



The Printer Working Group

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Working Draft

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## IPP Document Object v1.1 (DOCOBJECT)

Status: Initial

Abstract: This specification defines the IPP Document object and its associated attributes, values, group, and operations.

This is a PWG Working Draft. For a definition of a "PWG Working Draft", see:

<https://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf>

This specification is available electronically at:

<https://ftp.pwg.org/pub/pwg/ipp/wd-ippdocobject11-20180919.docx>

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67 a stable, well understood, and technically competent specification that is widely used with  
68 multiple independent and interoperable implementations. Printer manufacturers and  
69 vendors of printer related software benefit from the interoperability provided by voluntary  
70 conformance to these standards.

71 For additional information regarding the Printer Working Group visit:

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## 175 **1. Introduction**

176 This specification extends the Internet Printing Protocol/1.1 [STD92] by defining the IPP  
177 Document object and its associated attributes, values, group, and operations. The IPP Job  
178 object is extended to contain zero or more addressable Document objects representing the  
179 documents submitted for and operated on by the Job.

## 180 **2. Terminology**

### 181 **2.1 Conformance Terminology**

182 Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD,  
183 SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as  
184 defined in Key words for use in RFCs to Indicate Requirement Levels [BCP14]. The term  
185 CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that  
186 applies when a specified condition is true.

### 187 **2.2 Printing Terminology**

188 Normative definitions and semantics of printing terms are imported from the Internet Printing  
189 Protocol/1.1 [STD92].

190 *Document*: An object created and managed by a Printer that contains description,  
191 processing, and status information. A Document object may have attached data and is  
192 bound to a single Job.

193 *Job*: An object created and managed by a Printer that contains description, processing, and  
194 status information. The Job also contains zero or more Document objects.

195 *Logical Device*: a print server, software service, or gateway that processes jobs and either  
196 forwards or stores the processed job or uses one or more Physical Devices to render output.

197 *Output Device*: a single Logical or Physical Device

198 *Physical Device*: a hardware implementation of an endpoint device, e.g., a marking engine,  
199 a fax modem, etc.

## 200 **2.3 Protocol Role Terminology**

201 This document also defines the following protocol roles to specify unambiguous  
202 conformance requirements:

203 *Client*: Initiator of outgoing connections and sender of outgoing operation requests  
204 (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] User Agent).

205 *Printer*: Listener for incoming connections and receiver of incoming operation requests  
206 (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] Server) that represents one or more  
207 Physical Devices or a Logical Device.

## 208 **2.4 Other Terminology**

209 *Attribute Precedence*: The rules which dictate which attribute value takes precedence when  
210 the same attribute is supplied at different points in the workflow with different values, such  
211 as at both the Job Level and the Document Level.

212 *Document Creation Operation*: Operations that create Document objects including Print-Job,  
213 Print-URI, Send-Document, and Send-URI as defined in the IPP/1.1 Model and Semantics  
214 [STD92].

215 *Document Level*: Operation and Document Template attributes supplied in the Send-  
216 Document and Send-URI operations are referred to as being supplied at the Document  
217 Level. Attributes supplied in the Print-Job and Print-URI operations are considered as being  
218 supplied at the Job Level only, *not* also at the Document Level, even though Print-Job and  
219 Print-URI also create Document objects.

220 *Document Template*: An attribute that the Client supplies in a Send-Document or Send-URI  
221 request in the Document attributes group, e.g., “media”.

222 *Honor*: A Printer is said to honor an attribute supplied by the Client if the Printer supports  
223 the attribute and supplied value and conforms to the defined semantics.

224 *Job Creation Operation*: Operations that create Job objects including Create-Job, Print-Job,  
225 and Print-URI as defined in the IPP/1.1 Model and Semantics [STD92].

226 *Job Level*: Operation and Job Template attributes supplied in Print-Job, Print-URI, and  
227 Create-Job requests are referred to as being supplied at the Job Level.

## 228 **2.5 Acronyms and Organizations**

229 *IANA*: Internet Assigned Numbers Authority, <http://www.iana.org/>



230 *IETF*: Internet Engineering Task Force, <http://www.ietf.org/>

231 *ISO*: International Organization for Standardization, <http://www.iso.org/>

232 *PWG*: Printer Working Group, <http://www.pwg.org/>

## 233 **3. Requirements**

### 234 **3.1 Rationale**

235 The Internet Printing Protocol/1.1 [STD92] defines the IPP Model and Semantics, including  
236 abstract objects for a Printer that processes Jobs and the Jobs themselves which process  
237 Documents. Given the need to directly address Documents in a Job, the IPP Document  
238 Object v1.1 should:

- 239 1. Define an abstract IPP Document object and its attributes;
- 240 2. Define new IPP operations for the IPP Document object; and
- 241 3. Extend existing IPP operations as needed to support the IPP Document object.

### 242 **3.2 Use Cases**

#### 243 **3.2.1 Specify Per-Document Print Intent**

244 Jane is printing a multi-volume report and would like the output printed together. She uses  
245 an application on her computer to select each volume in the report and a shipping envelope.  
246 She then initiates a print action, specifying the media and finishing processes for each  
247 volume and the media for the shipping envelope. The printer processes all of the documents  
248 as a single job, placing the hardcopy output in a mailbox together.

#### 249 **3.2.2 See a List of Documents in a Job**

250 John has submitted a multi-document job to a printer but cannot remember if he included all  
251 of the documents needed. He uses an application on his mobile device to query the list of  
252 documents in the print job and display them on the screen.

#### 253 **3.2.3 Cancel a Single Document**

254 Bob has submitted a multi-document job to a printer but realizes there was a typographical  
255 error in one of the documents that has not yet printed. He uses an application on his

256 computer to view the list of jobs on the printer, views the list of documents in the job he  
257 submitted, and initiates a cancel action for the document containing the error.

### 258 **3.3 Exceptions**

259 There are no exceptions defined for this specification.

### 260 **3.4 Out of Scope**

261 The following are considered out of scope for this specification:

- 262 1. Definition of copy or page level semantics; and
- 263 2. Definition of per-page or per-copy overrides.

### 264 **3.5 Design Requirements**

265 The design requirements for this specification are:

- 266 1. Define an abstract IPP Document object and its semantics;
- 267 2. Define an attribute group tag for attributes of an IPP Document object;
- 268 3. Define attributes and values to describe an IPP Document object;
- 269 4. Define operations for querying and manipulating IPP Document objects;
- 270 5. Extend existing operations to explicitly create IPP Document objects;
- 271 6. Define security requirements necessary to support IPP Document objects; and
- 272 7. Define sections to register all objects, attribute groups, attributes, values, and
- 273 operations with IANA.
- 274

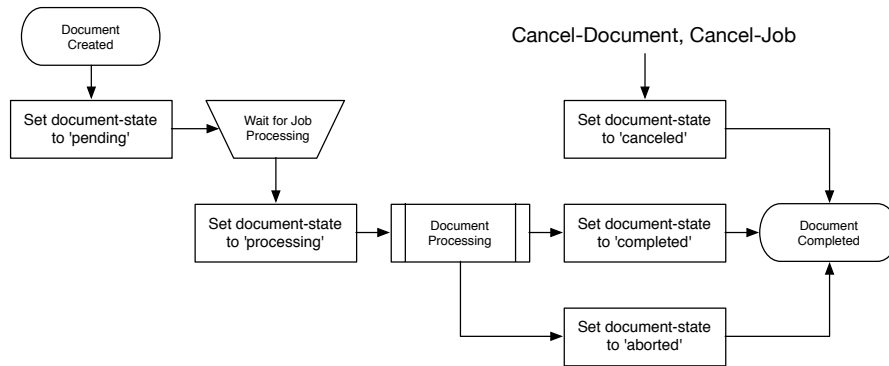
275 **4. Model**

276 The Internet Printing Protocol/1.1 [STD92] defines an object model containing a Printer that  
 277 processes Jobs and a Job that processes Documents. This document extends the Model  
 278 with an addressable Document object with its own attributes and state. Printers **MAY** support  
 279 multiple Documents per Job.

**Commented [MRS1]:** PWG 5100.5-2003 said that multi-document support was required when supporting Create-Job/Send-Document, but that isn't true.

