



Project of the PWG-IPP Working Group

# Internet Printing Protocol (IPP): Production Printing Attributes – Set1

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## Abstract

This document specifies an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1 [RFC2910, RFC2911]. This extension consists primarily of Job Template attributes defined for submitting print jobs primarily (but not limited to) to production printers. These attributes permit a user to control and/or override instructions in the document content to perform the following functions: print on document covers, control the positioning of stapling, force pages to the front side of the media, identify an imposition template, insert sheets into the document, provide an accounting id, provide an accounting user id, request accounting sheets, provide job sheet messages, request error sheets, provide a message to the operator, control the media used for job sheets, request media by characteristic (size, weight, etc.), request to check the media characteristics in an input tray, specify the presentation direction of page images with number-up, and shift the images of finished pages.

This extension also defines the "current-page-order" Job Description attribute, the "user-defined-values-supported" and "max-stitching-locations-supported" Printer Description attributes, and the 'resources-are-not-supported' value for the "job-state-reasons" Job Description attribute. Some additional "media" keyword values are defined for use with the "media" and "media-col" Job Template attribute.

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227

## 228 1. Introduction

229

230 This document specifies an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and  
231 IPP/1.1 [RFC2910, RFC2911]. This extension consists primarily of OPTIONAL Job Template attributes defined  
232 for submitting print jobs primarily (but not limited to) to production printers. These attributes permit a user to  
233 control and/or override instructions in the document content to perform the following functions: print on document  
234 covers, control the positioning of stapling, force pages to the front side of the media, identify an imposition  
235 template, insert sheets into the document, provide an accounting id, provide an accounting user id, request  
236 accounting sheets, provide job sheet messages, request error sheets, provide a message to the operator, control  
237 the media used for job sheets, request media by characteristic (size, weight, etc.), request to check the media  
238 characteristics in an input tray, specify the presentation direction of page images with number-up, and shift the  
239 images of finished pages. All of these Job Template attributes are OPTIONAL for a Printer to support. However,  
240 some of these Job Template attributes do require other Job Template attributes in this document to be supported.  
241 See the Conformance section (section 7.1).

242

243 This extension document also defines the "current-page-order" Job Description attribute, the "user-defined-values-  
244 supported" and "max-stitching-locations-supported" Printer Description attributes, and the 'resources-are-not-  
245 supported' value for the "job-state-reasons" Job Description attribute.

246

247 Some additional "media" keyword values are defined for use with the "media" and "media-col" Job Template  
248 attribute.

249

250 Many of these functions MAY be specified in a document format (PDL). In such cases, the user MAY request  
251 that the application include these instructions as part of the document data when the document is generated, rather  
252 than in the IPP protocol at print time. However, some applications are unable to support some of the functions.  
253 Also some of these functions are not supported in some PDLs. Finally, in a production environment, the document  
254 may be generated separately from being printed, in which case the end user or the production printer operator  
255 supplies the instructions at print time, long after the document had been created.

256

257

## 258 2. Terminology

259

260 This section defines the following additional terms that are used throughout this document.

261

### 262 2.1 Conformance Terminology

263

264 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, **NEED**  
265 **NOT**, and **OPTIONAL**, have special meaning relating to conformance to this specification. These terms are  
266 defined in [RFC2911 section 13.1 on conformance terminology, most of which is taken from RFC 2119  
267 [RFC2119]. Since support of this entire IPP extension specification is OPTIONAL for conformance to IPP/1.0



268 ([RFC2566], [RFC2565]) or IPP/1.1 ([RFC2911], [RFC2910]), the terms MUST, MUST NOT, REQUIRED,  
 269 SHOULD, SHOULD NOT, MAY, NEED NOT, and OPTIONAL apply *if and only if the extension*  
 270 *specification in this document is implemented*. Thus a feature labeled as REQUIRED in this document is not  
 271 REQUIRED if implementing the basic IPP/1.1 protocol defined by [RFC2911] and [RFC2910].

