model by defining 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 attributes describe the contents of 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" 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].

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

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

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

284 3.1.1 Close-Job Request

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

286 Group 1: Operation Attributes

287 Natural Language and Character Set:

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

291 Target:

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

295 Requesting User Name:

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

298 3.1.2 Close-Job Response

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

300 Group 1: Operation Attributes

301 Status Message:

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

305 Natural Language and Character Set:

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

307 Group 2: Unsupported Attributes

308 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	Operation attribute syntax	Default Value attribute syntax	Supported Values attribute syntax
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.

331 Table 6 lists the Operation attributes that clients supply in Job and Document Creation operations and whether the
 332 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’.

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

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 accept the attribute anyway. The Printer MUST reject this Job Creation only if the client actually supplies any of the

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].

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).

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.

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

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

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

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

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

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

431 **4.2.2 document-digital-signature (type2 keyword)**

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

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

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

- 442 1. ignore the signature (and MAY indicate on the printed output some how) and MUST set the Job's "job-state-
443 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 This specification 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.

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

484 Note: It is proposed that CIP4 [cip4] register the YYY document formats with IANA as 'application/vnd.CIP4-YYY'
 485 that CIP4 is using that don't have a registered MIME Media type. For example, TIFF/IT [iso12639] would be
 486 registered as: 'application/vnd.CIP4-TIFF-IT'. Then CIP4 would keep a list of TIFF/IT versions. For example:
 487 'TIFF/IT-CT/P1:1998' to use with the "document-format-version" attribute (and the CIP4 JDF equivalent
 488 MimeTypeVersion attribute).

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

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

493 4.2.4 document-format-details (1setOf collection)

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

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

502 If a client supplies the "document-format-details" Operation attribute in a Document Creation request with member
 503 attributes and/or values that the Printer doesn't support, the Printer MUST perform one of the following actions
 504 depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the
 505 'pending-held' state or (b) process the job ignoring the attribute. See section 4.2 above for more details. However, if
 506 the "document-charset" or the "document-format" member attributes are the ones in question, the Printer MUST
 507 reject the request, same as for the "document-charset" and "document-format" Operation attributes (see sections
 508 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-
 509 error-document-format-not-supported' (see [rfc2911] section 13.1.4.11), respectively.

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

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

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

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

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.

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

526 **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

527
 528 The client can determine which member attributes of the “document-format-details” are supporter by querying the
 529 Printer’s “document-format-details-supported” (1setOf type2 keyword) Printer Description attribute (see section 8.6).
 530 The client can determine a supported set of document details by querying the Printer’s “document-format-details-
 531 implemented” (1setOf collection) Printer Description attribute (see section 8.7).

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

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

543 **4.2.4.1 document-source-application-name (name(MAX))**

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

547 **4.2.4.2 document-source-application-version (text(127))**

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

551 “8.1 (4331)” for Winzip®, “5.0.5 10/26/2001” for Acrobat®, “2000 (9.0.4119 SR-1)” for Microsoft® Word

552 When populating the “document-source-application-version-implemented” member attribute of the
 553 “document-format-details-implemented” Printer Description attribute, some of the trailing information MAY be
 554 omitted, so that a substring match of the Printer’s value with the value supplied by the client is sufficient for a
 555 match. For example, the Printer’s value MAY be “8.1”, “5.0”, and “2000”, respectively, as compared to the
 556 corresponding example values above that MAY be supplied by the client.

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

559 **4.2.4.3 document-source-os-name (name(40))**

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

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

567 **4.2.4.4 document-source-os-version (text(40))**

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

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

573 For ‘AIX’: ‘370’, ‘PS/2’
 574 For ‘LINUX’: ‘1.0’, ‘1.2’, ‘2.0’, ‘2.2’, ‘2.4’
 575 For ‘MVS’: ‘SP’
 576 For ‘NETWARE’: ‘3’, ‘3.11’, ‘4.0’, ‘4.1’, ‘5.0’
 577 For ‘SUN-OS’: ‘3.5’, ‘4.0’
 578 For ‘UNIX’: ‘BSD’, ‘V’, ‘V.1’, ‘V.2’, ‘V.3’, ‘PC’
 579 For ‘WINDOWS’: ‘95’, ‘98’, ‘CE’, ‘NT’, ‘NT-2’, ‘NT-3’, ‘NT-3.5’, ‘NT-3.51’, ‘NT-4’, ‘NT-5’, ‘2000’, ‘XP’
 580 [not registered yet]
 581