280 **4.1 Document Object**

281 The Document object represents a single Document in a Job that contains Document-  
 282 specific Description, Status, and Template attributes. Document Description attributes  
 283 provide information about the Document, Document Status attributes provide state  
 284 information for the Document, and Document Template attributes override the  
 285 corresponding Job Template attributes for the Document. A Document object also contains  
 286 the Document data and/or a URI that references the Document data. Figure 1 shows the life  
 287 cycle of the Document object.



288 **Figure 1 - Document Object Life Cycle**

290 **4.2 Operations**

291 The Print-Job and Print-URI operations [STD92] create a Job object containing a single  
 292 Document object while the Create-Job operation [STD92] creates a Job object with no  
 293 Document objects. The Send-Document and Send-URI operations [STD92] add Document  
 294 objects to the specified Job object. Printers conforming to this specification **MUST** support  
 295 the Create-Job and Send-Document operations.

296 This specification extends the Send-Document and Send-URI operations to accept  
 297 Document Template attributes in the Document Attributes group. The Document Template

298 attributes are applied to the Document object being created, overriding any corresponding  
 299 Job Template attributes supplied at the Job Level which allows the Client to vary the  
 300 Document Template attributes between Document objects in a single Job.

301 This specification also defines one new Job operation and four new Document operations.  
 302 Table 1 lists the operations and their conformance requirements.

303 **Table 1 - IPP Operations**

Operation	Conformance	Reference
Cancel-Document	MUST	Section 5.1.1
Create-Job	MUST	STD92
Get-Document-Attributes	MUST	Section 5.1.2
Get-Documents	MUST	Section 5.2.1
Print-Job	MUST	STD92, Section 8.3
Print-URI	MAY	STD92, Section 8.3
Send-Document	MUST	STD92, Section 8.4
Send-URI	MAY	STD92, Section 8.5
Set-Document-Attributes	MAY	Section 5.1.3

304 **4.3 Job and Document Template Attributes**

305 Clients OPTIONALLY supply Job Template attributes in Create-Job, Print-Job, and Print-  
 306 URI requests, and OPTIONALLY supply Document Template attributes in Print-Job, Print-  
 307 URI, Send-Document, and Send-URI requests. Job Template attributes apply to the Job as  
 308 a whole while Document Template attributes apply only to the corresponding Document  
 309 object.

310 Printers MUST support the following Attribute Precedence from highest to lowest when  
 311 processing a Document:

- 312 1. Document Level - The Document Template attributes supplied in the Document  
 313 Creation request or a subsequent Set-Document-Attributes request;
- 314 2. Job Level - The Job Template attributes supplied in the Job Creation request or  
 315 a subsequent Set-Job-Attributes request; and
- 316 3. Printer Default - The Printer Default attributes as supplied by the manufacturer  
 317 or configured by the operator or administrator using a Set-Printer-Attributes  
 318 request.

319 Note: Depending on the value of the "pdl-override-supported" Printer Description attribute  
 320 [STD92], device commands embedded in the Document data could override attributes  
 321 specified at any of these levels.

**Commented [MS2]:** The previous version of this was a lot more complicated and contradictory. It talked a lot about doing things outside of IPP and was basically unenforceable. It also talked about requirements for PWG 5100.6 (Page Overrides) which belongs in "that" specification.

The new text honors the spirit of the original with a single exception for pdl-override-supported.

## 322 **5. New Operations**

323 This section defines the new IPP operations for this specification.

324 Note: The use of the "job-uri" operation attribute [STD92] to specify the target Job object is  
325 deprecated. Clients SHOULD send the "printer-uri" and "job-id" operation attributes [STD92]  
326 instead.

### 327 **5.1 Document Operations**

#### 328 **5.1.1 Cancel-Document**

329 This REQUIRED Document operation allows a Client to cancel a specified Document in a  
330 specified Print Job any time from the time the Document is created up to, but not including,  
331 the time that the Document is completed, canceled, or aborted. Since a Document might  
332 already be printing by the time a Cancel-Document request is received, some media sheet  
333 pages might be printed before the Document processing is actually terminated.

334 The Cancel-Document operation does not remove the Document from the Job and Printer,  
335 but only sets the specified Document's "document-state" Document Status attribute to  
336 'canceled' and the Document's "document-state-reasons" Document Status attribute with  
337 'canceled-by-user' or 'canceled-by-operator'. If the Job object is printed again using  
338 operations such as Reprocess-Job [RFC3998], Restart-Job (deprecated) [STD92], or  
339 Resubmit-Job [PWG5100.11], any canceled Documents are also printed again. Thus  
340 Cancel-Document has the same semantics as Cancel-Job [STD92] which only cancels the  
341 processing of the Job and doesn't delete the Job object itself.

342 The Cancel-Document operation does not affect the states of any of the other Document  
343 objects in the Job. If the Job was processing and there are more Documents to be  
344 processed, the Printer does so. If there are no further Documents to process, the Job moves  
345 to the 'completed' state as usual whenever there is no more processing to be done.

346 The Printer MUST accept or reject the request based on the document's current state and  
347 transition the document to the indicated new state as shown in Table 2.

348 Access Rights: The authenticated user performing this operation must either be the Job  
349 owner or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject the  
350 operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-  
351 not-authorized' as appropriate.  
352

353

**Table 2 - Document State Transitions for Cancel-Document**

<b>Current "document-state"</b>	<b>New "document-state"</b>	<b>Printer's response status code and action:</b>
'pending'	'canceled'	'successful-ok'
'processing'	'canceled'	'successful-ok'
'processing'	'processing'	'successful-ok' (note 1)
'processing'	'processing'	'client-error-not-possible' (note 2)
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

354

Note 1: If the implementation requires some measurable time to cancel the Document in the 'processing' state, the Printer MUST add the 'processing-to-stop-point' value to the Document's "document-state-reasons" attribute and then transition the Document to the 'canceled' state when the processing ceases.

355

356

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358

Note 2: If the Document object already has the 'processing-to-stop-point' value in its "document-state-reasons" attribute, then the Printer MUST reject the Cancel-Document request.

359

360

#### 361 5.1.1.1 Cancel-Document Request

362 The following groups of attributes are part of the Cancel-Document request:

363 Group 1: Operation Attributes

364 Natural Language and Character Set:

365 The "attributes-charset" and "attributes-natural-language" attributes as  
366 described in [STD92].

367 Target:

368 Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri"  
369 (uri) operation attribute(s) [STD92] which define the target Job object for this  
370 operation, followed by the "document-number" (integer(1:MAX)) operation  
371 attribute which defines the target Document object for this operation. If the  
372 Client omits the "document-number" operation attribute, the Printer MUST  
373 reject the request and return the 'client-error-bad-request' status code.

374 Requesting User Name:

375 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by  
376 the Client as described in [STD92].

377 "document-message" (text(MAX)):

378 The Client MAY supply this attribute. If supported by the Printer, the Printer  
379 MUST also support the corresponding "document-message" (text(MAX))  
380 Document Status attribute (see section ???) and copy the value to the  
381 Document's "document-message" attribute.

### 382 5.1.1.2 Cancel-Document Response

383 The following groups of attributes are part of the Cancel-Document response:

384 Group 1: Operation Attributes

385 Status Message:

386 In addition to the REQUIRED status code returned in every response, the  
387 response OPTIONALLY includes a "status-message" (text(255)) and/or a  
388 "detailed-status-messages" (text(MAX)) Operation attribute as described in  
389 [STD92].

390 Natural Language and Character Set:

391 The "attributes-charset" and "attributes-natural-language" attributes as  
392 described in [STD92].

393 Group 2: Unsupported Attributes

394 See [STD92] for details on returning Unsupported Attributes.

### 395 5.1.2 Get-Document-Attributes

396 This REQUIRED Document operation allows a Client to request the values of selected  
397 attributes of a Document object. The Printer MUST only return attributes that were submitted  
398 by a Client or generated by the Printer.

399 The Client requests attributes using the "requested-attributes (keyword)" operation attribute  
400 [STD92] which lists the attribute names and groups of interest. For Document objects the  
401 possible names of attribute groups are:

402 'document-template': The subset of Document Template that the implementation  
403 supports for Document objects.