## 272 2.2 Other terminology

273

|                          |   |
|--------------------------|---|
| collection               | An attribute syntax consisting of a set of attributes. Such a collection attribute has a value that is a set of attributes, similar to a Java Map or a PostScript dictionary. See [ipp-coll].   |
| document data            | The data that represent an "original document" supplied with a Job Creation request. Typically Document Data is in the form of a PDL.   |
| Finished Document        | The document that results after the operation of printing, folding, cutting, finishing, etc. are completed. Lay terms include 'book', 'booklet' and 'document'.   |
| Finished Page            | One side of a sheet in a Finished Document, i.e., one side of a sheet as perceived by a person <i>after</i> any cutting, folding, and/or booklet making. See the expanded definitions and figures in section 2.3. The lay term is 'page'.   |
| Finished-Page Image      | The single image on a Finished Page, i.e. all the marks imaged on a Finished Page. See the expanded definitions and figures in section 2.3.   |
| Finished-Page-Image Cell | The region on the surface (i.e. side) of a sheet where the Finished-Page Image is placed.   |
| Imposition               | The process of laying out multiple Finished-Page Images on the sides of one or more larger sheets. The side of each sheet contains multiple Finished-Page Images. The sheets are folded and possibly cut in order to produce a series of Finished Pages. See the expanded definitions and figures in section 2.3. |
| Impression               | The single image on one side of a sheet, i.e. all the marks that are imaged on one side of a sheet. See the figures in section 2.3.   |
| Input-Document           | The sequence of input pages that the client sends as document data to the IPP Printer (see [ipp-override]).   |
| Insert-Sheet             | A media sheet that the Printer inserts into an Output-Document, on which no Input-Pages are imaged.   |
| Job Creation operation   | An operation that creates a Job, i.e., Create-Job, Print-Job, and Print-URI, but not Validate-Job. If Validate-Job is intended as well, then it is explicitly mentioned.  |
| Number Up                | The process of laying out multiple consecutive page images to produce a Finished-Page Image (see RFC 2911 "number-up" Job Template attribute). See the expanded definitions and figures in section 2.3.   |
| original document        | The document composed by a user that is eventually submitted in the form of Document Data as part of a Job Creation request.  |

|                         |   |
|-------------------------|---|
| original document order | The orders of the pages, typically reading order, as defined in the Original Document.  |
| Output-Document         | The sequence of output pages that the Printer renders onto output media (see [ipp-override]).   |
| print-stream pages      | The sequence of pages according to the definition of pages in the language used to express the document data defined relative to the Input Document (see section 2.5).              |
| rendered output         | Media sheets that are delivered as part of the output of a print request, typically containing Impressions.   |
| set                     | The sheets of either (1) one copy of an output document copy with collated sheets or (2) all the copies of a single sheet for uncollated sheets. See description in section 3.18.1. |

274

275

### 2.3 Number-up and Imposition

276

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278

279

280

The concepts of “number-up” (see RFC 2911 section ) and imposition are similar. However, they have some important differences which are explained in this section. The relevant terms from section 2.2 are presented again with more elaboration.

281

282

283

284

**Finished Page** - One side of a sheet in a Finished Document, i.e., one side of a sheet as perceived by a person *after* any cutting, folding, and/or booklet making. The lay term is ‘page’. See the right-most part of each of the figures in this section.

285

286

**Finished-Page Image** - The single image on a Finished Page, i.e. all the marks imaged on a Finished Page.

287

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292

**Finished-Page-Image Cell** - The region on the surface (i.e. side) of a sheet where the Finished-Page Image is placed. When imposition is not applied, the Finished-Page-Image Cell coincides with the entire surface of one side of the sheet. When imposition is applied, a) the sheet is partitioned into multiple non-overlapping Finished-Page-Image Cells, typically in a rectangular grid, and b) the area near the edges of the sheet may not belong to any Finished-Page-Image Cell.

