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

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11 **Abstract:** This IPP specification extends the Job semantics of the IPP Model and Semantics [rfc2911] object model.
12 This specification defines some new Operation attributes for use in Job Creation and Document Creation operations.
13 The Printer copies these Operation attributes to the corresponding Job Description attributes, which the clients may
14 query. The Document Creation Operation attributes describe the Document Content and permit the Printer to reject
15 requests that it cannot process correctly. Some corresponding "xxx-default" and "xxx-supported" Printer attributes
16 are defined. This specification defines some Job Template attributes that apply to a multi-document Job as a whole
17 and the "output-device" Job Template attribute that can apply to Documents and to Sheets as well as Jobs. This
18 specification also defines some additional values for the "job-state-reasons" Job Description attribute. Each of the
19 attributes defined in this specification are independent of each other and are OPTIONAL for a Printer to support.

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The Printer Working Group (PWG)

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Standard for

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The Internet Printing Protocol (IPP):

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Job Extensions

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This version of the PWG Proposed Standard is available electronically at:

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ftp://ftp.pwg.org/pub/pwg/ipp/new_JOBX/wd-ippjobx10-20031014.pdf , .doc, .rtf

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103 end

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105 discussions of clarifications or review of registration proposals for additional names. Requests for additional
106 extensions, for inclusion in this specification, should be sent to the IPP Mailing list for consideration. In order to
107 reduce spam the mailing list rejects mail from non-subscribers, so you must subscribe to the mailing list in order to
108 send a question or comment to the mailing list.

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242

243 1 Introduction and Summary

244 This IPP specification is an assortment of attributes and values that extend the Job semantics of the IPP Model and
 245 Semantics [rfc2911]. This specification defines some new Operation attributes for use in Job Creation and
 246 Document Creation operations. The Printer copies these Operation attributes to the corresponding Job Description
 247 attributes, which the clients may query. The Document Creation Operation attributes describe the Document Content
 248 and permit the Printer to reject requests that it cannot process correctly. Some corresponding "xxx-default" and "xxx-
 249 supported" Printer attributes are defined. This specification defines some Job Template attributes that apply to a
 250 multi-document Job as a whole; their names start with "job-" to indicate their job-wide scope. This specification
 251 defines the "output-device" Job Template attribute that can apply to Documents and to Sheets as well as Jobs. This
 252 specification also defines some additional values for the "job-state-reasons" Job Description attribute. Each of the
 253 attributes defined in this specification are independent of each other and are OPTIONAL for a Printer to support.

254 This specification is an IPP extension referenced by the PWG Semantic Model [pwg-sm]. The purpose for these
 255 extensions is so that the print industry can have a common semantic specification for use in IPP, the PWG Semantic
 256 Model [pwg-sm], the PWG Print Service Interface (PSI) project [pwg-psi], the PWG IPP Fax (IPPFAX) project
 257 [ippfax], and the Free Standards Group Job Ticket API [fsg-jt].

258 1.1 Attributes Summary

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

261 **Table 1 - Summary of Job Creation Operation attributes**

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

262 Table 2 summarizes the Operation attributes defined in this specification for use with Job Creation operations and
 263 Send-Document and Send-URI operations. These Operation attributes allow the client to supply descriptions of the
 264 Document Content to the Printer about individual Document Contents at request time. When supplied in a Job
 265 Creation request, these Operation attributes provide defaults for the Document or Documents of the Job. When
 266 supplied in a Document Creation operation, they describe the Document explicitly. This specification does *not* define
 267 corresponding Document Description attributes, since this specification does not include or depend on a Document
 268 object¹.
 269

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

270

Table 2 - Summary of Job and Document Creation Operation attributes

Operation attribute	Printer support	Description
document-charset (charset)	MAY	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)	MAY	The details of the Document Content, including when it's a package of files (e.g., zip, multipart/related). The details include information, such as the application and the operating system that created the document, the intended device type (when the format is device-dependent), and the natural languages of the document.
document-format-version (text(127))	MAY	The version of the document format.
document-format-natural-language (naturalLanguage)	MAY	The primary natural language of the Document Content.

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Table 3 summarizes the Job Template attributes defined in this specification for use with Job Creation operations. The Job Template attributes that have a "job-" prefix 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' values cause the Printer to produce separate Output Documents. The "output-device" Job Template attribute is not restricted to be job-wide and can be supplied in Document Creation operations and in the "override" attribute to override at the Sheet level (see section 9). When supplied in a Document Creation operation, the "output-device" Job Template attribute describes the Document explicitly. This specification does *not* define corresponding Document Description attributes, since this specification does not include or depend on a Document object².

282

Table 3 - Summary of Job Template Attributes

Job Template attribute	Printer support	Description
job-copies (integer(1:MAX))	MAY	The number of copies of the entire Job.
job-cover-back (collection)	MAY	The cover for the back of the entire Job.
job-cover-front (collection)	MAY	The cover for the front of the entire Job.
job-finishings (1setOf type2 enum)	MAY	The finishing for the entire Job.
job-finishings-col (1setOf collection)	MAY	The finishing characteristics for the entire Job.
output-device (name(127))	MAY	Allows the client to indicate a preference for output devices, for a Printer that supports one or more output device (see fan-out in [rfc2911] section 2.1).

283

2 Terminology

284

This section defines terminology used throughout this document.

285

2.1 Conformance Terminology

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287

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].

² For Document Description attributes that correspond to the Operation attributes defined for Document Creation operations, see the Document object defined in [ippdoc].

288 2.2 Other Terminology

289 This document uses the same terminology as [rfc2911], such as “client”, “Printer”³, “attribute”, “attribute value”,
 290 “keyword”, “Job Template attribute”, “Operation attribute”, “operation”, “request”, “response”, and “support”
 291 (see [rfc2911] section 12.2.3) with the same meaning. In addition, the following terms are defined for use in this
 292 document:

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

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

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

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

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

306 **Page** - The term “Page” used throughout this document is a synonym for PDL page.

307 **PDL Page** - A “PDL Page” is a page according to the definition of pages in the language used to express the
 308 document data. Note: If the PDL contains multiple original source pages that have been placed on a single page by
 309 the client application, then the PDL page count is one. On the other hand, if the client requests that multiple PDL
 310 Pages are placed on a single side of media, by supplying “number-up” with a value greater than 1, then the PDL
 311 page count will be more than one. [rfc2911] uses the term “print stream page” for PDL Page.

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

314 3 Operation Attributes for Job Creation and Document Creation operations

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

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

³ [rfc2911] uses the terms “Printer object” and “Printer” interchangeably to mean the same thing. For simplicity, this document uses the term “Printer” exclusively, except for definitions copied directly from [rfc2911]. Nonetheless, the intent is as in [rfc2911]: a Printer is an object that MAY be hosted in the device or in a server.

322

Table 4 - Operation, Default, and Supported Attributes

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

323 Table 5 lists the Operation attributes that clients supply in Job and Document Creation operations and whether the
 324 Printer copies (indicated by "? ") the supplied value to the corresponding Job Description⁴ attribute. The following
 325 statements apply to all Operation attributes for Job and Document Creation operations and are *not* repeated in each
 326 Operation attribute Description:

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

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

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

⁴ 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.

Legend:	
“Operation”	Column indicates the operation attribute names for Job and Document Creation requests.
“**”	Following attribute name indicates value sent on Create-Job, Print-Job and Print-Uri is the default for all the Documents in the Job.
“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. It has a corresponding Job Description attribute (see section 4.1.5.4) defined that the Printer MUST support and to which the Printer MUST copy this Operation attribute, if it supports the Operation attribute. See Table 4 for whether there are corresponding “xxx-default” and “xxx-supported” Printer Description attributes defined.
“y? **”	Same as above except the corresponding Job Description attribute has an “-supplied” suffix appended to the Operational attribute name.
“-”	the Operation attribute is <i>not</i> defined for the indicated operation.
“Conformance”	column indicates the conformance requirements for what the client supplies in a request and the Printer supports in a request. For (indented) member attributes, a MUST means if the collection attribute is supplied or supported.
“Section”	column indicates where the Operation attribute is defined in this spec.

342

343

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

Operation attribute name	Attribute Syntax	Creation operations			Conformance		Section
		CJ	PJ, PU	SD, SU	Client supply	Printer support	
The following 10 Operation attributes have corresponding “xxx-supplied” Job Description attributes:							
compression	type2 keyword	y? **	y? **	y	MAY	MAY	§3.2.1
document-charset*	charset	y? **	y? **	y	MAY	MAY	§3.2.2
document-digital-signature*	type2 keyword	y? **	y? **	y	MAY	MAY	§3.2.3
document-format*	mimeMediaType	y? **	y? **	y	MAY	MUST	§3.2.4
document-format-details*	1setOf collection	y? **	y? **	y	MAY	MAY	§3.2.5
document-source-application-name*	name(MAX)	y?	y?	y	MAY	MAY	§3.2.5.1
document-source-application-version*	text(127)	y?	y?	y	MAY	MAY	§3.2.5.2
document-source-os-name*	name(40)	y?	y?	y	MAY	MAY	§3.2.5.3
document-source-os-version*	text(40)	y?	y?	y	MAY	MAY	§3.2.5.4
document-format*	mimeMediaType	y?	y?	y	MUST	MUST	§3.2.5.5
document-format-device-id*	text(127)	y?	y?	y	MAY	MAY	§3.2.5.6
document-format-version*	text(127)	y?	y?	y	SHOULD	MUST	§3.2.5.7
document-natural-language*	naturalLanguage	y?	y?	y	MAY	MAY	§3.2.5.8
document-format-version*	text(127)	y? **	y? **	y	MAY	MAY	§3.2.6
document-message*	text(MAX)	y? **	y? **	y	MAY	MAY	§3.2.7
document-name*	name(MAX)	y? **	y? **	y	MAY	MUST	§3.2.8
document-natural-language*	naturalLanguage	y? **	y? **	y	MAY	MAY	§3.2.9
ipp-attribute-fidelity	boolean	y?	y?	-	MAY	MUST	§3.1.1,
job-mandatory-attributes	1setOf type2 keyword	y?	y?	-	MAY	MAY	§3.1.2

344

345 **3.1 Operation attributes for Job Creation operations only**

346 This section defines additional operation attributes that the client MAY supply in Job Creation operations (Print-Job,
347 Print-URI, and Create-Job) and Validate-Job, but not in Send-Document or Send-URI operations.