404 'document-description': The subset of Document Description and Document Status  
405 attributes that the implementation supports for Document objects.

406 'all': All attributes that the implementation supports for Document objects.

407 Since a Client MAY request specific attributes or named groups, there is a potential that  
408 there is some overlap. For example, if a Client requests 'document-name' and 'document-  
409 description', the Client is actually requesting the "document-name" attribute once by naming  
410 it explicitly and once by inclusion in the 'document-description' group. In such cases, the  
411 Printer returns the attribute only once in the response even if it is requested multiple times.  
412 The Client SHOULD NOT request the same attribute in multiple ways.

413 Printers MUST support all group names and MUST return all supported attributes belonging  
414 to the group.

415 Access Rights: The authenticated user performing this operation must either be the Job  
416 owner or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject the  
417 operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-  
418 not-authorized' as appropriate.

#### 419 **5.1.2.1 Get-Document-Attributes Request**

420 The following groups of attributes are part of the Get-Document-Attributes request:

421 Group 1: Operation Attributes

422 Natural Language and Character Set:

423 The "attributes-charset" and "attributes-natural-language" attributes as  
424 described in [STD92].

425 Target:

426 Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri"  
427 (uri) operation attribute(s) [STD92] which define the target Job object for this  
428 operation, followed by the "document-number" (integer(1:MAX)) operation  
429 which defines the target Document object for this operation. If the Client  
430 omits the "document-number" operation attribute, the Printer MUST reject the  
431 request and return the 'client-error-bad-request' status code.

432 Requesting User Name:

433 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by  
434 the Client as described in [STD92].

435 "requested-attributes" (1setOf keyword):

436 The Client OPTIONALLY supplies and the Printer MUST support this  
437 attribute, which is a list of Document attribute names and/or attribute group  
438 names that are returned to the Client for each Document object. If the Client  
439 does not supply this attribute, the Printer MUST respond as if the Client had  
440 supplied this attribute with the single value 'all'.



**441 5.1.2.2 Get-Document-Attributes Response**

442 The following groups of attributes are part of the Get-Document-Attributes response:

443 Group 1: Operation Attributes

444 Status Message:

445 In addition to the REQUIRED status code returned in every response, the  
446 response OPTIONALLY includes a "status-message" (text(255)) and/or a  
447 "detailed-status-messages" (text(MAX)) Operation attribute as described in  
448 [STD92].

449 Natural Language and Character Set:

450 The "attributes-charset" and "attributes-natural-language" attributes as  
451 described in [STD92]. The "attributes-natural-language" MAY be the natural  
452 language of the Document object rather than the one in the Get-Document-  
453 Attributes request.

454 Group 2: Unsupported Attributes

455 See [STD92] for details on returning Unsupported Attributes.

456 The response MAY contain the "requested-attributes" operation attribute with  
457 any supplied values (attribute keywords) that were requested by the Client  
458 but are not supported by the Printer. If the Printer does return unsupported  
459 attributes referenced in the "requested-attributes" operation attribute and that  
460 attribute included group names such as 'all', the unsupported attributes  
461 MUST NOT include attributes described in the standard but not supported by  
462 the implementation.

463 Group 3: Document Attributes

464 The Printer responds with the Document Description, Document Status, and  
465 Document Template attributes for each returned Document object as  
466 requested by the "requested-attributes" operation attribute supplied by the  
467 Client in the request. The Printer ignores (does not respond with) any  
468 requested attribute or value which is not supported or which is restricted by  
469 the security policy in force, including whether the requesting user is the Job  
470 owner. However, the Printer MUST respond with the 'unknown' out of band  
471 value [STD92] for any supported attribute (including all REQUIRED  
472 attributes) for which the Printer does not know the value, unless it would  
473 violate the security policy.

474 **5.1.3 Set-Document-Attributes**

475 This OPTIONAL Document operation allows a Client to set the values of the attributes of a  
 476 Document object after the Document object is submitted to the Printer. In the request, the  
 477 Client supplies the set of Document attributes and values that are to be set. In the response,  
 478 the Printer returns success or rejects the entire request with indications of which attribute or  
 479 attributes could not be set.

480 This operation is similar to the Set-Job-Attributes operation [RFC3380] and follows the same  
 481 rules for validation. As with the Set-Job-Attributes operation, the Set-Document-Attributes  
 482 operation can add a new attribute, replace the value of an existing attribute, or remove an  
 483 attribute using 'delete-attribute' out-of-band value.

484 If the Client supplies an attribute in a Set-Document-Attributes request with the 'delete-  
 485 attribute' out-of-band value and that attribute is not present on the Document object, the  
 486 Printer ignores the attribute and does not return the attribute in the Unsupported Attributes  
 487 group. The Printer also returns the 'successful-ok' status code if there are no other problems  
 488 with the request.

489 The Printer MUST accept or reject this operation when the Document's "document-state"  
 490 attribute has the values shown in ??? but MUST NOT change the state of the Document  
 491 object since the Document is a passive object and the Document state is a subset of the Job  
 492 State. For example, in the case where the operation creates a request for unavailable  
 493 resources, the Job (but not the Document) transitions to a new state.

494 **Table 3 - Allowed Document States for the Set-Document-Attributes operation**

<b>"document-state"</b>	<b>Printer's response status code and "action"</b>
'pending'	'successful-ok'
'pending'	'successful-ok' - needed resources are not ready (the Job MAY change state)
'processing'	'successful-ok' or 'client-error-not-possible' depending on implementation, including the attributes being set, whether the document has started marking media, etc.
'completed'	'client-error-not-possible'
'canceled'	'client-error-not-possible'
'aborted'	'client-error-not-possible'

495 This operation MUST NOT change the value of attributes not specified in the operation  
 496 unless the definition of the attribute explicitly specifies such side effects. In general,  
 497 Document attributes that are settable do not define side effects on other attributes that are  
 498 settable, only side effects on READ-ONLY attributes, if any.

499 If the Printer supports the Set-Document-Attributes operation, then it SHOULD support  
 500 setting of all Document Description and Document Template attributes that the

501 implementation supports. Document Status attributes are READ-ONLY and cannot be set  
502 directly using this operation.

503 Note: There is no way for the Client to set all of a Job's Document objects to the same  
504 attribute values in a single operation. Either a) the Client sets the corresponding attribute in  
505 each Document object in the Job with separate Set-Document-Attributes requests, or b) the  
506 Client sets the corresponding attribute at the Job Level using the Set-Job-Attributes  
507 operation. Setting the corresponding attribute at the Job Level (or supplying that attribute  
508 initially in the Job Creation operation) causes each Document object to inherit the Job Level  
509 attribute value, if the Document object doesn't have a corresponding explicit attribute  
510 supplied at the Document Level. In other words, supplying an attribute at the Job Level will  
511 affect all the Job's Document objects that don't have that attribute also explicitly supplied at  
512 the Document Level.

513 Access Rights: The authenticated user performing this operation must either be the Job  
514 owner or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject the  
515 operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-  
516 not-authorized' as appropriate.

#### 517 **5.1.3.1 Set-Document-Attributes Request**

518 The following groups of attributes are part of the Set-Document-Attributes request:

519 Group 1: Operation Attributes

520 Natural Language and Character Set:

521 The "attributes-charset" and "attributes-natural-language" attributes as  
522 described in [STD92].

523 Target:

524 Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri"  
525 (uri) operation attribute(s) [STD92] which define the target Job object for this  
526 operation, followed by the "document-number" (integer(1:MAX)) operation  
527 which defines the target Document object for this operation. If the Client  
528 omits the "document-number" operation attribute, the Printer MUST reject the  
529 request and return the 'client-error-bad-request' status code.

530 Requesting User Name:

531 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by  
532 the Client as described in [STD92].

533 Group 2: Document Attributes

534 The Client supplies one or more Document Description or Document  
535 Template attributes. If supported, the Printer MUST either add the attribute (if  
536 it does not already exist in the Document object), replace all values for the  
537 attribute (if it already exists in the Document object), or remove the attribute  
538 (if the 'delete-attribute' out-of-band value is supplied by the Client).