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**Number Up** - The process of laying out multiple Input-Page images to produce a Finished-Page Image (see RFC 2911 “number-up” Job Template attribute). Such page images are typically reduced in size, rotated, and placed in reading order in a Finished-Page Image. People use a Number Up process to save paper or have a thinner document (see Figure 1). When “number-up” is not applied, a Finished-Page Image is the same as a single page image (see Figure 2, Figure 3, Figure 4, and Figure 5). This concept of Number Up is common in office printing, but not in production printing.

300

301

302

303

**Impression** - The single image on one side of a sheet, i.e. all the marks that are imaged on one side of a sheet. See the middle part of each of the figures in this section. When the printing process does not include Imposition, an Impression is the same as a Finished-Page Image (see Figure 1). When the printing process includes Imposition, an Impression contains multiple Finished-Page images (see Figure 2, Figure 3, Figure

304 4, and Figure 5).

305

306 **Imposition** - The process of laying out multiple Finished-Page Images on the sides of one or more sheets (see  
307 “imposition-template” in section 3.4). Imposition MAY also include, but is not limited to, rotation, scaling,  
308 shifting, cropping, replicating page images, and re-ordering Finished-Page Images to create output  
309 Impressions properly formatted for a specific finishing operation to make, say, a pamphlet or booklet. The  
310 sheets are typically larger than the Finished-Page Images, so that the Finished-Page Images are not  
311 reduced in size. However, some impositions scale the Finished-Page Images, up or down. The sheets are  
312 folded and possibly cut in order to produce a series of Finished Pages. The concept of Imposition was  
313 originated by the printing industry. Examples of imposition include:

314

315 **Signaturization** lays out Finished-Page Images onto the surface of a series of sheets so that when the  
316 sheets are folded (and possibly cut) they form a "signature". Books and booklets consist of one or  
317 more signatures bound together. There is exactly one Finished-Page Image per sheet surface (i.e.,  
318 side) in the Finished Document. Typically there is one page image per Finished-Page Image. If  
319 Number Up is also specified with a value greater than 1, there is more than one page image per  
320 Finished-Page Image.

321

322 **Z-fold** lays out three portrait Finished-Page Images on each side of a sheet for a so-called z-fold brochure,  
323 with a concave and a convex fold between the page images.

324

325 **Same-up** lays out multiple copies of the same Finished-Page Image on the same side of a larger sheet for  
326 printing productivity, with the larger sheet then being cut into the target size. This is a standard  
327 concept in production press printing