348 **3.1.1 ipp-attribute-fidelity (boolean) ([rfc2911] section 3.2.1 and 15)**

349 This REQUIRED Operation attribute specifies the policy for the Printer to use (see [rfc2911] §3.2.1.1) when the client
350 supplies unsupported Job Template attributes⁵ or values in a Job Creation operation. The value 'true' indicates that
351 total fidelity to client-supplied Job Template attributes and values is required for this Job Creation operation. If the
352 client supplies the value 'false' or omits the attribute, then the Printer MUST accept the Job Creation operation.

353 The Printer MUST copy this attribute to the corresponding (new) Job Description attribute (see section 5.1.2).

354 **3.1.1.1 Why there are no "ipp-attribute-fidelity-default" and "ipp-attribute-fidelity-supported" attributes**

355 Because [rfc2911] defines the default value to be 'false' there is no point to define an "ipp-attribute-fidelity-default"
356 Printer Description attribute. Because [rfc2911] REQUIRES a Printer to support the "ipp-attribute-fidelity" Operation
357 attribute there is no need for an "ipp-attribute-fidelity-supported" Printer Description attribute.

358 **3.1.2 job-mandatory-attributes (1setOf type2 keyword)**

359 This OPTIONAL Operation attribute permits the client to identify which Job Template attributes the Printer MUST
360 support in this Job Creation request in order to accept the Job. The Printer MUST reject this Job Creation operation
361 if the client supplies an unsupported Job Template attribute or value in the request that is also identified in this list.
362 The client MAY supply the "job-mandatory-attributes" Operation attribute in a Job Creation operation or Validate-Job
363 operation and MUST NOT supply this attribute in any other operation. If the Printer supports the "job-mandatory-
364 attributes" Operation attribute, the Printer MUST support this attribute in all Job Creation operations that it supports
365 and in the Validate-Job operation.

366 If the client supplies the "job-mandatory-attributes" Operation attribute and the "ipp-attribute-fidelity" Operation
367 attribute with the 'true' value, the Printer MUST ignore the "job-mandatory-attributes", since the client is requesting
368 that all of the supplied Job Template attributes in the Job Creation request MUST be supported in order for the
369 Printer to accept the Job.

370 The Printer MUST copy this attribute to the corresponding "job-mandatory-attributes" Job Description attribute (see
371 section 5.1.3) for auditing and trouble-shooting purposes⁶.

372 The values of the "job-mandatory-attributes" attribute are the keyword attribute names that identify Job Template
373 attributes; for example, 'job-hold-until', 'job-finishings' (see section 4.1.3.3), 'copies' and 'media'. In order to identify a
374 member attribute of a collection attribute, the keyword names of both the collection attribute and the member
375 attribute are given separated by a period (.) character. For example, to make the "media" attribute of the "cover-
376 front" collection attribute mandatory, supply the keyword value: 'cover-front.media'.

377 The Printer MUST accept *any* keyword values for the "job-mandatory-attributes" attribute itself whether or not the
378 corresponding Job Template attributes are supported by the Printer and MUST NOT return any unsupported
379 keywords in the Unsupported Attributes Group in the response. If the client supplies this "job-mandatory-attributes"
380 Operation attribute in a Job Creation operation with values that represent Job Template attributes that the Printer

⁵ 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.

⁶ The Printer uses the "job-mandatory-attributes" Job Description attribute for validating subsequent Document Template attributes supplied in Send-Document and Send-URI operations for this job when also supporting [ippdoc], where the client can supply Document Template attributes.

381 doesn't support, the Printer MUST otherwise accept the attribute anyway. The Printer MUST reject this Job Creation
 382 only if the client *actually supplies* any of the identified Job Template attributes that the Printer doesn't support.
 383 Because the Printer doesn't reject when the "job-mandatory-attributes" Operation attribute has unsupported attribute
 384 keyword names, the client MAY supply all of the attribute keyword names that the client supports without having to
 385 tailor the list to the particular Printer to which the client is submitting the Job Creation operation, thereby simplifying
 386 client use of this attribute.

387 Note: The "job-mandatory-attributes" has nothing to do with whether the Printer overrides the PDL with the identified
 388 Job Template attributes (see [rfc2911] sections 4.4.28 and 15).

389 **3.1.2.1 Why there are no "job-mandatory-attributes-default" and "job-mandatory-attributes-supported"** 390 **Printer Description attributes**

391 By definition, omission of the "job-mandatory-attributes" Operation attribute (and the "ipp-attribute-fidelity" Operation
 392 attribute with a 'false' value or omitted) means that the client is requesting that none of the supplied Job Template
 393 attributes need to be supported in order to accept the Job, i.e., the Printer MUST NOT reject the job because of any
 394 unsupported Job Template attributes. So the default is an empty list, so there is no point to have a "job-mandatory-
 395 attributes-default" Printer attribute.

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

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

402 **3.2 Operation attributes for both Job and Document Creation operations**

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

406 **3.2.1 compression (type2 keyword)**

407 This REQUIRED Operation attribute identifies the compression used for the Documents in this Job and is defined in
 408 [rfc2911] section . It is included in this specification, because this specification defines the corresponding
 409 "compressions-supplied" Job Description attribute (see section 5.2.1).

410 **3.2.2 document-charset (charset)**

411 This OPTIONAL Operation attribute identifies the charset of the Document Content. This Operation attribute is
 412 intended to be supported by Printers that support a document-format in which the charset may be ambiguous in the
 413 Document content, such as 'application/vnd.hp-PCL', where the charset escape sequence MAY be omitted from the
 414 data.

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

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

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

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

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

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

445 **3.2.3 document-digital-signature (type2 keyword)**

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

447 If a client supplies this "document-digital-signature" Operation attribute in a Document Creation operation with a
448 value that the Printer doesn't support, the Printer MUST perform one of the following actions depending on
449 implementation: (1) reject the request OR (2) accept the request, set the Job's "job-state-reasons" attribute to
450 'digital-signature-type-not-supported' (see section 6.1), and either (a) put the Job in the 'pending-held' state or (b)
451 process the job ignoring the attribute. See section 3 above for more details.

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

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

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

471 The following standard keyword values are defined:

472 'dss': Digital Signature Standard (DSS) [dss].

473 'none': There is not a digital signature in the Document content. If this attribute is supported, the 'none'
 474 value MUST be implemented but MAY be removed by the administrator.

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

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

477 'xmldsig' XML Digital Signature [xmldsig].

478 3.2.4 document-format (mimeMediaType)

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

483 The standard values for this attribute are Internet Media types (sometimes called MIME types). For some MIME
 484 types, such as 'text/plain' [rfc2046], the "; charset=" parameter is defined which specifies the charset of the Document
 485 content. The Printer MUST support the charset MIME parameter as well as the "document-charset" Operation
 486 attribute (section 3.2.2) if the Printer supports any text MIME type, such as 'text/plain' or 'text/html'. For further
 487 details see the description of the 'mimeMediaType' attribute syntax in [rfc2911] section 4.1.9 and [rfc2046] and the
 488 "document-charset" Operation attribute (section 3.2.2).

489 Many printer languages in the Printer MIB do not have a MIME type registered with IANA.⁷ It is the intent of the PWG
 490 to registers all of the Printer MIB v2 XXX Printer Languages as 'application/vnd.PWG-XXX'. If a Printer Language
 491 already has a registered MIME Media type or gets a registration in the future, then that MIME Type MUST be used in
 492 preference to the 'application/vnd.PWG-XXX' MIME Type. For example, PostScript[®] has the MIME Media type:
 493 'application/postscript' and PCL has the MIME Media Type: 'application/vnd.HP-PCL', so those MIME Media types
 494 MUST be used instead of 'application/vnd.PWG-PS' and 'application/vnd.PWG-PCL'. For example, the NEC NPDL
 495 printer language from the Printer MIB does not have a MIME type registered with IANA. Therefore, the "document-
 496 format" = 'application/vnd.PWG-NPDL' MUST be used.

497 See also the "document-format-version" Operation attribute in section 3.2.6 and the "document-format-details"
 498 Operation attribute in section 3.2.5.

499 3.2.5 document-format-details (1setOf collection)

500 This OPTIONAL Operation attribute supplied in Document Creation operations summarizes the details of the
 501 Document content, including any files contained in the Document. This Operation attribute is intended to be
 502 supported by Printers that support a packaging document format, such as 'application/zip' or 'multipart/related', in
 503 order to detail the contents. However, this Operation attribute MAY be used with any document format. See Table 6
 504 for a list of the member attributes along with the client and Printer conformance requirements.

⁷ 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'.

505 All member attributes, if supplied, MUST have contents. The value MUST NOT be omitted.

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

511 If a client supplies the "document-format-details" Operation attribute in a Document Creation request with member
 512 attributes and/or values that the Printer doesn't support, the Printer MUST perform one of the following actions
 513 depending on implementation: (1) reject the request OR (2) accept the request and either (a) put the Job in the
 514 'pending-held' state or (b) process the job ignoring the attribute. See section 3 above for more details. However, if
 515 the "document-charset" or the "document-format" member attributes are the ones in question, the Printer MUST
 516 reject the request, same as for the "document-charset" and "document-format" Operation attributes (see sections
 517 3.2.2 and 3.2.4) and return the 'client-error-charset-not-supported' (see [rfc2911] section 13.1.4.16) or the 'client-
 518 error-document-format-not-supported' (see [rfc2911] section 13.1.4.11) status-codes, respectively.

519 For a packaging format, the "document-format-details" attribute does not provide means to associate each collection
 520 value with particular document in the archive file, so it does not provide a "manifest"⁸ of the packaging. One of the
 521 packaging collection values MAY describe the packaging format itself, in which case that collection value MUST be
 522 the first collection value. The remaining collection values provide the summary of the details of the contained files in
 523 any order.