582 **4.2.4.5 document-format (mimeMediaType)**

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

588 **4.2.4.6 document-format-device-id (text(127))**

589 This OPTIONAL member Operation attribute identifies the type of device for which the document was
 590 formatted, including manufacturer and model. This attribute is intended to identify document formats that are

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.

591 not portable, e.g., PDLs that are device dependent. The value of this variable MUST exactly match the IEEE
592 1284-2000 Device ID string (see [IEEE1284] clause 6), except the length field MUST NOT be specified. See
593 the Microsoft Universal Plug and Play [upnp] section 2.2.6 DeviceId parameter for details and examples.
594 Here is an example showing only the required fields for a PostScript document:
595 MANUFACTURER:ACME Co.;COMMAND SET:PS;MODEL:LaserBeam 9;

596 4.2.4.7 document-format-version (text(127))

597 This REQUIRED member Operation attribute identifies the level or version of the document format identified
598 by the "document-format" member attribute. The client MAY supply and the Printer MUST support this
599 member attribute if the Printer supports the "document-format-details" Operation attribute. The semantics
600 and supported values of this "document-format-version" member attribute MUST be the same as for the top
601 level "document-format-version" Operation attribute with the same name (see section 4.2.6 for the
602 semantics).

603 4.2.4.8 document-natural-language (naturalLanguage)

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

608 4.2.5 document-format-target (mimeMediaType)

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

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

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

619 ISSUE 03: OK that we defined the "document-format-target" and "document-format-version-target" attributes to be
620 Operation/Description attributes (SM Description attributes) instead of Job Template attributes (SM Document
621 Processing attributes), so that the Printer MUST perform the requested action without the client having to use the
622 "ipp-attribute-fidelity" or "job-mandatory-attributes" operation attribute and so the client can supply different values for
623 different documents without requiring the Document Object [ippdoc]?

624 4.2.6 document-format-version (text(127))

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

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

630 If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support as
631 indicated by the Printer's "document-format-version-supported" attribute (see section 8.11), the Printer MUST

632 perform one of the following actions, depending on implementation: (1) reject the request OR (2) accept the request
 633 and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 4.2
 634 above for more details.

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

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

644 Example values:

645 'PS/3': For Postscript level 3 [rfc1759].
 646 'PCL/5e': For PCL 5e [rfc1759].
 647 'PDF/1.4': For PDF version 1.4 [pdf]
 648 'PDF/X-1a:2001': For PDF/X-1a [iso15930]
 649 'TIFF/IT-FP:1998': TIFF/IT [iso12639] - Full Page - baseline.
 650 'TIFF/IT-CT:1998': TIFF/IT [iso12639] - Continuous Tone picture data - baseline
 651 'TIFF/IT-FP/P1:1998': TIFF/IT [iso12639] - Full Page - profile 1
 652 'TIFF/IT-CT/P1:1998': TIFF/IT [iso12639] - Continuous Tone picture data - profile 1
 653 'Automatic': auto sense the format [rfc1759]. Is use in combination with the 'application/octet-stream' (see
 654 [rfc2911] section 4.1.9.1) value of the "document-format" attribute (section 4.2.3).
 655

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

662 The Printer produces the value indicated by its "document-format-version-default" Printer attribute only if the client
 663 does not supply the "document-format-version" Operation attribute and the "document-format" Operation attribute. If
 664 the client supplies the "document-format" Operation attribute, but not the "document-format-version" Operation
 665 attribute, the Printer applies an appropriate default version for the supplied document format.