### 539 5.1.3.2 Set-Document-Attributes Response

540 The Printer returns the following groups of attributes as part of the Set-Document-Attributes  
541 response:

#### 542 Group 1: Operation Attributes

##### 543 Status Message:

544 In addition to the REQUIRED status code returned in every response, the  
545 response OPTIONALLY includes a "status-message" (text(255)) and/or a  
546 "detailed-status-messages" (text(MAX)) Operation attribute as described in  
547 [STD92].

##### 548 Natural Language and Character Set:

549 The "attributes-charset" and "attributes-natural-language" attributes as  
550 described in [STD92].

#### 551 Group 2: Unsupported Attributes

552 See [STD92] for details on returning Unsupported Attributes.

553 If some of the attributes in the operation fail to validate, the Printer MUST  
554 reject the operation, MUST NOT change any Document attributes, and  
555 MUST return the indicated status code below. In this group, the Printer  
556 MUST also return all attributes that fail to validate. The following are the  
557 reasons that an attribute fails to validate and the value returned for the  
558 attribute, along with the indicated status code and order of detection:

- 559 1. The number of attributes supplied by the client exceeds the maximum  
560 number that the Printer supports in a Set-Document-Attributes  
561 request: return the 'client-error-request-entity-too-large' status code  
562 [STD92].
- 563 2. The Printer doesn't support the attribute: return the attribute with the  
564 'unsupported' out-of-band attribute value and the 'client-error-  
565 attributes-or-values-not-supported' status code [STD92].
- 566 3. The attribute is READ-ONLY (in its definition) or is not-settable in this  
567 implementation: return the attribute with the 'not-settable' out-of-band

568 attribute value and the 'client-error-attributes-not-settable' status code  
569 [RFC3380].

570 4. The Printer doesn't support the value: if the attribute in the operation  
571 has a single value, return it. If the attribute in the operation is multi-  
572 valued, return only those values in a 1setOf that are not supported.  
573 Return the 'client-error-attributes-or-values-not-supported' status code  
574 [STD92].

575 5. The values of some of the supplied attributes conflict with one another  
576 and/or other Document attribute values not being set: if the conflicting  
577 attribute in the operation has a single value, return the attribute and  
578 the value. If the attribute in the operation is multi-valued, return only  
579 the attribute and those values in a 1setOf that are conflicting with  
580 other attributes. Return the 'client-error-conflicting-attributes' status  
581 code [STD92].

## 582 **5.2 Job Operations**

### 583 **5.2.1 Get-Documents**

584 This REQUIRED Job operation allows a Client to retrieve the list of Document objects  
585 belonging to the target Job object. The Client MAY also supply a list of Document attribute  
586 names and/or attribute group names. A group of Document object attributes will be returned  
587 for each Document object in the Job.

588 This operation is similar to the Get-Document-Attributes operation (see section ???), except  
589 that this operation returns attributes from all Document objects contained in the Job object  
590 instead of from a single selected Document object in the Job object. As with the Get-  
591 Document-Attributes operation, the Printer MUST only return attributes that were submitted  
592 by a Client or generated by the Printer.

593 This operation is also similar to the Get-Jobs operation [STD92] except that there are no  
594 equivalents to the "which-jobs" and "my-jobs" operation attributes.

595 It is not an error for the Printer to return 0 Documents. If the response returns 0 Documents  
596 because there are no Documents in the Job, then the status code for 0 Documents MUST  
597 be 'successful-ok'.

598 Access Rights: The authenticated user performing this operation MUST be the Job owner  
599 or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject the  
600 operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-  
601 not-authorized' as appropriate.

**602 5.2.1.1 Get-Documents Request**

603 The following groups of attributes are part of the Get-Documents request:

604       Group 1: Operation Attributes

605             Natural Language and Character Set:

606             The "attributes-charset" and "attributes-natural-language" attributes [STD92]

607             Target:

608             Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri"  
609             (uri) operation attribute(s) [STD92] which define the target Job object for this  
610             operation.

611             Requesting User Name:

612             The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by  
613             the Client as described in [STD92].

614             "limit" (integer(1:MAX)):

615             The client OPTIONALLY supplies and the Printer MUST support this  
616             operation attribute, which determines the maximum number of Documents  
617             that a Client will receive from the Printer. The limit is a "stateless limit" in that  
618             if the value supplied by the Client is 'N', then only the first 'N' Documents are  
619             returned in the Get-Documents Response. There is no mechanism to allow  
620             for the next 'M' Documents after the first 'N' Documents. If the Client does not  
621             supply the "limit" attribute, the Printer responds with all Documents in the  
622             Job.

623             "requested-attributes" (1setOf keyword):

624             The client OPTIONALLY supplies and the Printer MUST support this  
625             attribute, which is a list of Document attribute names and/or attribute group  
626             names that are returned to the Client for each Document object. The allowed  
627             attribute group names are the same as those defined in the Get-Documents-  
628             Attributes operation in section ????. If the Client does not supply this attribute,  
629             the Printer MUST respond as if the Client had supplied this attribute with the  
630             single value 'document-number'.

**631 5.2.1.2 Get-Documents Response**

632 The following groups of attributes are part of the Get-Documents request:

## 633 Group 1: Operation Attributes

## 634 Status Message:

635 In addition to the REQUIRED status code returned in every response, the  
636 response OPTIONALLY includes a "status-message" (text(255)) and/or a  
637 "detailed-status-messages" (text(MAX)) operation attribute as described in  
638 [STD92].

## 639 Natural Language and Character Set:

640 The "attributes-charset" and "attributes-natural-language" attributes as  
641 described in [STD92].

## 642 Group 2: Unsupported Attributes

643 See [STD92] for details on returning Unsupported Attributes.

644 The response MAY contain the "requested-attributes" operation attribute with  
645 any supplied values (attribute keywords) that were requested by the Client  
646 but are not supported by the Printer. If the Printer does return unsupported  
647 attributes referenced in the "requested-attributes" operation attribute and that  
648 attribute included group names such as 'all', the unsupported attributes  
649 MUST NOT include attributes described in the standard but not supported by  
650 the implementation.

## 651 Groups 3 to N: Document Attributes

652 The Printer responds with the Document Description, Document Status, and  
653 Document Template attributes for each returned Document object as  
654 requested by the "requested-attributes" operation attribute supplied by the  
655 Client in the request. The Printer ignores (does not respond with) any  
656 requested attribute or value which is not supported or which is restricted by  
657 the security policy in force, including whether the requesting user is the Job  
658 owner. However, the Printer MUST respond with the 'unknown' out of band  
659 value [STD92] for any supported attribute (including all REQUIRED  
660 attributes) for which the Printer does not know the value, unless it would  
661 violate the security policy.

662 The Printer MUST return the groups in order of increasing "document-  
663 number" value.

664 **6. New Attributes**665 **6.1 Document Description Attributes**666 **6.1.1 document-name (name(MAX))**

667 This REQUIRED Document Description attribute specifies the name of the document and is  
 668 copied from the "document-name" operation attribute [STD92] supplied by the Client in the  
 669 Document Creation request.

670 **6.2 Document Status Attributes**

671 Table 4 lists the Document Status attributes defined by this specification. Printers that  
 672 support a given operation or Job Status attribute MUST support the corresponding  
 673 Document Status attribute.