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

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

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

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

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

Member Attribute Name	Attribute Syntax	Client supplies	Printer Support	Member Attribute Section	Top Level Attribute Section
document-source-application-name	name(MAX)	MAY	MAY	3.2.5.1	N/A
document-source-application-version	text(127)	MAY	MAY	3.2.5.2	N/A
document-source-os-name	name(40)	MAY	MAY	3.2.5.3	N/A
document-source-os-version	text(40)	MAY	MAY	3.2.5.4	N/A
document-format	mimeMediaType	MUST	MUST	3.2.5.5	3.2.4
document-format-device-id	text(127)	MAY	MAY	3.2.5.6	N/A

⁸ If the client wants to achieve a "manifest", that is a complete list of each file in a packaging, then the client needs to extract each file from the package and submit each one in a separate Document Creation operation. Note: the client can re-compress each file before sending, so the compression isn't lost when sending each document separately.

document-format-version	text(127)	SHOULD	MUST	3.2.5.7	3.2.6
document-natural-languages	1setOf naturalLanguage	MAY	MAY	3.2.5.8	3.2.9

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538

The client can determine which member attributes of the “document-format-details” are supported by querying the Printer’s “document-format-details-supported” (1setOf type2 keyword) Printer Description attribute (see section 7.6).

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Table 6 shows that three of the member attributes also have comparable top level Operation attributes defined with the same names. See the sections listed in the rightmost column. These three high level attributes have corresponding “xxx-default” and “xxx-supported” Printer Description attributes. These values are also for use with the corresponding three member attributes. The remaining member attributes do not have any corresponding “xxx-default” and “xxx-supported” Printer Description attribute.

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If a client supplies this “document-format-details” Operation attribute with a member attribute with a value that the Printer doesn’t support, the Printer MUST perform one of the following actions: (1) reject the request OR (2) accept the request and either (a) put the Job in the ‘pending-held’ state or (b) process the job ignoring the attribute. See section 3 above for more details.

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3.2.5.1 document-source-application-name (name(MAX))

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This OPTIONAL member Operation attribute identifies the application that generated the document. The value MUST be all lowercase in order to facilitate matching. The version number MUST NOT be included (see the “document-source-application-version” attribute). Examples: “photoshop”, “microsoft word”, “unknown”.

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3.2.5.2 document-source-application-version (text(127))

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557

This OPTIONAL member Operation attribute identifies the version number of the application that created the document. The value MUST be all lowercase in order to facilitate matching. The intent of this attribute is for purposes of affecting the interpreting by the Printer for any formats for which the source application version might have different semantics. Examples:

558

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

559

560

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

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3.2.5.3 document-source-os-name (name(40))

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This OPTIONAL member Operation attribute identifies the name of the operating system on which the document was generated. Valid values are the operating system names defined in the IANA Operating System name registry [os-names] with the version number portion removed (see the “document-source-os-version” attribute). IANA Operating System Names consist of up to 40 *uppercase* US-ASCII letters, hyphen (“-“), period (“.”), and slash (“/”) characters. The value MUST be all lowercase in order to facilitate matching.

567

Possible example IANA OS Registry values: ‘linux’, ‘macos’, ‘sun-os’, ‘unix’, “unknown”, ‘windows’.

568

ACTION ITEM: Get Sun to register SOLARIS with IANA.(Tom H)

569

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

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571

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This OPTIONAL member Operation attribute identifies the version of the operating system on which the document was generated. Valid values include the version portion of any of the operating system names defined in the IANA Registry [os-names]. The value MUST be all lowercase in order to facilitate matching.

573 The value MUST NOT include the name portion of the registered OS name (see “document-source-os-
574 name” attribute).

575 Possible example values for the indicated “document-source-os-name” value are:
576 for ‘linux’: ‘1.0’, ‘1.2’, ‘2.0’, ‘2.2’, ‘2.4’
577 for ‘unix’: ‘bsd’, ‘v’, ‘v.1’, ‘v.2’, ‘v.3’, ‘pc’
578 for ‘windows’: ‘95’, ‘98’, ‘ce’, ‘nt’, ‘nt-2’, ‘nt-3’, ‘nt-3.5’, ‘nt-3.51’, ‘nt-4’, ‘nt-5’ (windows 2000),
579 ACTION ITEM: Get Microsoft to register NT-5.1 (maybe NT-5.2) with IANA.(Ira M)

580

581 **3.2.5.5 document-format (mimeMediaType)**

582 This REQUIRED member Operation attribute identifies the document format (see [rfc2911] §3.2.1.1) of the
583 collection value of which it is a member. The client MUST supply and the Printer MUST support this member
584 attribute in each collection value. The values for this member attribute are Internet Media types (sometimes
585 called MIME types) and have the same values and semantics as for the top level “document-format”
586 Operation attribute with the same name (see section 3.2.4 for the semantics).

587 **3.2.5.6 document-format-device-id (text(127))**

588 This OPTIONAL member Operation attribute identifies the type of device for which the document was
589 formatted, including manufacturer and model. This attribute is intended to identify document formats that are
590 not portable, e.g., PDLs that are device dependent. The value of this variable MUST exactly match the IEEE
591 1284-2000 Device ID string (see [IEEE1284] clause 6), except the length field MUST NOT be specified. See
592 the Microsoft Universal Plug and Play [upnp] section 2.2.6 DeviceId parameter for details and examples.
593 Here is an example showing only the required fields for a PostScript document:
594 MANUFACTURER:ACME Co.;COMMAND SET:PS;MODEL:LaserBeam 9;

595 **3.2.5.7 document-format-version (text(127))**

596 This REQUIRED member Operation attribute identifies the level or version of the document format identified
597 by the “document-format” member attribute. The client MAY supply and the Printer MUST support this
598 member attribute if the Printer supports the “document-format-details” Operation attribute. The semantics
599 and supported values of this “document-format-version” member attribute MUST be the same as for the top
600 level “document-format-version” Operation attribute with the same name (see section 3.2.6 for the
601 semantics).

602 **3.2.5.8 document-natural-language (1setOf naturalLanguage)**

603 This OPTIONAL member Operation attribute specifies the natural language(s) of the collection value of
604 which it is a member. The values for this attribute are natural language codes (with optional country codes)
605 and have the same values and semantics as for the top level “document-natural-language”
606 (naturalLanguage) operation attribute with the same name (see section 3.2.9 for the semantics). If the
607 document contains multiple natural languages, then the first value MUST be the primary language of the
608 document.

609 **3.2.6 document-format-version (text(127))**

610 This OPTIONAL Operation attribute identifies the level or version of the document format of the Document content
611 identified by the “document-format” Operation attribute (section 3.2.4).

612 If the client supplies this “document-format-version” Operation attribute, the client MUST also supply the “document-
613 format” Operation attribute (section 3.2.4), so that the Printer does not need to parse the “document-format-version”
614 string in order to determine the document format and version.

615 If a client supplies this "document-format-version" Operation attribute with a value that the Printer doesn't support as
 616 indicated by the Printer's "document-format-version-supported" attribute (see section 7.8), the Printer MUST perform
 617 one of the following actions, depending on implementation: (1) reject the request OR (2) accept the request and
 618 either (a) put the Job in the 'pending-held' state or (b) process the job ignoring the attribute. See section 3 above for
 619 more details.

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

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

630 Example values:

631 'PS/3': For Postscript level 3 [rfc1759].
 632 'PCL/5e': For PCL 5e [rfc1759].
 633 'PDF/1.4': For PDF version 1.4 [pdf]
 634 'PDF/X-1a:2001': For PDF/X-1a [iso15930]
 635 'DCS/2.0' For Document Color Separation (DCS), version 2.0. [dcs2.0]
 636 'TIFF-IT/FP:1998': TIFF/IT [iso12639] - Full Page - baseline.
 637 'TIFF-IT/CT:1998': TIFF/IT [iso12639] - Continuous Tone picture data - baseline
 638 'TIFF-IT/FP/P1:1998': TIFF/IT [iso12639] - Full Page - profile 1
 639 'TIFF-IT/CT/P1:1998': TIFF/IT [iso12639] - Continuous Tone picture data - profile 1
 640 'Automatic': auto sense the format [rfc1759]. Is use in combination with the 'application/octet-stream' (see
 641 [rfc2911] section 4.1.9.1) value of the "document-format" attribute (section 3.2.4).
 642

643 3.2.6.1 Why no "document-format-version-default"

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

647 3.2.7 document-message (text(MAX))

648 This OPTIONAL Operation attribute contains a message from the user to the operator about the Document.

649 3.2.8 document-name (name(MAX))

650 The Printer MUST support this Operation attribute in Print-Job, Print-URI, Send-Document, and Send-URI operations
 651 (see [rfc2911] section 3.2.1.1) and MAY support it in the Create-Job operation. For the Print-Job, Print-URI, and
 652 Create-Job operations, the Printer MUST copy the value to the corresponding Job Description attribute⁹.

⁹ For the Send-Document and the Send-URI Operation attribute, the Printer copies them to the corresponding Document Description attribute defined in [ippdoc].

653 **3.2.9 document-natural-language (naturalLanguage)**

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

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

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

- 663 'en': for English
- 664 'en-us': for US English
- 665 'fr': for French
- 666 'de': for German
- 667

668 **4 Job Template attributes**

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

672 Job Template attributes are OPTIONAL for a Printer to support and for a client to supply in a Job Creation request. If
673 a Printer supports a Job Template attribute, then the Printer MUST copy the supplied attribute to the Job object, so
674 that a client MAY query the attributes in subsequent Get-Job-Attributes/Get-Jobs operations (see [rfc2911] section
675 4.2). In addition, as in [rfc2911], for each "xxx" Job Template attribute supported, the Printer MUST support the
676 corresponding "xxx-default" and "xxx-supported" Printer attributes, if defined.