666 **ISSUE 04: OK not to have a "document-format-col-default" (collection) which is pairs of "document-format" and**
 667 **"document-format-version" values?**

668 **ISSUE: Or should the "document-format-version-default" be a 1setOf since the version string is self-identifying with**
 669 **the PDL? Then the different defaults could be indicated for each document format?**

670 **4.2.7 document-format-version-target (text(127))**

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

672 If the client supplies this "document-format-version-target" Operation attribute, the client MUST also supply the
 673 "document-format-target" Operation attribute (section 4.2.7), so that the Printer does not need to parse the
 674 "document-format-version-target" string in order to determine the document format and version.

675 If a client supplies this "document-format-version-target" Operation attribute with a value that the Printer doesn't
 676 support as indicated by the Printer's "document-format-version-target-supported" attribute (see section 8.13), the
 677 Printer MUST perform one of the following actions, depending on implementation: (1) reject the request OR (2)
 678 accept the request and either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute.
 679 See section 4.2 above for more details. **ISSUE: Or should we require the Printer to always reject a request for an**
 680 **unsupported target version?**

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

684 The Printer produces the value indicated by its "document-format-version-target-default" Printer attribute only if the
 685 client does not supply the "document-format-target-version" Operation attribute and the "document-format-target"
 686 Operation attribute. If the client supplies the "document-format-target" Operation attribute, but not the "document-
 687 format-version-target" Operation attribute, the Printer applies an appropriate default version for the supplied
 688 document format.

689 **ISSUE 04: OK not to have a "document-format-target-col-default" (collection) which is pairs of "document-format-**
 690 **target" and "document-format-version-target" values?**

691 **ISSUE: Or should the "document-format-version-target-default" be a 1setOf since the version string is self-identifying**
 692 **with the PDL? Then the different defaults could be indicated for each document format?**

693

694 **4.2.8 document-natural-language (naturalLanguage)**

695 This OPTIONAL Operation attribute specifies the natural language of the Document content (see [rfc2911] section
 696 3.2.1.1 and section 4.1.8).

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

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

704 'en': for English
 705 'en-us': for US English
 706 'fr': for French
 707 'de': for German
 708

709 **5 Job Template attributes**

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

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

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

718 **Table 8 - Job Template attributes**

Job Template attribute name	Attribute Syntax				Conformance		Reference
					Client supply	Printer support	
job-copies	integer(1:MAX)				MAY	MAY	§5.1.1
job-cover-back	collection				MAY	MAY	§5.1.2
cover-type	type2 keyword						
media	type3 keyword name(MAX)						
media-col	collection						
<i>member attributes</i> [pwg5100.3]	See [pwg5100.3]						
job-cover-front	collection				MAY	MAY	§5.1.3
<i>member attributes -</i> <i>same as job-cover-back</i>	see job-cover-back						
job-finishings	1setOf type2 enum				MAY	MAY	§5.1.4
job-finishings-col	collection				MAY	MAY	§5.1.5
finishing-template	name(MAX)				MAY	MAY	[pwg5100.3] §3.2.1
stitching	collection				MAY	MAY	[pwg5100.3] §3.2.2
stitching-reference- edge	type2 keyword				MUST	MUST	[pwg5100.3] §3.2.2.1
stitching-offset	integer (0:MAX)				MUST	MUST	[pwg5100.3] §3.2.2.2
stitching-locations	1setOf integer(0:MAX)				MUST	MUST	[pwg5100.3] §3.2.2.3

719 5.1 Job Template attributes defined for use with multi-document jobs

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

725 5.1.1 job-copies (integer(1:MAX))

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

732 5.1.2 job-cover-back (collection)

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

“multiple-document-handling” Job Template attribute ([rfc2911] section 4.2.4). The “job-cover-back” Job Template attribute is equivalent to “cover-back” with “multiple-document-handling” = ‘single-document-new-sheet’.

5.1.3 job-cover-front (collection)

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

5.1.4 job-finishings (1setOf type2 enum)

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

5.1.5 job-finishings-col (1setOf collection)

This OPTIONAL Job Template attribute specifies the job finishings collection, i.e., with all of the Documents taken together. Its interpretation is independent of the value of the “multiple-document-handling” Job Template attribute. See the “finishings” Job Template attribute defined in [rfc2911] section 4.2.6 which switches between job finishings collection and document finishings collection depending on the value of the “multiple-document-handling” Job Template attribute ([rfc2911] section 4.2.4). The “job-finishings-col” Job Template attribute is equivalent to “finishings-col” with “multiple-document-handling” = ‘single-document-new-sheet’.