674 **Table 4 - Document Status Attributes**

Document Attribute	Operation/Job Attribute	Reference
attributes-charset (charset)	attributes-charset	[STD92]
attributes-natural-language (naturalLanguage)	attributes-natural-language	[STD92]
current-page-order (type2 keyword)	current-page-order	[PWG5100.3]
date-time-at-completed (dateTime)	date-time-at-completed	[STD92]
date-time-at-creation (dateTime)	date-time-at-creation	[STD92]
date-time-at-processing (dateTime)	date-time-at-processing	[STD92]
detailed-status-messages (1setOf text(MAX))	job-detailed-status-messages	[STD92]
document-access-errors (1setOf text(MAX))	job-document-access-errors	[STD92]
document-charset (charset)	document-charset	Sections 6.2.1 and 6.4.1
document-format (mimeType)	document-format	[STD92]
document-format-detected (mimeType)	<none>	Section 6.2.2
document-job-id (integer(1:MAX))	job-id	[STD92]



Document Attribute	Operation/Job Attribute	Reference
document-job-uri (uri)	job-uri	[STD92]
document-message (text(MAX))	<none>	Section 6.2.3
document-natural-language (naturalLanguage)	document-natural-language	[STD92]
document-number (integer(1:MAX))	<none>	Section 6.2.4
document-printer-uri (uri)	job-printer-uri	[STD92]
document-state (type1 enum)	job-state (note 1)	[STD92]
document-state-message (text(MAX))	job-state-message	[STD92]
document-state-reasons (1setOf type2 keyword)	job-state-reasons	[STD92]
document-uri (uri)	document-uri (note 2)	[STD92]
impressions (integer(0:MAX))	job-impressions	[STD92]
impressions-completed (integer(0:MAX))	job-impressions-completed	[STD92]
k-octets (integer(0:MAX))	job-k-octets	[STD92]
k-octets-processed (integer(0:MAX))	job-k-octets-processed	[STD92]
last-document (boolean)	<none>	Section 6.2.5
media-sheets (integer(0:MAX))	job-media-sheets	[STD92]
media-sheets-completed (integer(0:MAX))	job-media-sheets- completed	[STD92]
more-info (uri)	job-more-uri	[STD92]
output-device-assigned (name(MAX))	output-device-assigned	[STD92]
printer-up-time (integer(1:MAX))	job-printer-up-time	[STD92]
time-at-completed (integer(MIN:MAX))	time-at-completed	[STD92]
time-at-creation (integer(MIN:MAX))	time-at-creation	[STD92]
time-at-processing (integer(MIN:MAX))	time-at-processing	[STD92]

675 Note 1: The "document-state" attribute supports all of the "job-state" values *except*  
676 '4' (pending-held).

677 Note 2: The "document-uri" attribute identifies the source location of the Document  
678 data and is not an identifier for the Document object. The simple identifier of the  
679 Document is the "document-number" Document Status attribute.

**680 6.2.1 document-charset (charset)**

681 This RECOMMENDED Document Status attribute specifies the charset used in the  
682 Document data. The Printer sets this attribute from the corresponding operation attribute  
683 supplied by the Client in the Document Creation request. Printers that support the  
684 "document-charset" operation attribute MUST support this attribute.

**685 6.2.2 document-format-detected (mimeMediaType)**

686 This Document Status attribute is generated by the Printer to indicate the format of the  
687 Document object content as detected by the Printer.

**688 6.2.3 document-message (text(MAX))**

689 This Document Description attribute contains a message from either a) the User to the  
690 Operator about the Document or b) from the Operator, Administrator, or "intelligent" process  
691 to indicate to the End User the reasons for modification or other management action taken  
692 on the Document. The Printer populates this attribute from the "document-message"  
693 operation attribute value supplied by the Client in any of the Document Creation requests or  
694 in a Cancel-Document request.

**695 6.2.4 document-number (integer(1:MAX))**

696 This REQUIRED Document Status attribute is the ordinal number of the Document within  
697 the Job, and determines its order of being printed in a multi-document Job. The Printer  
698 MUST generate the values monotonically increasing from 1 for each Job.

**699 6.2.5 last-document (boolean)**

700 This REQUIRED Document Status attribute indicates whether this Document is the last  
701 Document in the Job [STD92]. The Printer sets this attribute from the corresponding  
702 operation attribute supplied by the Client in the Document Creation request, when the Client  
703 sends a Close-Job request [PWG5100.11], or when the "multiple-operation-time-out" time  
704 interval has passed.

**705 6.3 Document Template Attributes**

706 This specification defines Document Template attributes for every Job Template attribute  
707 that does not apply to the whole Job. Table 5 lists the new attributes.

708 **Table 5 - Document Template Attributes**

Attribute	Reference
copies (integer(1:MAX))	[STD92]
cover-back (collection)	[PWG5100.3]
cover-front (collection)	[PWG5100.3]
finishings (1setOf type2 enum)	[STD92]
finishings-col (1setOf collection)	[PWG5100.1]
force-front-side (1setOf integer(1:MAX))	[PWG5100.3]
imposition-template (type2 keyword   name(MAX))	[PWG5100.3]
media (type2 keyword   name(MAX))	[STD92]
media-col (collection)	[PWG5100.3]
media-input-tray-check (type2 keyword   name(MAX))	[PWG5100.3]
number-up (integer(1:MAX))	[STD92]
orientation-requested (type2 enum)	[STD92]
output-bin (type2 keyword   name(MAX))	[PWG5100.2]
page-delivery (type2 keyword)	[PWG5100.3]
page-order-received (type2 keyword)	[PWG5100.3]
page-ranges (1setOf rangeOfInteger(1:MAX))	[STD92]
presentation-direction-number-up (type2 keyword)	[PWG5100.3]
print-quality (type2 enum)	[STD92]
printer-resolution (resolution)	[STD92]
sides (type2 keyword)	[STD92]
x-image-position (type2 keyword)	[PWG5100.3]
x-image-shift (integer(MIN:MAX))	[PWG5100.3]
x-side1-image-shift (integer(MIN:MAX))	[PWG5100.3]
x-side2-image-shift (integer(MIN:MAX))	[PWG5100.3]
y-image-position (type2 keyword)	[PWG5100.3]
y-image-shift (integer(MIN:MAX))	[PWG5100.3]
y-side1-image-shift (integer(MIN:MAX))	[PWG5100.3]
y-side2-image-shift (integer(MIN:MAX))	[PWG5100.3]

## 709 6.4 Operation Attributes

### 710 6.4.1 document-charset (charset)

711 This RECOMMENDED operation attribute specifies the character set used by the Document  
712 data.

### 713 6.4.2 document-number (integer(1:MAX))

714 This REQUIRED operation attribute specifies the ordinal number of the Document within the  
715 Job.

## 716 **6.5 Printer Description Attributes**

### 717 **6.5.1 document-creation-attributes-supported (1setOf type2 keyword)**

718 This REQUIRED attribute lists the keyword names of the Document Template and operation  
719 attributes that the Printer will accept in the Send-Document and Send-URI Document  
720 Creation operations. Implementations that support the Send-URI operation MUST include  
721 the 'document-uri' keyword in "document-creation-attributes-supported". Implementations  
722 that do not support Send-URI MUST NOT include the 'document-uri' keyword in "document-  
723 creation-attributes-supported".

724 Note: The "document-uri" attribute is specific to the Send-URI operation. Inclusion of the  
725 'document-uri' keyword in "document-creation-attributes-supported" does not imply that the  
726 "document-uri" attribute is valid for the Send-Document operation.

## 727 **7. New Attribute Group Tags**

### 728 **7.1 document-attributes-tag**

729 The document-attributes-tag (0x09) attribute group tag is used to delimit Document object  
730 attributes in IPP messages.

731

## 732 8. Additional Semantics for Existing Operations

### 733 8.1 Cancel-Job: "document-state" and "document-state-reasons"

734 This REQUIRED operation sets the "document-state" Document Status attribute to  
 735 'canceled' and the "document-state-reasons" Document Status attribute with 'canceled-by-  
 736 user' or 'canceled-by-operator' for *all* Document objects in the identified Job that have not  
 737 yet reached a terminating state ('completed', 'canceled', or 'aborted').

### 738 8.2 Hold-Job and Release-Job: "document-state-reasons"

739 These OPTIONAL operations affect the state of the target Job. The values of the  
 740 Documents' "document-state-reasons" Document Status attributes MUST NOT be affected  
 741 by these operations.

### 742 8.3 Print-Job, Print-URI: Document Object and Attributes

743 This specification extends the REQUIRED Print-Job and OPTIONAL Print-URI operations  
 744 [STD92] to explicitly create a Document object and copy the request operation attributes  
 745 listed in Table 6 to the corresponding Document attributes. Printers MUST NOT copy Job  
 746 Template attributes to the created Document object.

747 Printers can also return the attributes listed in Table 7 in the Document attributes group after  
 748 the Job attributes group.