677 **Table 7 - Job Template attributes**

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

Job Template attribute name "xxx"	Attribute Syntax	Printer: Default Value attribute syntax "xxx-default"	Printer: Supported Values attribute syntax "xxx-supported"
job-cover-back	collection	collection	1setOf type2 keyword
cover-type	type2 keyword	-	1setOf type2 keyword
media	type3 keyword name(MAX)	-	1setOf (type3 keyword name(MAX))
media-col	collection	-	1setOf type2 keyword
<i>member attributes [pwg5100.3]</i>	See [pwg5100.3]	-	-
job-cover-front	collection	collection	1setOf type2 keyword
<i>member attributes - same as job-cover-back</i>	see job-cover-back		
job-finishings	1setOf type2 enum	1setOf type2 enum ¹⁰	1setOf type2 enum
job-finishings-col	collection	collection ¹⁰	1setOf type2 keyword
finishing-template	name(MAX)	-	1setOf name(MAX)
stitching	collection		1setOf type2 keyword
stitching-reference-edge	type2 keyword	-	1setOf type2 keyword
stitching-offset	integer (0:MAX)	-	1setOf (integer(0:MAX) rangeOfInteger(0:MAX))
stitching-locations	1setOf integer(0:MAX)	-	1setOf (integer(0:MAX) rangeOfInteger(0:MAX))
output-device	name(127)	-	1setOf name(127)
print-content-optimize	type2 keyword	type2 keyword	1setOf type2 keyword

678 4.1 Job Template attributes defined for Job-wide effect in multi-document jobs

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

686 4.1.1 job-copies (integer(1:MAX))

687 This OPTIONAL Job Template attribute specifies the number of job copies, i.e., with all of the Documents taken
688 together. Its interpretation is independent of the value of the "multiple-document-handling" Job Template attribute.
689 See the "copies" Job Template attribute defined in [rfc2911] section 4.2.5 that switches between job copies and
690 document copies depending on the value of the "multiple-document-handling" Job Template attribute ([rfc2911]
691 section 4.2.4).

692 For example assume a Job has two documents. The "copies" attribute has a value of '3' and "job-copies" has a
693 value of '2'. With "multiple-document-handling" set to 'separate-documents-collated-copies' the resulting printout
694 would have two sets (i.e. job-copies=2). The first set would be 3 copies of Document 1 and then 3 copies of
695 Document 2. The second set would be identical to the first. If a similar Job was run with "multiple-documents-
696 handling" set to 'single-document-new-sheet' it would also produce two set. In this case however each set would
697 contain Document 1, Document 2, Document 1, Document 2, Document 1, Document 2 (i.e copies=3). The "copies"
698 and "job-copies" become more interesting when Documents within the Job each have their own value of "copies".
699 This can be accomplished via the Document object [ippdoc] or Overrides [PWG5100.4], [ippOverride].

¹⁰ The "job-finishings" and "job-finishings-col" Job Template attributes also include corresponding "job-finishings-ready" (1setOf type 2 enum) and "job-finishings-col-ready" (1setOf collection) attributes.

700 4.1.1.1 job-copies-default (integer(1:MAX))

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

703 4.1.1.2 job-copies-supported (rangeOfInteger(1:MAX))

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

706 4.1.1.3 job-copies-actual (1setof Integer(1:MAX))

707 This OPTIONAL Job Description attribute specifies the number of copies that the Printer actually printed for the job
708 as a whole. The Printer MAY support this attribute even if it does not support the "job-copies" Job Template attribute.

709 4.1.2 job-cover-back (collection)

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

717 4.1.2.1 job-cover-back-default (collection)

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

720 4.1.2.2 job-cover-back-supported (1setOf type2 keyword)

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

724 4.1.2.3 job-cover-back-actual (1setOf collection)

725 This OPTIONAL Job Description attribute specifies the "job-cover-back" that the Printer actually used in producing
726 the job. The Printer MAY support this attribute even if it does not support the "job-cover-back" Job Template
727 attribute.

728 4.1.3 job-cover-front (collection)

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

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

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

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

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

743 4.1.3.3 job-cover-front-actual (1setOf collection)

744 This OPTIONAL Job Description attribute specifies the "job-cover-front" that the Printer actually used in producing
745 the job. The Printer MAY support this attribute even if it does not support the "job-cover-front" Job Template
746 attribute.

747 4.1.4 job-finishings (1setOf type2 enum)

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

754 4.1.4.1 job-finishings-default (1setOf type2 enum)

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

757 4.1.4.2 job-finishings-ready (1setOf type2 enum)

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

761 4.1.4.3 job-finishings-supported (1setOf type2 enum)

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

764 4.1.4.4 job-finishings-actual (1setOf type2 enum)

765 This OPTIONAL Job Description attribute specifies the "job-finishings" that the Printer actually used in producing the
766 job. The Printer MAY support this attribute even if it does not support the "job-finishings" Job Template attribute.

767 4.1.5 job-finishings-col (1setOf collection)

768 This OPTIONAL Job Template attribute specifies the job finishings collection, i.e., with all of the Documents taken
769 together. Its interpretation is independent of the value of the "multiple-document-handling" Job Template attribute.
770 See the "finishings-col" Job Template attribute defined in [pwg5100.3] section 3.2 that switches between job
771 finishings collection and document finishings collection depending on the value of the "multiple-document-handling"

772 Job Template attribute ([rfc2911] section 4.2.4). The "job-finishings-col" Job Template attribute is equivalent to
773 "finishings-col" with "multiple-document-handling" = 'single-document-new-sheet'.

774 4.1.5.1 job-finishings-col-default (collection)

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

777 4.1.5.2 job-finishings-col-ready (collection)

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

781 4.1.5.3 job-finishings-col-supported (1setOf type2 keyword)

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

785 4.1.5.4 job-finishings-col-actual (1setOf collection)

786 This OPTIONAL Job Description attribute specifies the "job-finishings-col" attributes that the Printer actually used in
787 producing the job. The Printer MAY support this attribute even if it does not support the "job-finishings-col" Job
788 Template attribute.

789 4.2 Job Template attributes that may have Document Scope and Override Scope

790 This section defines additional Job Template attributes that are *not* restricted to job-wide scope and MAY be supplied
791 in Document Creation operations and in the "override" attribute to override at the Sheet level (see section 9). When
792 supplied in a Document Creation operation, these Job Template attributes describes the Document explicitly. This
793 specification does *not* define corresponding Document Description attributes, since this specification does not include
794 or depend on a Document object¹¹.

795 4.2.1 output-device (name(127))

796 This OPTIONAL Job Template attribute specifies the name of the target output device for a Printer that fans-out to
797 multiple devices (see [rfc2911] section 2.1). This allows the client to control which output device the Printer selects.
798 If this Job Template attribute is omitted, the Printer selects whichever output device seems best for the job in an
799 implementation dependent manner. Note that "output-device" can be applied at the Job, Document, Document-Copy
800 or Page level.

801 4.2.1.1 Why there is no output-device-default

802 There is no "output-device-default" Printer attribute. A Printer MAY have a dynamic scheduling algorithm to assign
803 jobs to output devices, in which case the "output-device-supported" Printer attribute would have multiple values. A
804 client that did not supply an explicit "output-device" is asking the Printer to choose the most appropriate output
805 device(s) (i.e. physical printer(s)) to print the Job. If "output-device-default" was allowed there would be no way to
806 request this since the default output device would be assigned when it was not supplied by the client. If the Printer

¹¹ For Document Description attributes that correspond to the Operation attributes defined for Document Creation operations, see the Document object defined in [ippdoc].

807 does not have a dynamic scheduling algorithm to assign Jobs to output devices, the Printer would populate "output-
808 device-supported" with only one value.

809 **4.2.1.2 output-device-supported (1setOf name(127))**

810 This OPTIONAL Job Template Printer attribute specifies the supported "output-device" values. The Printer MUST
811 support this attribute if it supports the "output-device" Job Template attribute.

812 **4.2.1.3 output-device-actual (1setOf name(127))**

813 This OPTIONAL Job Description attribute specifies the output-device(s) that the Printer actually used to produce the
814 job [ippact]. The Printer MAY support this Job Description attribute even if it does not support the "output-device "
815 Job Template attribute. The "output-device-actual" attribute MAY have more than one value, while the [rfc2911]
816 "output-device-assigned" Job Description attribute has only a single name(127) value.

817 For example printers that automatically splits Jobs between OutputDevices can indicate the location of the pages of
818 the Job via this element This can occur if the Printer automatically routes Pages to the appropriate output device or
819 "output-device" is included in an "override" or applied to individual Documents within the Job.

820 **4.2.2 print-content-optimize (type2 keyword)**

821 This OPTIONAL Job Template attribute refines the value specified by the "print-quality" ([rfc2911] §4.2.13) attribute.
822 The "print-quality" attribute specifies the level of quality. The "print-content-optimize" attribute directs the type of
823 optimization/processing that will be performed on the Document content. It does not necessarily mean the value
824 describes the content.

825 The standard keyword values are:

- 826 ? 'photo': optimize for photographic clarity
- 827 ? 'graphics': optimize for graphic clarity such as graphs and line drawings
- 828 ? 'text': optimize for text clarity
- 829 ? 'text-and-graphics': optimize for both text and graphic clarity

830 **4.2.2.1 print-content-optimize-default (type2 keyword)**

831 This OPTIONAL Job Template Printer attribute specifies the default "print-content-optimize" value. The Printer
832 MUST support this attribute if it supports the "output-device" Job Template attribute.

833 **4.2.2.2 print-content-optimize-supported(1setOf type2 keyword)**

834 This OPTIONAL Job Template Printer attribute specifies the supported "print-content-optimize" values. The Printer
835 MUST support this attribute if it supports the "output-device" Job Template attribute.

836 **4.2.2.3 print-content-optimize-actual (1setOf type2 keyword)**

837 This OPTIONAL Job Description attribute specifies the "print-content-optimize "(s) that the Printer actually used to
838 produce the job [ippact]. The Printer MAY support this Job Description attribute even if it does not support the " print-
839 content-optimize " Job Template attribute. Note: The "print-content-optimize -actual" attribute MAY have more than
840 one value, while the "print-content-optimize" Job Description attribute has only a single value.

841

842 **5 Job Description attributes**

843 This section defines the new Job Description attributes defined in this IPP specification. Job Description attributes
 844 are Job object attributes that are filled in by the Printer. Some Job Description attribute values are supplied by the
 845 client in the Job operation using corresponding Operation attributes as indicated in the "Set by" column. The Printer
 846 MUST NOT support modification of any of these Job Description attributes using the Set-Job-Attributes operation
 847 ([rfc3380]).