6 Job Description attributes

Table 9 lists the new Job Description defined in this IPP specification. Job Description attributes are Job object attributes that are filled in by the Printer. Some Job Description attribute values are supplied by the client in the Job operation using corresponding Operation attributes as indicated with “⇒y”. The Printer MUST NOT support modification of any of these Job Description attributes using the Set-Job-Attributes operation ([ref3380]).

Legend:	
IPP attribute syntax	the attribute syntax (see [rfc2911] section 4.1).
Printer conformance	indicates MUST or MAY for Printer conformance.
“_”	indicates that the Job or Document attribute is <i>not</i> defined.
“⇒y”	the Printer MUST populate this Job Description attribute by copying <i>from</i> the corresponding Operation attribute that the client MAY supply in a Job Creation operation. See Table 6 for the corresponding Operation attribute.
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.

767 **Table 9 - Job Description attributes**[illegible]

"y", " $\Rightarrow y$ ", "- " See the description in the Legend before the table.

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

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)¹⁶ 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 accepted¹⁷. However, this attribute does provide an audit capability to the user and service desk for comparing unexpected printed results with what was submitted.

¹⁶ 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.

¹⁷ 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].

784 **6.2 job-errors-count (integer(0:MAX))**

785 This OPTIONAL Job Description attribute counts the number of errors encountered processing the job as a whole.
786 An error where some portion of the printed output is not present, such as a glyph encountered which isn't in the
787 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
788 overall document format.

789 **6.3 job-mandatory-attributes (1setOf type2 keyword)**

790 This OPTIONAL Job Description attribute indicates which Job Template attributes that the client required that the
791 Printer Honor in order to accept the Job Creationrequest. The Printer populates this attribute with the value of the
792 corresponding "job-mandatory-attributes" Operation attribute (see section 4.1.2) supplied by the client in the Job
793 Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation
794 operation has been accepted¹⁷. However, this Job Description attribute does provide an audit capability of the Job
795 object in the Job History (see [rfc2911] section 4.3.7.2) to the user and service desk for comparing unexpected
796 printed results with what was submitted. See section 4.1.2 for additional details of the semantics of this "job-
797 mandatory-attributes" Operation attribute that are not repeated here.

798 **6.4 job-warnings-count (integer(0:MAX))**

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

801 **6.5 output-device-requested (name(127))**

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

806 **7 New values to existing attributes**

807 This section defines new values to existing attributes.

808 **7.1 New job-state-reasons(1setOf type2 keyword) Values**

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

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

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

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

822 **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

823
824 For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely
825 to occur (if implemented):

- 826 **'digital-signature-type-not-supported':** The Job contains a digital signature type that is not supported.
827 Implementation or site policy determines the state of the Job once this condition is detected.
- 828 **'job-digital-signature-wait':** The Job is currently being held because the Job was submitted with a
829 “document-digital-signature” attribute value that is not supported. The operator MAY either cancel
830 the job or release it to be processed.
- 831 **'digital-signature-did-not-verify':** The Job contains a digital signature type that is supported (see section
832 4.2.2), but the signature did not verify when the Printer attempted to verify the signature.
- 833

834 **8 New Printer attributes**

835 This section lists *the new* Printer attributes defined in this document. Printer attributes are divided into two disjoint
836 groups:
837

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

839 In a Get-Printer-Attributes request, a client can request all of the Printer attributes in the Job Template (JT) or Printer
 840 Description (PD) groups by supplying the 'job-template' or 'printer-description' group name, respectively. The client
 841 can also request "all". 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.
"Group"	the group to which the attribute belongs. "PD" = Printer Description; "JT" = Job Template as explained above.
"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.