749 **Table 6 - Operation Attributes Copied to Document Objects**

Operation Attribute	Document Attribute	Reference
attributes-charset	attributes-charset	[STD92]
attributes-natural-language	attributes-natural-language	[STD92]
document-charset	document-charset	Sections 6.2.1 and 6.4.1
document-format	document-format	[STD92]
	document-format-detected	Section 6.2.2
document-message	document-message	Section 6.2.3
document-name	document-name	[STD92]
document-natural-language	document-natural-language	[STD92]
document-uri	document-uri	[STD92]
job-impressions	impressions	[STD92], Section 6.2.3
job-k-octets	k-octets	[STD92], Section <b>Error!</b> <b>Reference source not found.</b>

Operation Attribute	Document Attribute	Reference
job-media-sheets	media-sheets	[STD92], Section <b>Error! Reference source not found.</b>

750 Editor's note: The following attributes have been omitted from the table since they will have  
 751 been deprecated since the publication of v1.0: document-digital-signature, document-  
 752 format-details, and document-format-version. Also, the compression, ipp-attribute-fidelity,  
 753 and job-mandatory-attributes have been omitted since they are only evaluated at the time of  
 754 job/document creation.

755 **Table 7 - Returned Document Status Attributes**

Document Status Attribute	Print-xxx Conformance	Send-xxx Conformance	Reference
document-number	OPTIONAL	REQUIRED	Section 6.2.4
document-state	OPTIONAL	REQUIRED	Section <b>Error! Reference source not found.</b>
document-state-message	OPTIONAL	OPTIONAL	Section <b>Error! Reference source not found.</b>
document-state-reasons	OPTIONAL	REQUIRED	Section <b>Error! Reference source not found.</b>

756 **8.3.1 Print-Job/Print-URI Response**

757 The following sets of attributes are part of the Print-Job and Print-URI responses:

- 758 Group 1: Operation Attributes
  - 759 As specified in [STD92].
- 760 Group 2: Unsupported Attributes
  - 761 As specified in [STD92].
- 762 Group 3: Job Object Attributes
  - 763 As specified in [STD92].
- 764 Group 4: Document Object Attributes (new)

765 "document-number" (integer(1:MAX)):  
766 The Printer MAY return the document number of this Document object that  
767 was assigned by the Printer starting with 1 for each Job.  
768 "document-state" (type1 enum):  
769 The Printer MAY return the state of this Document object.  
770 "document-state-reasons" (1setOf type2 keyword):  
771 The Printer MAY return the associated state reasons for this Document.  
772 "document-state-message" (text(MAX)):  
773 The Printer MAY return the localized description of the "document-state" and  
774 "document-state-reasons" values for this Document.

#### 775 **8.4 Send-Document: Document Object and Attributes**

776 This specification extends the REQUIRED Send-Document operation [STD92] to explicitly  
777 create a Document object and copy the operation attributes listed in Table 6 to the  
778 corresponding Document attributes.

779 The Send-Document request is also extended to support an additional Document Template  
780 attribute group after the operation attribute group. Document Template attributes are copied  
781 to the Document object after validation as described in section 4.3. Printers MUST NOT  
782 copy Document Template attributes to the Job object.

783 Finally, Printers also return the attributes listed in Table 7 in the Document attributes group  
784 after the Job attributes group.

##### 785 **8.4.1 Send-Document Request**

786 The following attribute sets are part of the Send-Document request:

787 Group 1: Operation Attributes

788 As specified in [STD92].

789 Group 2: Document Template Attributes (new)

790 The Client OPTIONALLY supplies and the Printer MUST support a set of  
791 Document Template attributes. If the Client is not supplying any Document  
792 Template attributes in the request, the Client SHOULD omit Group 2 rather

793 than sending an empty group. However, a Printer MUST be able to accept  
794 an empty group.

795 Group 3: Document Data

796 As specified in [STD92].

#### 797 **8.4.2 Send-Document Response**

798 The following sets of attributes are part of the Send-Document response:

799 Group 1: Operation Attributes

800 As specified in [STD92].

801 Group 2: Unsupported Attributes

802 As specified in [STD92].

803 Group 3: Job Object Attributes

804 As specified in [STD92].

805 Group 4: Document Object Attributes (new)

806 "document-number" (integer(1:MAX)):

807 The Printer MUST return the document number of this Document object that  
808 was assigned by the Printer starting with 1 for each Job.

809 "document-state" (type1 enum):

810 The Printer MUST return the state of this Document object.

811 "document-state-reasons" (1setOf type2 keyword):

812 The Printer MUST return the associated state reasons for this Document.

813 "document-state-message" (text(MAX)):

814 The Printer MAY return the localized description of the "document-state" and  
815 "document-state-reasons" values for this Document.



## 816 **8.5 Send-URI: Document Object and Attributes**

817 This specification extends the OPTIONAL Send-URI operation [STD92] to explicitly create  
818 a Document object and copy the operation attributes listed in Table 6 to the corresponding  
819 Document attributes.

820 The Send-URI request is also extended to support an additional Document Template  
821 attribute group after the operation attribute group. Document Template attributes are copied  
822 to the Document object after validation as described in section 4.3. Printers MUST NOT  
823 copy Document Template attributes to the Job object.

824 Finally, Printers also return the attributes listed in Table 7 in the Document attributes group  
825 after the Job attributes group.

### 826 **8.5.1 Send-URI Request**

827 The following attribute sets are part of the Send-URI request:

828       Group 1: Operation Attributes

829               As specified in [STD92].

830       Group 2: Document Template Attributes (new)

831               The Client OPTIONALLY supplies and the Printer MUST support a set of  
832               Document Template attributes. If the Client is not supplying any Document  
833               Template attributes in the request, the Client SHOULD omit Group 2 rather  
834               than sending an empty group. However, a Printer MUST be able to accept  
835               an empty group.

### 836 **8.5.2 Send-URI Response**

837 The following sets of attributes are part of the Send-URI response:

838       Group 1: Operation Attributes

839               As specified in [STD92].

840       Group 2: Unsupported Attributes

841               As specified in [STD92].

842       Group 3: Job Object Attributes

843               As specified in [STD92].

844 Group 4: Document Object Attributes (new)

845 "document-number" (integer(1:MAX)):

846 The Printer MUST return the document number of this Document object that  
847 was assigned by the Printer starting with 1 for each Job.

848 "document-state" (type1 enum):

849 The Printer MUST return the state of this Document object.

850 "document-state-reasons" (1setOf type2 keyword):

851 The Printer MUST return the associated state reasons for this Document.

852 "document-state-message" (text(MAX)):

853 The Printer MAY return the localized description of the "document-state" and  
854 "document-state-reasons" values for this Document.

## 855 9. Additional Values for Existing Attributes

### 856 9.1 operations-supported (1setOf type2 enum)

857 Table 8 lists the "operation-id" values for the new operations defined in this specification.

858 **Table 8 – Operation-id Values**

Value	Operation Name	Reference
0x0033	Cancel-Document	Section 5.1.1
0x0034	Get-Document-Attributes	Section 5.1.2
0x0035	Get-Documents	Section 5.2.1
0x0036	Delete-Document (obsolete)	Section 10.1
0x0037	Set-Document-Attributes	Section 5.1.3

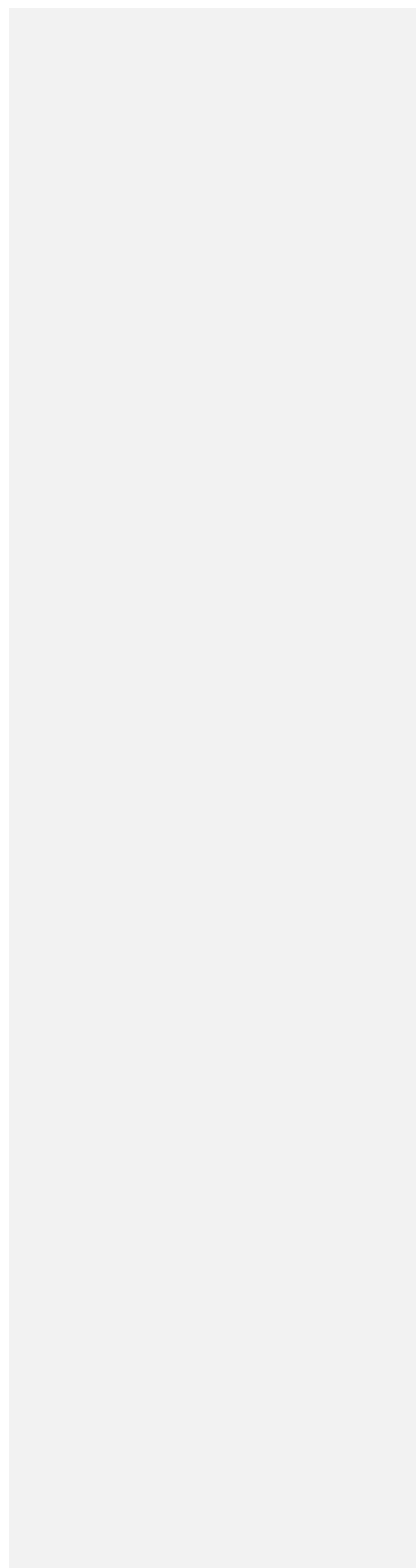
### 859 9.2 requested-attributes (1setOf type2 keyword)

860 This specification defines the following additional values for the "requested-attributes"  
861 operation attribute [STD92]:

862 'document-description': All Document Description and Document Status attributes.