328

329 See section 3.19.1.2 for the interaction between “number-up” and Imposition attributes.

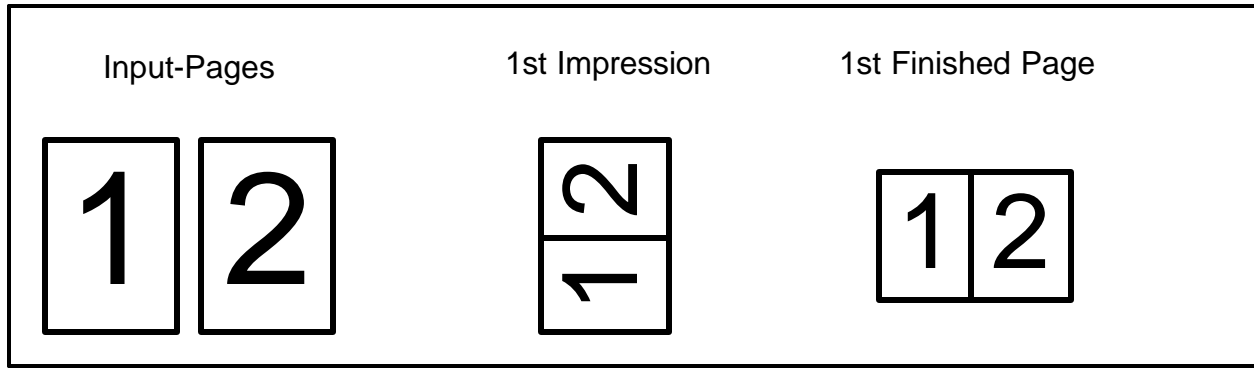
330

### 331 2.3.1 Figures Illustrating “number-up” and Imposition

332

333 Typical number-up is shown in Figure 1 (with scaling) compared with typical Impositions shown in Figure 2, Figure  
334 3, Figure 4, and Figure 5 (without scaling). The first Impression (the first side of the first sheet) and the first  
335 Finished Page (the first page that a human would read) are shown for each figure.

336

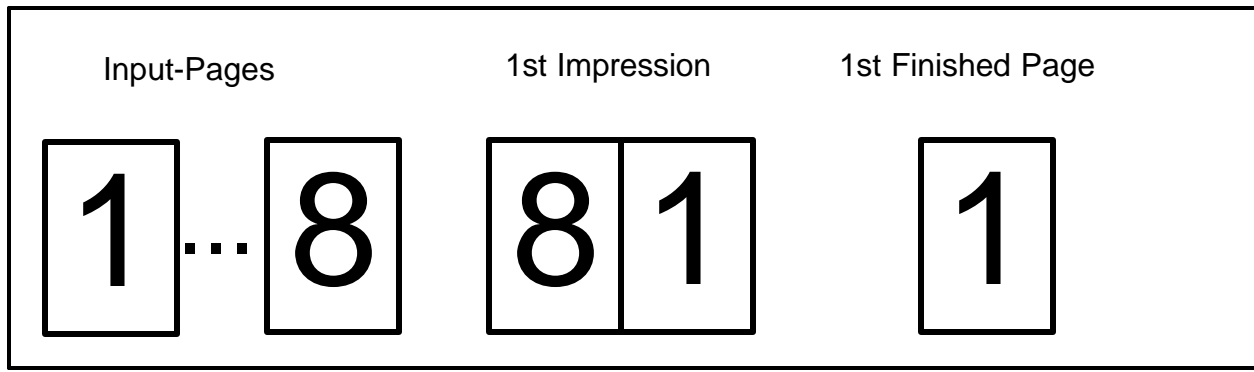


337

338

**Figure 1 - number-up = 2**

339 Figure 1 shows number-up with a value of 2 so that the Input-Page images, say, iso-a4, are being scaled down to  
340 fit onto the same size media (iso-a4). Note that consecutive Input-Page images are placed next to each other on  
341 an Impression.  
342