842

843

Table 11 - New Printer attributes (Job Template and Printer Description)

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Group	Printer Conf.	Reference
document-charset-default	charset	PD	CMUST ¹⁸	[this-spec] §8.1
document-charset-supported	1setOf charset	PD	CMUST ¹⁸	[this-spec] §8.2
document-digital-signature-default	type2 keyword	PD	MAY	[this-spec] §8.3
document-digital-signature-supported	1setOf type2 keyword	PD	MAY	[this-spec] §8.4
document-format-details-supported	1setOf type2 keyword	PD	CMUST ¹⁹	[this-spec] §8.6
document-format-details-implemented	1setOf collection	PD	CMUST ¹⁹	[this-spec] §8.7
document-format-target-default	mimeMediaType	PD	MAY	[this spec] §8.8
document-format-target-supported	1setOf mimeMediaType	PD	MAY	[this spec] §8.9
document-format-version-default	text(127)	PD	MAY	[this-spec] §8.10
document-format-version-supported	1setOf text(127)	PD	MAY	[this-spec] §8.11
document-format-version-target-default	mimeMediaType	PD	MAY	[this spec] §8.12
document-format-version-target-supported	1setOf mimeMediaType	PD	MAY	[this spec] §8.13
document-natural-language-default	naturalLanguage	PD	MAY	[this-spec] §8.14
document-natural-language-supported	1setOf naturalLanguage	PD	MAY	[this-spec] §8.15
job-copies-default	integer(1:MAX)	JT	MAY	[this-spec] §5.1.1
job-copies-supported	reangeOfInteger(1:MAX)	JT	MAY	[this-spec] §5.1.1
job-cover-back-default	collection	JT	MAY	[this-spec] §5.1.2
job-cover-back-supported	1setOf type2 keyword	JT	MAY	[this-spec] §5.1.2
job-cover-front-default	collection	JT	MAY	[this-spec] §5.1.3
job-cover-front-supported	1setOf type2 keyword	JT	MAY	[this-spec] §5.1.3

¹⁸ 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).

¹⁹ The Printer MUST support the "document-format-details-supported" and "document-format-details-implemented" Printer attributes if the Printer supports a packaging document format, such as application/zip or multipart/related.

Printer attribute name (Job Template & Printer Description)	Attribute Syntax	Group	Printer Conf.	Reference
job-finishings-default	1setOf type2 enum	JT	MAY	[this-spec] §5.1.4
job-finishings-supported	1setOf type2 enum	JT	MAY	[this-spec] §5.1.4
job-finishings-col-default	collection	JT	MAY	[this-spec] §5.1.5
job-finishings-col-supported	1setOf type2 keyword	JT	MAY	[this-spec] §5.1.5
output-device-requested-supported	1setOf name(127)	PD	MAY	[this spec] §8.16

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

8.1 document-charset-default (charset)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the default charset that the Printer will assume for charset-ambiguous document formats when the client omits the “document-charset” Operation attribute (section 4.2.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 4.2.1).

8.2 document-charset-supported (1setOf charset)

This CONDITIONALLY REQUIRED Printer Description attribute indicates the charsets that the Printer supports in Document Content, that is, supports as values of the “document-charset” Operation attribute (section 4.2.1). The Printer MUST support this attribute if it supports any charset-ambiguous document formats (see section 4.2.1).

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

This OPTIONAL Printer Description attribute indicates the default digital signature, if any, that the Printer will assume when the client omits the “document-digital-signature” Operation attribute (section 4.2.2). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

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 REQUIRED²⁰ 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.

ISSUE01: 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?

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.

²⁰ 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.

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

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

902 **8.8 document-format-target-default (text(127))**

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

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

907 **8.9 document-format-target-supported (1setOf text(127))**

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

912 **8.10 document-format-version-default (text(127))**

913 This OPTIONAL Printer Description attribute indicates the default document format version that the Printer will
 914 assume when the client omits the "document-format-version" Operation attribute (section 4.2.6). The Printer MUST
 915 support this attribute if it supports the "document-format-version" Operation attribute.

916 **8.11 document-format-version-supported (1setOf text(127))**

917 This OPTIONAL Printer Description attribute indicates the document format versions that the Printer supports for
 918 Document Contents, that is, supports as values of the "document-format-version" Operation attribute (section 4.2.6).
 919 The Printer MUST support this attribute if it supports the "document-format-version" Operation attribute.