863 'document-template': All Document Template and Printer "xxx-supported" attributes.

864



## 865 10. Obsolete Operations and Attributes

### 866 10.1 Obsolete Delete-Document Operation

867 The obsolete Delete-Document operation removes the specified Document object and its  
 868 data immediately from the specified Job. This operation is obsolete because it destroys  
 869 accounting information about the target Document and MUST NOT be supported by new  
 870 implementations of this specification.

### 871 10.2 Obsolete Document Status Attributes

872 Table 9 lists Document Status attributes defined in PWG 5100.5-2003: The IPP Document  
 873 Object that are now deprecated or obsolete.

874 **Table 9 - Obsolete Document Status Attributes**

Attribute	Reference
compression (type2 keyword)	[STD92]
document-digital-signature (type2 keyword)	[PWG5100.7]
document-format-details (1setOf collection)	[PWG5100.7]
document-format-details-detected (1setOf collection)	[PWG5100.7]
document-format-version (text(127))	[PWG5100.7]
document-format-version-detected (text(127))	[PWG5100.7]
impressions-completed-current-copy (integer(0:MAX))	[RFC3381]
sheet-completed-copy-number (integer(0:MAX))	[RFC3381]

## 875 11. Conformance Requirements

### 876 11.1 Printer Conformance Requirements

877 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 878 1. The required operations defined in section 5;
- 879 2. The required attributes and values defined in section 6;
- 880 3. The new attribute group tag defined in section 7;
- 881 4. The additional semantics defined in section 8;
- 882 5. The additional values defined in section 9;
- 883 6. The internationalization considerations defined in section 12; and
- 884 7. The security considerations defined in section 13.

## 885 11.2 Client Conformance Requirements

886 In order for a Client to claim conformance to this specification, a Client MUST support:

- 887 1. The required operations defined in section 5;
- 888 2. The required attributes and values defined in section 6;
- 889 3. The new attribute group tag defined in section 7;
- 890 4. The additional values defined in section 9;
- 891 5. The internationalization considerations defined in section 12; and
- 892 6. The security considerations defined in section 13.

## 893 12. Internationalization Considerations

894 For interoperability and basic support for multiple languages, conforming implementations  
895 MUST support:

- 896 7. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)  
897 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 898 8. The Unicode Format for Network Interchange [RFC5198] which requires  
899 transmission of well-formed UTF-8 strings and recommends transmission of  
900 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

901 Unicode NFC is defined as the result of performing Canonical Decomposition (into base  
902 characters and combining marks) followed by Canonical Composition (into canonical  
903 composed characters wherever Unicode has assigned them).

904 WARNING – Performing normalization on UTF-8 strings received from Clients and  
905 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client  
906 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now  
907 'hidden').

908 Implementations of this specification SHOULD conform to the following standards on  
909 processing of human-readable Unicode text strings, see:

- 910 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 911 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 912 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 913 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 914 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 915 Unicode Collation Algorithm [UTS10] – sorting

- 916 Unicode Locale Data Markup Language [UTS35] – locale databases
- 917 Implementations of this specification are advised to also review the following informational
- 918 documents on processing of human-readable Unicode text strings:
- 919 Unicode Character Encoding Model [UTR17] – multi-layer character model
- 920 Unicode Character Property Model [UTR23] – character properties
- 921 Unicode Conformance Model [UTR33] – Unicode conformance basis

922 **13. Security Considerations**

923 The IPP extensions defined in this document require the same security considerations as  
924 defined in the Internet Printing Protocol/1.1 [STD92].

925 Implementations of this specification SHOULD conform to the following standard on  
926 processing of human-readable Unicode text strings, see:

- 927 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

928 Implementations of this specification are advised to also review the following informational  
929 document on processing of human-readable Unicode text strings:

- 930 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

931 **14. IANA Considerations**

932 **14.1 Attribute Registrations**

933 The attributes defined in this specification will be published by IANA according to the  
934 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

- 935 <http://www.iana.org/assignments/ipp-registrations>

936 The registry entries will contain the following information:

937	Document Description attributes:	Reference
938	-----	-----
939	document-name (name (MAX))	[PWG5100.5]
940		
941	Document Status attributes:	Reference
942	-----	-----
943	attributes-charset (charset)	[PWG5100.5]
944	attributes-natural-language (naturalLanguage)	[PWG5100.5]

945	compression(obsolete) (type2 keyword)	[PWG5100.5]
946	current-page-order (type2 keyword)	[PWG5100.5]
947	date-time-at-completed (dateTime)	[PWG5100.5]
948	date-time-at-created (dateTime)	[PWG5100.5]
949	date-time-at-processing (dateTime)	[PWG5100.5]
950	detailed-status-messages (1setOf text(MAX))	[PWG5100.5]
951	document-access-errors (1setOf text(MAX))	[PWG5100.5]
952	document-charset (charset)	[PWG5100.5]
953	document-digital-signature(obsolete) (type2 keyword)	[PWG5100.5]
954	document-format (mimeType)	[PWG5100.5]
955	document-format-details(obsolete) (1setOf collection)	[PWG5100.5]
956	document-format-details-detected(obsolete) (1setOf collection)	[PWG5100.5]
957		[PWG5100.5]
958	document-format-detected (mimeType)	[PWG5100.5]
959	document-format-version(obsolete) (text(127))	[PWG5100.5]
960	document-format-version-detected(obsolete) (text(127))	[PWG5100.5]
961	document-job-id (integer(1:MAX))	[PWG5100.5]
962	document-job-uri (uri)	[PWG5100.5]
963	document-message (text(MAX))	[PWG5100.5]
964	document-natural-language (naturalLanguage)	[PWG5100.5]
965	document-number (integer(1:MAX))	[PWG5100.5]
966	document-printer-uri (uri)	[PWG5100.5]
967	document-state (type1 enum)	[PWG5100.5]
968	document-state-message (text(MAX))	[PWG5100.5]
969	document-state-reasons (1setOf type2 keyword)	[PWG5100.5]
970	document-uri (uri)	[PWG5100.5]
971	impressions (integer(0:MAX))	[PWG5100.5]
972	impressions-completed (integer(0:MAX))	[PWG5100.5]
973	impressions-completed-current-copy(obsolete) (integer(0:MAX))	[PWG5100.5]
974		[PWG5100.5]
975	k-octets (integer(0:MAX))	[PWG5100.5]
976	k-octets-processed (integer(0:MAX))	[PWG5100.5]
977	last-document (boolean)	[PWG5100.5]
978	media-sheets (integer(0:MAX))	[PWG5100.5]
979	media-sheets-completed (integer(0:MAX))	[PWG5100.5]
980	more-info (uri)	[PWG5100.5]
981	output-device-assigned (name(MAX))	[PWG5100.5]
982	printer-up-time (integer(1:MAX))	[PWG5100.5]
983	sheet-completed-copy-number(obsolete) (integer(0:MAX))	[PWG5100.5]
984	time-at-completed (integer(MIN:MAX))	[PWG5100.5]
985	time-at-creation (integer(MIN:MAX))	[PWG5100.5]
986	time-at-processing (integer(MIN:MAX))	[PWG5100.5]
987		
988	Document Template attributes:	Reference
989	-----	-----
990	copies (integer(1:MAX))	[PWG5100.5]
991	cover-back (collection)	[PWG5100.5]
992	<Member attributes are the same as the "cover-back" Job Template	
993	attribute>	[PWG5100.5]
994	cover-front (collection)	[PWG5100.5]
995	<Member attributes are the same as the "cover-front" Job Template	
996	attribute>	[PWG5100.5]
997	finishings (1setOf type2 enum)	[PWG5100.5]
998	finishings-col (1setOf collection)	[PWG5100.5]
999	<Member attributes are the same as the "finishings-col" Job Template	
1000	attribute>	[PWG5100.5]