848 This section divides Job Descriptions into two subsections: Section 5.1 contains Job Description attributes that
 849 describe the Job as a whole and Section 5.2 contains Job Description attributes that are defaults for the Document(s)
 850 in the Job¹². The following legend is used in the tables in both sections:

Legend:	
IPP Attribute Syntax	the attribute syntax (see [rfc2911] section 4.1).
Set by	indicates whether the value is set by the client or Printer in the Job Creation operation: client - means that the Printer MUST populate this Job Description attribute by copying <i>from</i> the corresponding Operation attribute that the client MAY supply in the Job Creation operation. See Table 5 for the corresponding Operation attribute. Printer - means that the Printer sets the value based on the state of the Printer.
Printer conformance	indicates MUST or MAY for Printer conformance.
Reference	references either to a sub-section of this specification or to a section in another specification, where further information about this attributes can be found.

851

852 **5.1 Job Description attributes that describe the Job as a whole**

853 This section defines those Job Description attributes that describe the Job as a whole. See section 5.2 below for
 854 those Job Description attributes that are defaults for the Document or Documents in the Job.

855 **Table 8 - Job Description attributes that describe the Job as a whole**

Job Description attribute name	IPP Attribute Syntax	Set by	Printer conformance	Reference
errors-count	integer(0:MAX)	Printer	MAY	§5.1.1
ipp-attribute-fidelity	boolean	client	MAY	§5.1.2
job-mandatory-attributes	1setOf type2 keyword	client	MAY	§5.1.3
output-device-assigned	name(127)	Printer	MAY	[rfc2911] §4.3.7.2
warnings-count	integer(0:MAX)	Printer	MAY	§5.1.4

856 Most of the existing "job-state" and "job-state-reasons" Job Description attribute values apply equally well to
 857 individual documents in a multi-document job (with removal of the 'job-' prefix for those that apply to both Job and
 858 Document). Furthermore, the job states are completely service-type neutral, so they can apply to scanning, faxing,
 859 and formatting processes as well. The job state reasons have a number of reasons that are print service specific, but
 860 most can apply to other types of service as well. The reason for separating state from reasons is so that the states
 861 can be the fundamental states that most implementations have, while the state reasons can vary depending on the
 862 sophistication of the system. The states are the ones that clients are most likely to base actions upon, and the state
 863 reasons are more information, both for programs and people.
 864

¹² The [jobx] specification does not define any Document Description attributes. See the [ippdoc] specification.

865 **5.1.1 errors-count (integer(0:MAX))**

866 This OPTIONAL Job Description attribute counts the number of errors encountered processing the job as a whole.
 867 An error where some portion of the printed output is not present, such as a glyph encountered which isn't in the
 868 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
 869 overall document format.

870 **5.1.2 ipp-attribute-fidelity (boolean)**

871 This OPTIONAL Job Description attribute indicates the value of the corresponding "ipp-attribute-fidelity" Operation
 872 attribute ([rfc2911] section 3.2.1.1)¹³ that the client supplied in the Job Creation operation. This Job Description
 873 attribute has no effect on the processing of the job once the Job Creation operation has been accepted¹⁴. However,
 874 this attribute does provide an audit capability to the user and service desk for comparing unexpected printed results
 875 with what was submitted.

876 **5.1.3 job-mandatory-attributes (1setOf type2 keyword)**

877 This OPTIONAL Job Description attribute indicates which Job Template attributes that the client required that the
 878 Printer Support in order to accept the Job Creation request. The Printer populates this attribute with the value of the
 879 corresponding "job-mandatory-attributes" Operation attribute (see section 3.1.2) supplied by the client in the Job
 880 Creation operation. This Job Description attribute has no effect on the processing of the job once the Job Creation
 881 operation has been accepted¹⁴. However, this Job Description attribute does provide an audit capability of the Job
 882 object in the Job History (see [rfc2911] section 4.3.7.2) to the user and service desk for comparing unexpected
 883 printed results with what was submitted. See section 3.1.2 for additional details of the semantics of this "job-
 884 mandatory-attributes" Operation attribute that are not repeated here.

885 **5.1.4 warnings-count (integer(0:MAX))**

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

888 **5.2 Job Description attributes that are defaults for the Document(s) in the Job**

889 This section defines those Job Description attributes that provide defaults for the Document Or Documents in the
 890 Job. See section 5.1 above for those Job Description attributes that describe the Job as a whole.

891 **5.2.1 compression-supplied (type3 keyword)**

892 This REQUIRED Job Description attribute specifies the *default* compression used to represent the document(s) in
 893 the Job. The Printer sets this Job Description attribute from the corresponding Operation attribute (see [rfc2911]
 894 §3.2.1.1) supplied by the client in the Job Creation operation.

895 **5.2.2 document-charset-supplied (charset)**

896 This OPTIONAL Job Description attribute specifies the *default* charset used to represent this document (see section
 897 3.2.2). The Printer sets this Job Description attribute from the corresponding Operation attribute supplied by the
 898 client in the Job Creation operation.

¹³ 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.

¹⁴ 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].

899 **5.2.3 document-digital-signature-supplied (type2 keyword)**

900 This OPTIONAL Job attribute specifies the *default* digital signature technology used in the Document content. The
901 Printer sets this Job Description attribute from the corresponding “document-digital-signature” Operation attribute
902 (see section 3.2.3 for the semantics), if supplied by the client in the Job Creation operation. If a Printer supports the
903 “document-digital-signature” Operation attribute, the Printer MUST support this “document-digital-signature” Job
904 Description attribute.

905 **5.2.4 document-format-details-supplied (1setOf collection)**

906 This OPTIONAL Job Description attribute specifies the *default* details of the document format(s) of the Document
907 Object content. The Printer sets this Job Description attribute from the corresponding “document-format-details”
908 Operation attribute (see section 3.2.5 for the semantics), if supplied by the client in the Job Creation operation. If a
909 Printer supports the “document-format-details” Operation attribute, the Printer MUST support this “document-format-
910 details” Job Description attribute.

911 **5.2.5 document-format-supplied (mimeMediaType)**

912 This REQUIRED¹⁵ Job Description attribute specified the *default* document format of the Document Object content.
913 The Printer sets this Job Description attribute from the corresponding “document-format” Operation attribute (see
914 [rfc2911] section 3.2.1.1 and [this spec] section 3.2.4 for the semantics), if supplied by the client in the Job Creation
915 operation.

916 **5.2.6 document-format-version-supplied (text(127))**

917 This OPTIONAL Job Description attribute specifies the *default* version of the document format of the Document
918 Object content. The Printer sets this Job Description attribute from the corresponding “document-format-version”
919 Operation attribute (see section 3.2.6 for the semantics), if supplied by the client in the Job Creation operation (see
920 section). If a Printer supports the “document-format-version” Operation attribute, the Printer MUST support this
921 “document-format-version” Job Description attribute.

922 **5.2.7 document-message-supplied (text(MAX))**

923 This OPTIONAL Job Description contains either (1) the *default* message from the user to the operator about the
924 Document(s) or (2) a message from the operator, system administrator, or “intelligent” process to indicate to the end
925 user the reasons for modification or other management action taken on the Document. The Printer populates this
926 Job Description attribute from the “document-message” (text(MAX)) Operation attribute value (see section 3.2.7)
927 supplied by the client in the Job Creation operation.

928 In addition, the user and the operator can set the value of this Job Description attribute explicitly using the Set-Job-
929 Attributes operation (see [rfc3380]).

930 **5.2.8 document-name-supplied (name (MAX))**

931 This REQUIRED Job Description attribute specifies the *default* name of the document (see [rfc2911] §3.2.1.1). The
932 Printer sets this Job Description attribute from the corresponding Operation attribute (see section 3.2.8) supplied by
933 the client in the Job Creation operation.

¹⁵ [rfc2911] did not define a “document-format” Document Description attribute; it is a new attribute defined in this specification.

934 5.2.9 document-natural-language-supplied (naturalLanguage)

935 This OPTIONAL Job Description attribute specifies the *default* primary natural language of the Document content
 936 (see [rfc2911] section 3.2.1.1). The Printer sets this Job Description attribute from the corresponding Operation
 937 attribute (see section 3.2.9) supplied by the client in the Job Creation operation.

938 6 New values to existing attributes

939 This section defines new values for existing attributes.

940 6.1 New job-state-reasons(1setOf type2 keyword) Values

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

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

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

951 Table 9 lists the new keyword values for the "job-state-reasons" attribute defined in this specification as indicated in
 952 the References column. In Table 9 the keywords are listed in alphabetic order, while in their descriptions following
 953 Table 9, they are listed in the most likely order of occurrence to help understanding.

954 **Table 9 - New "job-state-reasons" attribute values**

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

955 For ease of understanding, the following value descriptions are presented in the order in which the reasons are likely
 956 to occur (if implemented):
 957

958 **'digital-signature-type-not-supported'**: One or more documents in the Job contain a digital signature type
 959 that is not supported. Implementation or site policy determines the state of the Job once this
 960 condition is detected.

961 **'job-digital-signature-wait'**: The Job is currently being held because the Job was submitted with a
 962 "document-digital-signature" attribute value that is not supported.

963 **'digital-signature-did-not-verify'**: One or more documents in the Job contains a digital signature type that is
 964 supported (see section 3.2.3), but the signature did not verify when the Printer attempted to verify the
 965 signature.

966 **'errors-detected'** : If the Printer supports this value, the Printer MUST add this value to “job-state-reasons”
 967 when the Printer generates the first error message. That is, a single occurrence of this value is
 968 present in the “job-state-reasons” Job Description attribute if the Printer has generated one or more
 969 errors. An error indicates loss of information, such as a page not imaged. See also the ‘warnings-
 970 detected’ value.

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

976 **6.2 New media (type 3 keyword | name(MAX)) Values**

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

978 **'choice_iso_a4_210x297mm_na_letter_8.5x11in'**: The client has explicitly allowed a choice of media for
 979 the Job. The Printer MUST choose physical media of size na_letter_8.5x11in (215.9 x 279.4 mm) or
 980 iso_a4_210x297mm. The Printer MUST NOT choose physical media of any other size. The Printer
 981 MAY scale the image to fit, but any scaling MUST be isomorphic scaling and without image content
 982 loss, or overflow to additional sheets (so-called tiling), or truncate (and MUST notify the sending user
 983 and receiving user by implementation means if truncation is performed, since that is loss of
 984 information).