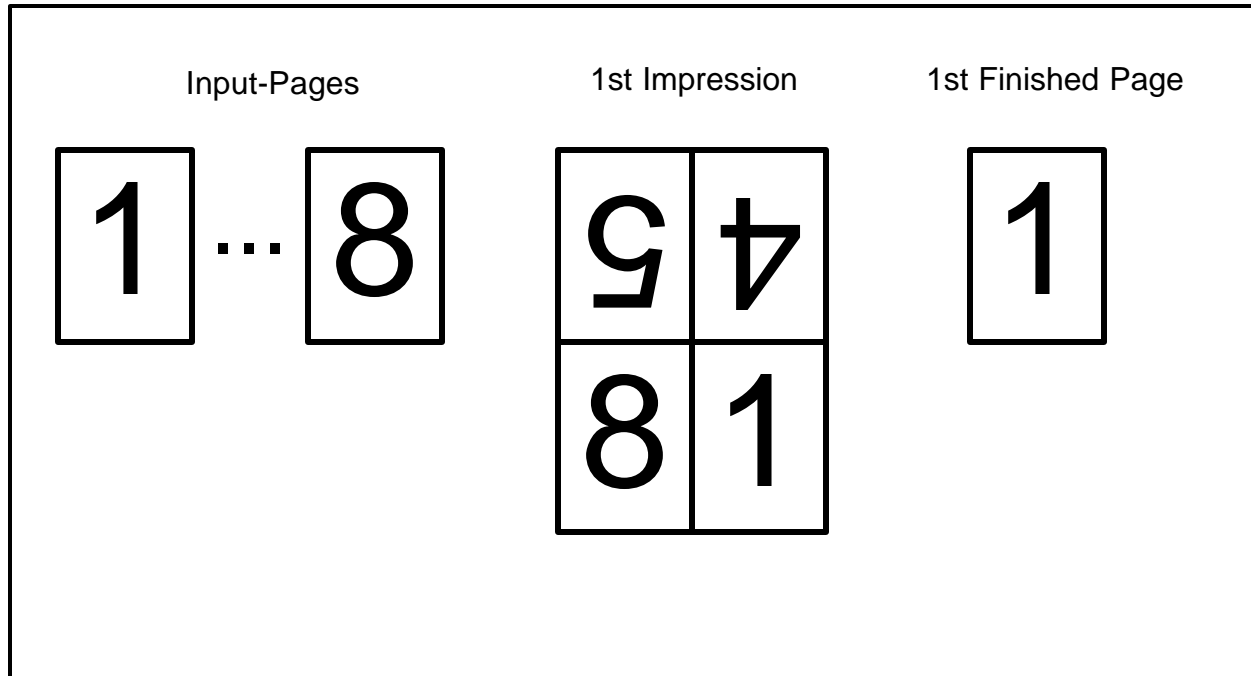


343

344

**Figure 2 - Imposition: 8-page, two-sheet signature**

345 Figure 2 shows a signature imposition that takes 8 Input-Page images and places them on both sides of two larger  
346 sheets without scaling. Two Input-Page images, say iso-a4, appear side by side on each Impression on the twice  
347 as large medium (iso-a3). Note, that unlike number-up, consecutive Input-Page images are *not* placed next to  
348 each other on an Impression.  
349



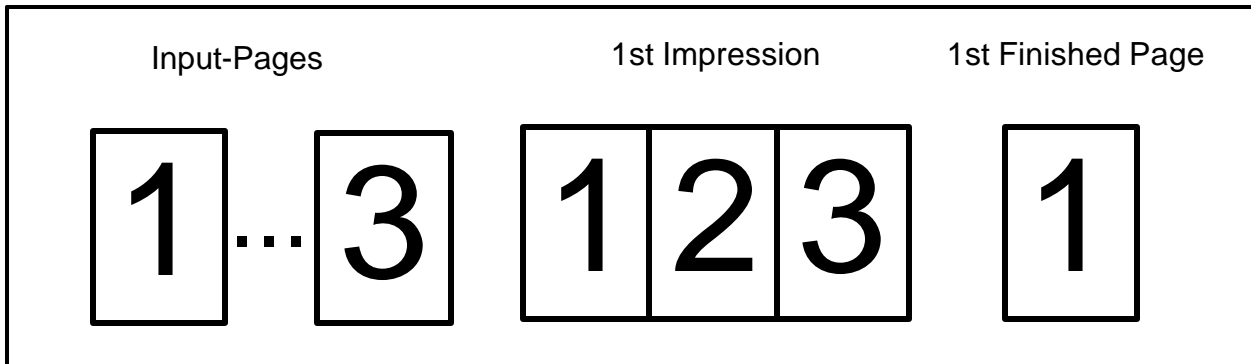
350

351

**Figure 3 - Imposition: 8-page, one-sheet signature**

352 Figure 3 shows a signature imposition that takes 8 Input-Page images and places them on both sides of one larger  
353 sheet without scaling. Four Input-Page images, say iso-a4, appear side by side on each Impression on the four-  
354 times as large medium (iso-a2). Note, that unlike number-up, consecutive Input-Page images are *not* placed next  
355 to each other on an Impression.