1001	force-front-side (1setOf integer(1:MAX))	[PWG5100.5]
1002	imposition-template (type2 keyword   name(MAX))	[PWG5100.5]
1003	media (type2 keyword   name(MAX))	[PWG5100.5]
1004	media-col (collection)	[PWG5100.5]
1005	<Member attributes are the same as the "media-col" Job Template attribute>	
1006	media-input-tray-check (type2 keyword   name(MAX))	[PWG5100.5]
1007	number-up (integer(1:MAX))	[PWG5100.5]
1008	orientation-requested (type2 enum)	[PWG5100.5]
1009	output-bin (type2 keyword   name(MAX))	[PWG5100.5]
1010	page-delivery (type2 keyword)	[PWG5100.5]
1011	page-order-received (type2 keyword)	[PWG5100.5]
1012	page-ranges (1setOf rangeOfInteger(1:MAX))	[PWG5100.5]
1013	presentation-direction-number-up (type2 keyword)	[PWG5100.5]
1014	print-quality (type2 enum)	[PWG5100.5]
1015	printer-resolution (resolution)	[PWG5100.5]
1016	sides (type2 keyword)	[PWG5100.5]
1017	x-image-position (type2 keyword)	[PWG5100.5]
1018	x-image-shift (integer(MIN:MAX))	[PWG5100.5]
1019	x-sidel-image-shift (integer(MIN:MAX))	[PWG5100.5]
1020	x-side2-image-shift (integer(MIN:MAX))	[PWG5100.5]
1021	y-image-position (type2 keyword)	[PWG5100.5]
1022	y-image-shift (integer(MIN:MAX))	[PWG5100.5]
1023	y-sidel-image-shift (integer(MIN:MAX))	[PWG5100.5]
1024	y-side2-image-shift (integer(MIN:MAX))	[PWG5100.5]
1025		
1026		
1027	Operation attributes:	Reference
1028	-----	-----
1029	document-charset (charset)	[PWG5100.5]
1030	document-number (integer(1:MAX))	[PWG5100.5]
1031		
1032	Printer Description attributes:	Reference
1033	-----	-----
1034	document-creation-attributes-supported (1setOf type2 keyword)	[PWG5100.5]
1035		

1036 **14.2 Attribute Value Registrations**

1037 The attribute values defined in this specification will be published by IANA according to the  
 1038 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1039 <http://www.iana.org/assignments/ipp-registrations>

1040 The registry entries will contain the following information:

1041	Attributes (attribute syntax)	
1042	Keyword Attribute Value	Reference
1043	-----	-----
1044	requested-attributes (1setOf type2 keyword)	[STD92]
1045	document-description	[PWG5100.5]
1046	document-template	[PWG5100.5]



### 1047 14.3 Type2 enum Registrations

1048 The enum values defined in this specification will be published by IANA according to the  
1049 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1050 <http://www.iana.org/assignments/ipp-registrations>

1051 The registry entries will contain the following information:

1052	Attributes (attribute syntax)		
1053	Enum Value	Enum Symbolic Name	Reference
1054	-----	-----	-----
1055	operations-supported (1setOf type2 enum)		[STD92]
1056	0x0033	Cancel-Document	[PWG5100.5]
1057	0x0034	Get-Document-Attributes	{PWG5100.5}
1058	0x0035	Get-Documents	[PWG5100.5]
1059	0x0036	Delete-Document (obsolete)	[PWG5100.5]
1060	0x0037	Set-Document-Attributes	[PWG5100.5]
1061			

### 1062 14.4 Operation Registrations

1063 The operations defined in this specification will be published by IANA according to the  
1064 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1065 <http://www.iana.org/assignments/ipp-registrations>

1066 The registry entries will contain the following information:

1067	Operation Name	Reference
1068	-----	-----
1069	Cancel-Document	[PWG5100.5]
1070	Cancel-Job (extension)	[PWG5100.5]
1071	Delete-Document (obsolete)	[PWG5100.5]
1072	Get-Document-Attributes	[PWG5100.5]
1073	Get-Documents	[PWG5100.5]
1074	Hold-Job (extension)	[PWG5100.5]
1075	Print-Job (extension)	[PWG5100.5]
1076	Print-URI (extension)	[PWG5100.5]
1077	Release-Job (extension)	[PWG5100.5]
1078	Send-Document (extension)	[PWG5100.5]
1079	Send-URI (extension)	[PWG5100.5]
1080	Set-Document-Attributes	[PWG5100.5]

### 1081 14.5 Attribute Group Registrations

1082 The attribute groups defined in this specification will be published by IANA according to the  
1083 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1084 <http://www.iana.org/assignments/ipp-registrations>

1085 The registry entries will contain the following information:

1086	Value	Attribute Group Name	Reference
1087	-----	-----	-----
1088	0x09	document-attributes-tag	[PWG5100.5]

1089 **15. Overview of Changes**

1090 **15.1 IPP Document Object v1.1**

1091 The following changes were made to PWG 5100.5-2003: Standard for The Internet Printing  
 1092 Protocol (IPP): Document Object [PWG5100.5]:

- 1093 • Printers no longer need to support multiple Document Jobs;
- 1094 • Rationale and model sections have been added;
- 1095 • References now point to the current versions of dependent documents and  
 1096 specifications at the time of publication;
- 1097 • The "document-charset" operation attribute from PWG 5100.7 has been added to this  
 1098 specification;
- 1099 • The Delete-Document operation has been made obsolete;
- 1100 • Additional semantics for the deprecated Reprocess-Job and Restart-Job operations  
 1101 have been removed;
- 1102 • The "ipp-attribute-fidelity" and "job-mandatory-attributes" operation attributes are no  
 1103 longer (incorrectly) promoted to persistent Job and Document attributes;
- 1104 • The "compression" Document Status attribute has been made obsolete because it  
 1105 serves no purpose;
- 1106 • Several "document-format-xxx" Document Status attributes from PWG 5100.7 have  
 1107 been made obsolete because they have serious interoperability issues; and
- 1108 • The "impressions-completed-current-copy" and "sheet-completed-copy-number"  
 1109 Document Status attributes have been made obsolete because the parent  
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1198 Implementers of this specification document are encouraged to join the IPP Mailing List in  
1199 order to participate in any discussions of clarification issues and review of registration  
1200 proposals for additional attributes and values.

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1203 Dennis Carney (author of v1.0)  
1204 Tom Hastings (author of v1.0)  
1205 Ira McDonald (High North, Inc.)  
1206 Peter Zehler (author of v1.0)

**1207 18. Change History****1208 18.1 September 19, 2018**

- 1209 • Initial revision for v1.1.
- 1210 • Updated to use new working draft template, section organizations.
- 1211 • Updated references.
- 1212 • Added Changes section.
- 1213 • Added proper rationale and model sections.
- 1214 • Printers no longer need to support multiple Document Jobs.
- 1215 • Added the "document-charset" operation attribute from PWG 5100.7.
- 1216 • Made the Delete-Document operation obsolete.
- 1217 • Made the "compression" Document Status attribute obsolete because it serves no  
1218 purpose.
- 1219 • Made several "document-format-xxx" Document Status attributes from PWG 5100.7  
1220 obsolete because they have serious interoperability issues.
- 1221 • Made the "impressions-completed-current-copy" and "sheet-completed-copy-  
1222 number" Document Status attributes obsolete because the parent specification (RFC  
1223 3381) is obsolete.