985 **Rationale:** If printing by reference, the size of the document isn't known by the submitter.

986 See Annex A (section 18) for additional requirements for a revision of the PWG IEEE/ISTO 5101.1 Candidate
 987 Standard [pwg5101.1] to include the new **'choice_iso_a4_210x297mm_na_letter_8.5x11in'** and other choice
 988 values.

989 **7 New Printer Description attributes**

990 This section lists *the new* Printer Description attributes defined in this document. These Printer attributes are “xxx-
 991 supported” and “xxx-default” Printer attributes which indicate the default and supported values that the Printer
 992 supports.. The Printer MUST support these Printers attributes if the Printer supports the corresponding “xxx”
 993 Operation attributes (see section 3) that the client can supply in a Job Creation or Document Creation request.

994 The column labels are:
 995

Column Heading	
“Attribute Syntax”	the attribute syntax (see [rfc2911] section 4.1). Many “xxx-default” and “xxx-supported” attributes have the ‘collection’ syntax which consists of a number of member attributes. These member attributes are not listed in this table when they are the same as the corresponding “xxx” attribute in Table 7. Only those few Printer attribute collection attributes that do not have a corresponding Job Template attributes show the member attributes in this table.
“Reference”	the section which defines the semantics of the attribute.

996

Table 10 - New Printer Description attributes

Printer Description attribute name	Attribute Syntax	Reference
document-charset-default	charset	[this-spec] §7.1
document-charset-supported	1setOf charset	[this-spec] §7.2
document-digital-signature-default	type2 keyword	[this-spec] §7.3
document-digital-signature-supported	1setOf type2 keyword	[this-spec] §7.4
document-format-details-default	collection	[this-spec] §7.5
document-format-details-supported	1setOf type2 keyword	[this-spec] §7.6
document-format-version-default	text(127)	[this-spec] §7.7
document-format-version-supported	1setOf text(127)	[this-spec] §7.8
document-natural-language-default	naturalLanguage	[this-spec] §7.9
document-natural-language-supported	1setOf naturalLanguage	[this-spec] §7.10

998

999 **7.1 document-charset-default (charset)**

1000 This OPTIONAL Printer Description attribute indicates the default charset that the Printer will assume for charset-
 1001 ambiguous document formats when the client omits the “document-charset” Operation attribute (section 3.2.2). The
 1002 Printer MUST support this attribute if it supports the corresponding “document-charset” Operation attribute (see
 1003 section 3.2.2)

1004 **7.2 document-charset-supported (1setOf charset)**

1005 This OPTIONAL Printer Description attribute indicates the charsets that the Printer supports in Document Content,
 1006 that is, supports as values of the “document-charset” Operation attribute (section 3.2.2). The Printer MUST support
 1007 this attribute if it supports the corresponding “document-charset” Operation attribute (see section 3.2.2).

1008 **7.3 document-digital-signature-default (type2 keyword)**

1009 This OPTIONAL Printer Description attribute indicates the default digital signature, if any, that the Printer will assume
 1010 when the client omits the “document-digital-signature” Operation attribute (section 3.2.3). The Printer MUST support
 1011 this attribute if it supports the “document-digital-signature” Operation attribute.

1012 **7.4 document-digital-signature-supported (1setOf type2 keyword)**

1013 This OPTIONAL Printer Description attribute indicates the digital signature technologies that the Printer supports in
 1014 Document Contents, that is, supports as values of the “document-digital-signature” Operation attribute (section
 1015 3.2.3). The Printer MUST support this attribute if it supports the “document-digital-signature” Operation attribute.

1016 **7.5 document-format-details-default (collection)**

1017 This OPTIONAL Printer Description attribute indicates the default document format details that the Printer will
 1018 assume when the client omits the “document-format-details” Operation attribute (section §3.2.5). The member
 1019 attributes are the same as “document-format-details” (see section 3.2.5). The Printer MUST support this attribute, if it
 1020 supports the “document-format-details” Operation attribute (see section 3.2.5).

1021 **7.6 document-format-details-supported (1setOf type2 keyword)**

1022 This OPTIONAL Printer Description attribute lists the type2 keyword names of the member attributes of “document-
 1023 format-details” that the Printer supports. The Printer MUST support this “document-format-details” (1setOf type2
 1024 keyword) Printer Description attribute, if the Printer supports the “document-format-details” (1setOf collection)
 1025 Operation attribute (see section 3.2.5). Table 11 lists the type2 keywords defined for use in the “document-format-
 1026 details-supported” Printer attribute.

1027 **Table 11 - 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

1028

1029 **7.7 document-format-version-default (text(127))**

1030 This OPTIONAL Printer Description attribute indicates the default document format version that the Printer will
 1031 assume when the client omits the “document-format-version” Operation attribute (section 3.2.6). The Printer MUST
 1032 support this attribute if it supports the “document-format-version” Operation attribute.

1033 **7.8 document-format-version-supported (1setOf text(127))**

1034 This OPTIONAL Printer Description attribute indicates the document format versions that the Printer supports for
 1035 Document Contents, that is, supports as values of the “document-format-version” Operation attribute (section 3.2.6).
 1036 The Printer MUST support this attribute if it supports the “document-format-version” Operation attribute.

1037 **7.9 document-natural-language-default (naturalLanguage)**

1038 This OPTIONAL Printer Description attribute indicates the default document natural language that the Printer will
 1039 assume for Document Content when the client omits the “document-natural-language” Operation attribute ([rfc2911]
 1040 section 3.2.1.1). The Printer MUST support this attribute if it supports the “document-natural-language” Operation
 1041 attribute.

1042 **7.10 document-natural-language-supported (1setOf naturalLanguage)**

1043 This OPTIONAL Printer Description attribute lists the natural languages supported in any of the supported document
 1044 formats, that is, it is the union of the natural languages. The Printer MUST support this attribute if it supports the
 1045 “document-natural-language” Operation attribute ([rfc2911] section 3.2.1.1).

1046 8 Status codes

1047 This section defines additional values for the IPP/1/1 operational attribute “status-code”. The “status-code”
 1048 attribute provides information on the processing of an operation. (See [rfc2911] sections 3.1.6.1 and 13)
 1049

1050 8.1 server-error-too-many-jobs (0x050B)

1051 The client has attempted to create a Job using any of the Job Creation operations which would exceed the capacity
 1052 of the Printer. The client MAY try the unmodified request again at some later point in time with an expectation that
 1053 the capacity condition may have changed.

1054 8.2 server-error-too-many-documents (0x050C)

1055 The client has attempted to create a Document using any of the Document Creation operations which would exceed
 1056 the capacity of the Printer for this Job. The client MAY try the unmodified request again at some later point in time
 1057 with an expectation that the capacity condition may have changed.

1058 9 Override Scope of Attributes

1059 This section defines the Override Scope of the Job Template attributes. An Override Scope is only applicable when
 1060 the Job Template attribute is applied as part of an Override [ippOverride]. An Override allows specifying Job
 1061 Template attributes that apply to a portion of a Job. The portion of the Job that an Override can apply is referred to
 1062 as its Scope. A Scope is the smallest entity to which a Job Template attribute applies. The order of Scopes is: a Job
 1063 contains one or more Documents that are printed on one or more Sheets that have up to two Impressions containing
 1064 one or more Pages. For a Printer to support a Job Template attribute in an Override, it MUST support the Job
 1065 Template at the specified Scope. Furthermore the scope of the attribute MUST be ‘Sheet’, ‘Impression’ or ‘Page’.
 1066 Although operation attributes can not be used in an Override, their scope is of interest to determine their applicability
 1067 in “Send-Document” and “Send-Uri”. The various possible scopes of Operation and Job Template attributes are:

1068	Job	Job Template Attributes that operate on whole Jobs are not applicable as page overrides.
1069	Document	Job Template Attributes that operate on whole Documents are not applicable as page 1070 overrides. (The Document operations “Send-Document” and Send-Iri” as well as the 1071 Document Object [ippdoc] are used to apply overrides at this level.)
1072	Sheet	Job Template Attributes that operate on whole Sheets, such as “media” and “finishings”. 1073 Attributes with this scope MAY be included in “overrides”.
1074	Impression	Job Template Attributes that operate on whole Impressions, such as “number-up” or “x- 1075 side1-image-shift”. Attributes with this scope MAY be included in “overrides”.
1076	Page	Job Template Attributes that operate on whole Pages, such as “orientation-requested” or 1077 “print-quality”. Attributes with this scope MAY be included in “overrides”. 1078

1079 9.1 Override Scope of Job Template attributes

1080 By definition only the “output-device” and “print-content-optimize” attributes from this specification can be used in an
 1081 Override.

1082

Table 12 Override Scope for Job Template Attributes

Attribute Name	Override Scope
job-cover-back	Job
job-cover-front	Job
job-finishings	Job
job-finishings-col	Job
job-mandatory-attributes	Job
output-device	Sheet
print-content-optimize	Page

1083

1084 **9.2 Scope for Operation attributes**

1085 Although, by definition, Operation attributes do not have an Override Scope, their Scope is applicable since the
 1086 attribute may be supplied as an Operation attribute in the Send-Document or Send-URI operations. In these cases,
 1087 the Operation attribute overrides the corresponding value supplied at the Job Level in the Create-Job operation.
 1088 Table 13 shows the pseudo "Override Scope" of the Operation attributes referenced in this specification. Note that
 1089 although these attributes may be used with a Document they can not be used as Overrides.

1090

Table 13 Scope for Operation Attributes

Attribute Name	Scope
compression-supplied	Document
document-charset	Document
document-digital-signature	Document
document-format-details	Document
document-format-version	Document
document-format-natural-language	Document
document-message	Document
document-name	Document
document-natural-language	Document

1091

1092 **10 Conformance Requirements**

1093 This specification contains a number of independent OPTIONAL attributes. This section summarizes the
 1094 conformance requirements for Printers and clients.