356



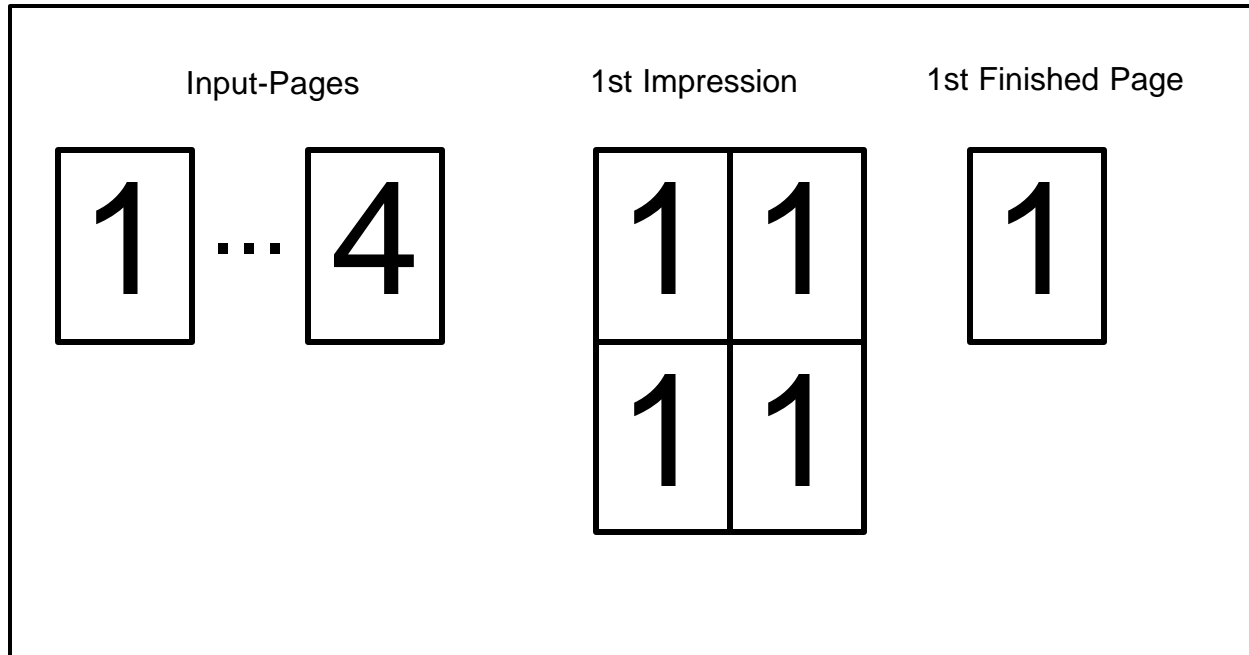
357

358

**Figure 4 - Imposition: z-fold**

359 Figure 4 shows a z-fold imposition that takes 3 Input-Page images and places them on both sides of one larger  
360 sheet without scaling. Three Input-Page images are placed next to each other on an Impression.

361



**Figure 5 - Imposition: same-up = 4**

362

363

364 Figure 5 shows a same-up imposition that takes 4 copies of pairs of Input-Page images (actually Finished Page  
 365 images), say iso-a4 size, and replicates them on both sizes of an iso-a2 impressions. Then the sheet is cut into four  
 366 separate sheets of iso-a4 size.

367

## 368 2.4 Coordinate System

369

370 Some of the attribute extensions defined in this document refer to specific edges of a sheet of printed media.  
 371 Specifying that a staple be placed in the upper left corner of a printed document is an example. To resolve  
 372 ambiguity the following coordinate system is used throughout this document:

373

374 The specified edge is always with respect to the document as if the document were a portrait document. If the  
 375 document is actually a landscape or a reverse-landscape document, the client (which may include a user) supplies  
 376 the appropriate transformed value. For example, to position a staple in the upper left hand corner of a landscape  
 377 document when held for reading, the client supplies the 'staple-bottom-left' value (since landscape is defined as a  
 378 +90 degree rotation from portrait, i.e., anti-clockwise). On the other hand, to position a staple in the upper left  
 379 hand corner of a reverse-landscape document when held for reading, the client supplies the 'staple-top-right' value  
 380 (since reverse-landscape is defined as a -90 degree rotation from portrait, i.e., clockwise).