920 **8.12 document-format-version-target-default (text(127))**

921 This OPTIONAL Printer Description attribute indicates the default document format level and version that the Printer
 922 will assume when the client omits the "document-format-version-target" Operation attribute (section 4.2.7). The
 923 Printer MUST support this attribute if it supports the "document-format-version-target" Operation attribute.

924 **8.13 document-format-version-target-supported (1setOf text(127))**

925 This OPTIONAL Printer Description attribute indicates the target document format levels and versions that the Printer
 926 supports for converting Document Content, that is, supports as values of the "document-format-version-target"
 927 Operation attribute (section 4.2.7). The Printer MUST support this attribute if it supports the "document-format-
 928 version-target" Operation attribute.

8.14 document-natural-language-default (naturalLanguage)

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

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

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

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

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

9 New Values for Existing Printer Description Attributes

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

9.1 operations-supported (1setOf type2 enum)

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

Table 14 - Operation-id assignments

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

10 Conformance Requirements

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

10.1 Printer conformance requirements

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

1. MUST meet the conformance requirements for Printers specified in [rfc2911].

- 957 2. MAY support the Close-Job operation according to section 3.1 and the corresponding enum value of the
958 "operations-supported" Printer Description attribute according to section 9.1.
- 959 3. MAY support any Operation attribute according to section 4 and the corresponding Job Description
960 attributes in section 6 and corresponding Printer attributes in section 8.
- 961 4. MAY support any Job Template attribute according to section 5.
- 962 5. MAY support any of the "job-state-reasons" values according to section 7.
- 963 6. .

964 10.2 Client conformance requirements

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

- 967 1. MUST meet the conformance requirements for clients specified in [rfc2911]
- 968 2. MAY support the Close-Job operation according to section 3.1.
- 969 3. MAY support any Operation attribute according to section 4 and the corresponding Job Description attributes
970 in section 6 and corresponding Printer attributes in section 8.
- 971 4. MAY support any Job Template attribute according to section 5.

972 11 Normative References

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1054 13 IANA Considerations

1055 This section contains the registration information for IANA to add to the various IPP Registries according to the
1056 procedures defined in RFC 2911 [rfc2911] section 6 to cover the definitions in this document. The resulting
1057 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations> registry.

1058 *Note to the PWG Editor: Replace the References below to [this spec] with the IEEE-ISTO standard number*
1059 *for the appropriate document, so that it accurately reflects the content of the information for the IANA Registry.*

13.1 Attribute Registrations

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

ACTION (Tom) - Need to add the JT and DT xxx-default and xxx-supported.

document-format-version-target-default (mimeMediaType)	[this spec]	4.2.5
document-format-version-target-supported (1setOf mimeMediaType)	[this spec]	4.2.5
document-format-version-target-default (mimeMediaType)	[this spec]	4.2.7
document-format-version-target-supported (1setOf mimeMediaType)	[this spec]	
job-copies (integer(1:MAX))	[this spec]	5.1.1
job-cover-back (collection)	[this spec]	5.1.2
<member attributes are the same as "cover-back">		
job-cover-front (collection)	[this spec]	5.1.3
<member attributes are the same as "cover-front">		
job-finishings (1setOf type2 enum)	[this spec]	5.1.4
job-finishings-col (1setOf collection)	[this spec]	5.1.5
<member attributes are the same as "finishings-col">		

Printer Description attributes:

document-charset-default (charset)	[this spec]	8.1
document-charset-supported (1setOf charset)	[this spec]	8.2
document-digital-signature-default (type2 keyword)	[this spec]	8.3
document-digital-signature-supported (1setOf type2 keyword)	[this spec]	8.4
document-format-details-default (collection)	[this spec]	8.5
document-format-details-supported (1setOf type2 keyword)	[this spec]	8.6