1095 **10.1 Printer conformance requirements**

1096 In order to claim conformance to this specification,

- 1097 1. A Vendor MUST explicitly identify the attributes and values supported by the Printer implementation in
 1098 any such claim of conformance. In addition, the Vendor's Printer implementation:
- 1099 2. MUST meet the conformance requirements for Printers specified in [rfc2911].

- 1100 3. MUST support one or more OPTIONAL Operation attribute according to section 3 and the corresponding
1101 Job Description attributes in section 4.1.5.4 and corresponding Printer attributes in section 7. & and
1102 combine with #3
- 1103 4. MAY support any Job Template attribute according to section 4.
- 1104 5. MAY support any of the "job-state-reasons" values according to section 6.

1105 10.2 Client conformance requirements

1106 In order to claim conformance to this specification,

- 1107 1. A Vendor MUST explicitly identify the attributes and values supported by the client implementation in any
1108 such claim of conformance. In addition, the Vendor's client:
- 1109 2. MUST meet the conformance requirements for clients specified in [rfc2911]
- 1110 3. MUST support at least one Operation attribute according to section 3 and the corresponding Job Description
1111 attributes in section 4.1.5.4 and corresponding Printer attributes in section 7. & combine with #3
- 1112 4. MAY support any Job Template attribute according to section 4.

1113 11 Normative References

1114 [dcs2.0]

1115 Document Color Separation (DCS), version 2.0. Available at:
1116 <http://www.npes.org/standards/Tools/DCS20Spec.pdf>

1117 [dss]

1118 U.S. Department of Commerce, "Digital Signature Standard (DDS)", Federal Information Processing
1119 Standards Publication 186-1 (FIPS PUB 186-1), December 15, 1998.

1120 [ippOverride]

1121 Zehler, P., Herriot, R., and K. Ocke, "Internet Printing Protocol (IPP): Page Overrides", October 14, 2003,
1122 ftp://ftp.pwg.org/pub/pwg/ipp/new_EXC/wd-ippOverride10-20031014.doc, .pdf, .rtf.

1123 [iso12639]

1124 ISO 12639:1998 Graphic technology -- Prepress digital data exchange -- Tag image file format for image
1125 technology (TIFF/IT), 1998.

1126 [iso15930]

1127 ISO 15930-1:2001 Graphic technology -- Prepress digital data exchange -- Use of PDF -- Part 1: Complete
1128 exchange using CMYK data (PDF/X-1 and PDF/X-1a), 2001.

1129 [pdf]

1130 "Adobe Portable Document Format", Version 1.4, PDF Reference, Third Edition, Adobe Systems
1131 Incorporated, <http://www.adobe.com>, December 2001.

- 1132 [pwg5100.4]
 1133 Herriot, R., Ocke, K., "Internet Printing Protocol (IPP): Override Attributes for Documents and Pages", IEEE-
 1134 ISTO 5100.4:2001, February 7, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.4.pdf>. - being obsoleted
 1135 by (1) a new Page Overrides specification which removes the "document-overrides" Job Template attribute
 1136 and Operation attribute in favor of using the Document Object [ippdoc] and (2) a clarified definition of
 1137 "pages-per-subset" Job Template attribute [ippfutures].
- 1138 [pwg5100.3]
 1139 Ocke, K., Hastings, T., "Internet Printing Protocol (IPP): Production Printing Attributes - Set1", IEEE-ISTO
 1140 5100.3-2001, February 12, 2001, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf>.
- 1141 [rfc1991]
 1142 D. Atkins, W. Stallings, P. Zimmermann, "PGP Message Exchange Formats", RFC 1991, August, 1996.
- 1143 [rfc2046]
 1144 Freed, N., and N. Borenstein, "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", RFC
 1145 2046, November 1996.
- 1146 [rfc2634]
 1147 P. Hoffman, "Enhanced Security Services for S/MIME", RFC 2634, June 1999.
- 1148 [rfc2854]
 1149 Connolly, D., and L. Masinter, "The 'text/html' Media Type", RFC 2854, June 2000.
- 1150 [rfc2911]
 1151 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.1: Model and
 1152 Semantics", RFC 2911, September 2000.
- 1153 [rfc3380]
 1154 Hastings, T., Herriot, R., Kugler, C., and H. Lewis, "Internet Printing Protocol (IPP): Job and Printer Set
 1155 Operations", RFC 3380, September 2002.
- 1156 [upnp]
 1157 Microsoft, "Basic *PrintBasic:1.0* Service Template Version 1.01 For Universal Plug and Play Version 1.0"
- 1158 [xmldsig]
 1159 D. Eastlake, J. Reagle, D. Solo "XML-Signature Syntax and Processing", <draft-ietf-xmldsig-core-11.txt>,
 1160 October 31, 2000.

1161 12 Informative References

- 1162 [fsg-jt]
 1163 Free Software Group, Open Printing Job Ticket API, Visit: <http://www.freestandards.org/openprinting/>
- 1164 [ippact]
 1165 Carney, D., and H. Lewis, "Internet Printing Protocol (IPP), "-actual" attributes extension", work in progress,
 1166 January 31, 2003, ftp://ftp.pwg.org/pub/pwg/ipp/new_ACT/pwg-ipp-actual-attrs-v04-030131.pdf

- 1167 [ippdoc]
 1168 Hastings, T., and P. Zehler, "Internet Printing Protocol (IPP): Document Object", October 14, 2003,
 1169 ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/wd-ippdoc10-20031014.doc, .pdf, .rtf <work in progress>
- 1170 [ippfax]
 1171 Moore, P., Songer, G., Hastings, T., McDonald, I., Pulera, J., Carney, D., and Seeler, R., "IPP FAX Protocol",
 1172 October 14, 2003, <ftp://ftp.pwg.org/pub/pwg/QUALDOCS/wd-ifx10-20031014.pdf>.
- 1173 [ippfutures]
 1174 Work in progress to contain attributes not needed immediately. No draft is currently available.
- 1175 [pwg-psi]
 1176 "Print Service Interface (PSI)", work in progress to become a PWG IEEE-ISTO standard. Visit
 1177 <http://www.pwg.org/>.
- 1178 [pwg-sm]
 1179 Zehler, P., Hastings, T., and S. Albright, "PWG Semantic Model", work in progress to become a PWG IEEE-
 1180 ISTO standard, version 0.90, August 20, 2003. <ftp://ftp.pwg.org/pub/pwg/Semantic-Model/PWG-Semantic-Model-Latest.pdf>
 1181

1182 13 IANA Considerations

1183 This section contains the registration information for IANA to add to the various IPP Registries according to the
 1184 procedures defined in RFC 2911 [rfc2911] section 6 to cover the definitions in this document. The resulting
 1185 registrations will be published in the <http://www.iana.org/assignments/ipp-registrations> registry.

1186 *Note to the PWG Editor: Replace the References below to [this spec] with the IEEE-ISTO standard number*
 1187 *for the appropriate document, so that it accurately reflects the content of the information for the IANA Registry.*

1188 13.1 Attribute Registrations

1189 The following table lists all the attributes defined in this specification. These are to be registered according to the
 1190 procedures in RFC 2911 [rfc2911] section 6.2. If the attribute has a separate sub-section definition in this
 1191 specification, that sub-section is listed as the Reference. This table contains the reference to another specification
 1192 that completely defines each attribute.

1194 Attribute Name (attribute syntax)	Reference	Section
1195 -----	-----	-----
1196		
1197 Job Description attributes:		
1198 compression-supplied (type3 keyword)	[this spec]	5.2.1
1199 document-charset-supplied (charset)	[this spec]	5.2.2
1200 document-digital-signature-supplied (type2 keyword)		
1201	[this spec]	5.2.3
1202 document-format-details-supplied (lsetOf collection)		
1203	[this spec]	5.2.4
1204 document-source-application-name (name(MAX))	[this spec]	5.2.4
1205 document-source-application-version (text(127))		

1206		[this spec]	5.2.4
1207	document-source-os-name (name(40))	[this spec]	5.2.4
1208	document-source-os-version (text(40))	[this spec]	5.2.4
1209	document-format (mimeMediaType)	[this spec]	5.2.4
1210	document-format-device-id (text(127))	[this spec]	5.2.4
1211	document-format-version (text(127))	[this spec]	5.2.4
1212	document-natural-language (1setOf naturalLanguage)		
1213		[this spec]	5.2.4
1214	document-format-supplied (mimeMediaType)	[this spec]	5.2.5
1215	document-format-version-supplied (text(127))	[this spec]	5.2.6
1216	document-message-supplied (text(MAX))	[this spec]	5.2.7
1217	document-name-supplied (name(MAX))	[this spec]	5.2.8
1218	document-natural-language-supplied (naturalLanguage)		
1219		[this spec]	5.2.9
1220	errors-count (integer(0:MAX))	[this spec]	5.1.1
1221	job-attribute-fidelity (boolean)	[this spec]	5.1.2
1222	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	5.1.3
1223	warnings-count (integer(0:MAX))	[this spec]	5.1.4
1224			
1225	Job Template attributes:		
1226	job-copies (integer(1:MAX))	[this spec]	4.1.1
1227	job-copies-default (integer(1:MAX))	[this spec]	4.1.1.1
1228	job-copies-supported (rangeOfInteger(1:MAX))	[this spec]	4.1.1.2
1229	job-copies-actual (1setOf Integer(1:MAX))	[this spec]	4.1.1.3
1230	job-cover-back (collection)	[this spec]	4.1.2
1231	<member attributes are the same as "cover-back" [pwg5100.3]		3.1>
1232	job-cover-back-default (collection)	[this spec]	4.1.2.1
1233	<member attributes are the same as "cover-back" [pwg5100.3]		3.1>
1234	job-cover-back-supported (1setOf type2 keyword)	[this spec]	4.1.2.2
1235	job-cover-back-actual (1setOf collection)	[this spec]	4.1.2.3
1236	<member attributes are the same as "cover-back" [pwg5100.3]		3.1>
1237	job-cover-front (collection)	[this spec]	
1238	4.1.34.1.2.3		
1239	<member attributes are the same as "cover-front" [pwg5100.3]		3.1>
1240	job-cover-front-default (collection)	[this spec]	4.1.3.1
1241	<member attributes are the same as "cover-front" [pwg5100.3]		3.1>
1242	job-cover-front-supported (1setOf type2 keyword)	[this spec]	4.1.3.2
1243	job-cover-front (1setOf collection)	[this spec]	4.1.3.3
1244	<member attributes are the same as "cover-front" [pwg5100.3]		3.1>
1245	job-finishings (1setOf type2 enum)	[this spec]	4.1.4
1246	job-finishings-default (1setOf type2 enum)	[this spec]	4.1.4.1
1247	job-finishings-ready (1setOf type2 enum)	[this spec]	4.1.4.2
1248	job-finishings-supported (1setOf type2 keyword)	[this spec]	4.1.4.3
1249	job-finishings-actual (1setOf type2 enum)	[this spec]	4.1.4.4
1250	job-finishings-col (1setOf collection)	[this spec]	4.1.5
1251	<member attributes are the same as "finishings-col" [pwg5100.3]		3.2>

1252	job-finishings-col-default (1setOf type2 enum)	[this spec]	4.1.5.1
1253	job-finishings-col-ready (1setOf type2 enum)	[this spec]	4.1.5.2
1254	job-finishings-col-supported (1setOf type2 keyword)		
1255		[this spec]	4.1.5.3
1256	job-finishings-col-actual (1setOf collection)	[this spec]	4.1.5.4
1257	<member attributes are the same as "finishings-col"[pwg5100.3] 3.2>		
1258	output-device (name(127))	[this spec]	4.2.1
1259	output-device-ready (1setOf name(127))	[this spec]	Error!
1260	Reference source not found.		
1261	output-device-supported (1setOf name(127))	[this spec]	4.2.1.2
1262	output-device-actual (1setOf name(127))	[this spec]	4.2.1.3
1263	print-content-optimize (type2 keyword)	[this spec]	4.2.2
1264	print-content-optimize-default (type2 keyword)	[this spec]	4.2.2.1
1265	print-content-optimize-supported (1setOf type2 keyword)		
1266		[this spec]	4.2.2.2
1267	print-content-optimize-actual (1setOf type2 keyword)		
1268		[this spec]	4.2.2.3
1269			
1270	Printer Description attributes:		
1271	document-charset-default (charset)	[this spec]	7.1
1272	document-charset-supported (1setOf charset)	[this spec]	7.2
1273	document-digital-signature-default (type2 keyword)	[this spec]	7.3
1274	document-digital-signature-supported (1setOf type2 keyword)		
1275		[this spec]	7.4
1276	document-format-details-default (collection)	[this spec]	7.5
1277	<member attributes are the same as "document-format-details"		
1278		[this spec]	3.2.5>
1279	document-format-details-supported (1setOf type2 keyword)		
1280		[this spec]	7.6
1281	document-format-version-default (text(127))	[this spec]	7.7
1282	document-format-version-supported (1setOf text(127))	[this spec]	7.8
1283	document-natural-language-default (naturalLanguage)	[this spec]	7.9
1284	document-natural-language-supported (1setOf naturalLanguage)		
1285		[this spec]	7.10
1286			
1287	Operation attributes:		
1288	document-charset (charset)	[this spec]	3.2.2
1289	document-digital-signature (type2 keyword)	[this spec]	3.2.3
1290	document-format-details (1setOf collection)	[this spec]	3.2.5
1291	document-source-application-name (name(MAX))	[this spec]	3.2.5.1
1292	document-source-application-version (text(127))		
1293		[this spec]	3.2.5.2
1294	document-source-os-name (name(40))	[this spec]	3.2.5.3
1295	document-source-os-version (text(40))	[this spec]	3.2.5.4
1296	document-format (mimeMediaType)	[this spec]	3.2.5.5
1297	document-format-device-id (text(127))	[this spec]	3.2.5.6

1298	document-format-version (text(127))	[this spec]	3.2.5.7
1299	document-natural-language (1setOf naturalLanguage)		
1300		[this spec]	3.2.5.8
1301	document-format-version (text(127))	[this spec]	3.2.6
1302	document-natural-language (naturalLanguage)	[this spec]	3.2.9
1303	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	3.1.2
1304	13.2 Keyword attribute values		
1305	document-digital-signature (type2 keyword)	[this spec]	3.2.3
1306	document-digital-signature-default (type2 keyword)		
1307		[this spec]	7.3
1308	document-digital-signature-supported (1setOf type2 keyword)		
1309		[this spec]	7.4
1310	dss	[this spec]	3.2.3
1311	none	[this spec]	3.2.3
1312	pgp	[this spec]	3.2.3
1313	smime	[this spec]	3.2.3
1314	xmldsig	[this spec]	3.2.3
1315			
1316	document-format-details-supported (1setOf type2 keyword)		
1317		[this spec]	7.6
1318	document-source-application-name	[this spec]	7.6
1319	document-source-application-version	[this spec]	7.6
1320	document-source-os-name	[this spec]	7.6
1321	document-source-os-version	[this spec]	7.6
1322	document-format	[this spec]	7.6
1323	document-format-device-id	[this spec]	7.6
1324	document-format-version	[this spec]	7.6
1325	document-natural-language	[this spec]	7.6
1326			
1327	job-cover-back-supported (1setOf type2 keyword)	[this spec]	4.1.2.2
1328	<same as "cover-back-supported">	[pwg5100.3]	3.1.4
1329	job-cover-front-supported (1setOf type2 keyword)	[this spec]	4.1.2.2
1330	<same as "cover-front-supported">	[pwg5100.3]	3.1.4
1331	job-mandatory-attributes (1setOf type2 keyword)	[this spec]	3.1.2
1332	<any Job Template attribute keyword>		
1333			
1334	job-state-reasons (1setOf type2 keyword)	[rfc2911]	4.3.8
1335	digital-signature-did-not-verify	[this spec]	6.1
1336	digital-signature-type-not-supported	[this spec]	6.1
1337	errors-detected	[this spec]	6.1
1338	job-digital-signature-wait	[this spec]	6.1
1339	warnings-detected	[this spec]	6.1
1340			
1341	media (type2 keyword name(MAX))	[rfc2911]	4.2.11
1342	choice_iso_a4_210x297mm_na_letter_8.5x11in	[this spec]	6.2

1343	print-content-optimize (type2 keyword)	[this spec]	4.2.2
1344	photo	[this spec]	4.2.2
1345	graphic	[this spec]	4.2.2
1346	text	[this spec]	4.2.2
1347	text-and-graphic	[this spec]	4.2.2
1348			

1349 **13.3 Enum Attribute Values**

1350 The following table lists all the new enum attribute values defined in this document as additional type2 enum values.
 1351 These are to be registered according to the procedures in RFC 2911 [rfc2911] section 6.1.

1352			
1353	job-finishings (1setOf type2 enum)	[this spec]	4.1.3.3
1354	job-finishings-default (1setOf type2 enum)	[this spec]	4.1.4.1
1355	job-finishings-ready (1setOf type2 enum)	[this spec]	4.1.4.2
1356	job-finishings-supported (1setOf type2 enum)	[this spec]	4.1.4.3
1357	<enum values are the same as "finishings">		
1358			
1359	job-finishings-col-supported (1setOf type2 keyword)		
1360		[this spec]	4.1.5.3
1361	<same as for "finishing-col-supported">	[pwg5100.3]	3.2.5

1362 **14 Internationalization Considerations**

1363 The internationalization considerations for the extensions defined in this specification are the same as for handling
 1364 the Job object in [rfc2911].

1365 **15 Security Considerations**

1366 This specification adds no more security burden on Printer implementations than does [rfc2911].

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1391 **18 Annex A: Additional requirements for a revision of the PWG IEEE/ISTO**
 1392 **5101.1 Candidate Standard [pwg5101.1] to add the new 'choice_xxx'**

1393 This section also generalizes the choice mechanism for inclusion in a revision to the PWG IEEE/ISTO 5101.1
 1394 Candidate Standard [pwg5101.1]. This specification gives the *outline* of the proposed addition to [pwg5101.1] for
 1395 information only, in order to agree to the one new value defined for use with IPPFAX, namely,
 1396 **'choice_iso_a4_210x297mm_na_letter_8.5x11in'**.

1397 The proposed extension to [pwg5101.1] will have the following requirements:

- 1398 1. The ABNF will be extended to define the **'choice_'** prefix to introduce a list of choices of self describing
 1399 names.
- 1400 2. Following the **'choice_'** prefix will be two or more fully self describing names, including all three fields.
- 1401 3. The order of the list of fully self describing names **MUST** be in alphabetic order, so that there is only one
 1402 canonical order for each list of choices.
- 1403 4. Printer **MAY** support dynamic combinations of supported values or **MAY** support the entire choice value as a
 1404 conventional keyword which it simply matches for validation purposes.
- 1405 5. Printer **MUST** map the choice value to a particular supported value when selecting the actual media for
 1406 marking.
- 1407 6. If the Printer supports a **'choice_xxx'** "media" attribute value and the "media-ready" Printer attribute, the
 1408 Printer **MUST** include the **'choice_xxx'** value in its "media-ready" Printer attribute as well as the currently
 1409 loaded value(s) when at least one of the members of a choice value is ready. For example, if
 1410 **'iso_a4_210x297mm'** is loaded, then the "media-ready" Printer attribute **MUST** include the
 1411 **'iso_a4_210x297mm'** and the **'choice_iso_a4_210x297mm_na_letter_8.5x11in'** values.

1412 **19 Annex B: Change Log (informative - to be removed before publication)**

1413 The following summaries of the changes in reverse chronological order:

1414 Version 0.9, October 14, 2003:

- 1415 1. Updated references

1416 Version 0.8, October 1, 2003:

- 1417 1. made changes for Jerry Thrasher's 3 editorial comments

- 1418
- 1419 Version 0.7, September 11, 2003:
- 1420 2. Prepared specification for Last Call
- 1421 3. Changed Maturity to Stable
- 1422 4. Removed highlights & empty table rows
- 1423 5. Removed unused references and changed some references to informative
- 1424
- 1425