1106	document-format-details-implemented (1setOf collection)		
1107		[this spec]	8.7
1108	document-format-target-default (text(127))	[this spec]	8.8
1109	document-format-target-supported (1setOf text(127))	[this spec]	8.9
1110	document-format-version-default (text(127))	[this spec]	8.10
1111	document-format-version-supported (1setOf text(127))	[this spec]	8.11
1112	document-format-version-target-default (text(127))	[this spec]	8.12
1113	document-format-version-target-supported (1setOf text(127))		
1114		[this spec]	8.13
1115	document-natural-language-default (naturalLanguage)	[this spec]	8.14
1116	document-natural-language-supported (1setOf naturalLanguage)		
1117		[this spec]	8.15
1118	output-device-requested-supported (1setOf name(127))	[this spec]	8.16
1119			
1120			
1121	Operation attributes:		
1122	document-charset (charset)	[this spec]	4.2.1
1123	document-digital-signature (type2 keyword)	[this spec]	4.2.2
1124	document-format-details (1setOf collection)	[this spec]	4.2.4
1125	document-source-application-name (name(MAX))	[this spec]	4.2.4.1
1126	document-source-application-version (text(127))		
1127		[this spec]	4.2.4.2
1128	document-source-os-name (name(40))	[this spec]	4.2.4.3
1129	document-source-os-version (text(40))	[this spec]	4.2.4.4
1130	document-format (mimeMediaType)	[this spec]	4.2.4.5
1131	document-format-device-id (text(127))	[this spec]	4.2.4.6
1132	document-format-version (text(127))	[this spec]	4.2.4.7
1133	document-natural-language (1setOf naturalLanguage)		
1134		[this spec]	4.2.4.8
1135	document-format-target (mimeMediaType)	[this spec]	4.2.5
1136	document-format-version (text(127))	[this spec]	4.2.6
1137	document-format-version-target (text(127))	[this spec]	4.2.7
1138	document-natural-language (naturalLanguage)	[this spec]	4.2.8
1139	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	4.1.2
1140	output-device-requested (name(127))	[this spec]	4.1.3

1141 13.2 Keyword attribute values

1142	job-state-reasons (1setOf type2 keyword)	[rfc2911]	4.3.8
1143	digital-signature-did-not-verify	[this spec]	7.1
1144	digital-signature-type-not-supported	[this spec]	7.1
1145	job-digital-signature-wait	[this spec]	7.1
1146			

1147 13.3 Enum Attribute Values

1148 The following table lists all the new enum attribute values defined in this document as additional type2 enum values.
 1149 These are to be registered according to the procedures in RFC 2911 [rfc2911] section 6.1.

1150
1151
1152 job-finishings (1setOf type2 enum) [this spec] 5.1.4
1153 <enum values are the same as "finishings">
1154
1155 operations-supported (type2 enum) [rfc2911] 4.4.15
1156 0x000F Close-Job [this spec] 3.1
1157

1158 **13.4 Operations**

1159 The following table lists all of the operations defined in this document. These are to be registered according to the
1160 procedures in RFC 2911 [rfc2911] section 6.4.
1161
1162 Operations Reference Section
1163 -----
1164 Close-Job [this spec] 3.1

1165 **14 Internationalization Considerations**

1166 The internationalization considerations for the extensions defined in this specification are the same as for handling
1167 the Job object in [rfc2911].

1168 **15 Security Considerations**

1169 Printer implementations MUST ensure that the Close-Job operation is being performed by a client with proper
1170 authorization. Otherwise, a malicious user could close other people's jobs, thereby denying the rightful owner from
1171 adding additional documents to his/her Job. See section 3.1.

1172 **16 Contributors**

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1176 **17 Acknowledgments**

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1196 **19 Annex B: Change Log (informative)**

1197 The following summaries of the changes in reverse chronological order:

1198 Version 0.1, 14 May 2003:

- 1199 1. Split document out of Document Object specification.
- 1200 2. Moved "document-format-target" and "document-format-version-target" from the Job Template section to the
1201 Operation Attributes section so that it can be supplied with Document Creation operations and so that it
1202 MUST be honored, even if "job-attribute-fidelity" is 'false' or omitted.
- 1203 3. Removed all Document Description attributes and the concept of Job Level and Document Level. That
1204 terminology is introduced in the Document Object spec [ippdoc].
1205