381

382 The x-axis is defined to be along the bottom edge, with positive values extending in the direction of the right edge.

383

384 The y-axis is defined to be along the left edge, with positive values extending toward the top edge.

385

386 The origin (0,0) is the bottom-left corner.

387

388 Some other attribute extensions defined in this document refer to edges of the Finished-Page-Image Cell and to  
389 axes relative to the Finished-Page-Image Cell. For example, there is an attribute that shifts a Finished-Page Image  
390 along the x-axis and another that shifts it to a left edge.

391

392 When imposition is not applied, the Finished-Page-Image Cell coincides to the surface of a medium. The rules cited  
393 in the above paragraphs of this section apply.

394

395 When imposition is applied, the Finished-Page-Image Cell acts like the surface of a medium with regard to the co-  
396 ordinate system. That is, the edges and axes are as if the Finished-Page-Image Cell were in portrait orientation.  
397 The x-axis is along the bottom of the Finished-Page-Image Cell, the y-axis is along the left edge of the Finished-  
398 Page-Image Cell, and the origin at the bottom-left corner of the Finished-Page-Image Cell.

399

400

## 401 **2.5 Enumeration and Ordering of print-stream pages**

402

403 A *print-stream page* is a page according to the definition of pages in the language used to express the document  
404 data" (see section of 13.2.4 of the IPP Model and Semantics Document). The *document data* included in an IPP  
405 request is typically a PDL representation of a document composed by a user. For the remainder of this description  
406 we will use the term document data to mean the typical PDL representation sent with an IPP request (e.g., a  
407 PostScript File), and the term *original document* to mean the document composed by the user (e.g., a Word97  
408 document). The print-stream page numbering is with respect to the Input-Document, not the Output-Document  
409 (see [ipp-override]). Furthermore, the page numbers are ordinal numbers starting at 1 and are independent of the  
410 page numbers that may be printed on the pages.

411

412 The order of the print-stream pages in the document data is either the same as the order of the original document,  
413 known as 1-N (read "one to N"), or the reverse of that order, known as N-1. There are no assumptions on the  
414 order of the original document, other than it is ordered.

415

416 The enumeration of print-stream pages begins with 1 and increments by 1 for each additional print-stream page.  
417 The enumeration is based on the order of the original document, not the document data supplied with the IPP  
418 request. In other words, if the document data is supplied in N-1 order (reverse of the original document order),  
419 then print-stream page number '1' in the enumeration is actually the N<sup>th</sup> print-stream page defined in the document  
420 data (see the "page-order-received" attribute in section 3.16). Similarly, print-stream page number '2' is defined  
421 by the (N-1)<sup>th</sup> print-stream page defined in the document data. Suppose the document data is supplied in the 1-  
422 N order (same as the original document order), then print-stream page number '1' in the enumeration is the 1<sup>st</sup>  
423 print-stream page defined in the document data. Similarly, print-stream page number '2' is defined by the 2<sup>nd</sup>  
424 print-stream page defined in the document data. The enumeration of print-stream pages is only relevant when  
425 applying attributes or operations that act on a page, or range of page basis (e.g., the "insert-sheet" attribute in  
426 section 3.5).

427

428 The enumeration of print-stream pages is affected by the "multiple-document-handling" attribute. When the

429 "multiple-document-handling" attribute is 'single-document' or 'single-document-new-sheet,' the enumeration is  
430 based on the concatenation of all the print-stream pages in the job. In the case of 'separate-documents-collated-  
431 copies' and 'separate-documents-uncollated-copies,' the enumeration of print-stream pages applies to each  
432 document. For example, for a job with eight documents, referring to print-stream page number '1' actually refers to  
433 print-stream page number '1' in each of the eight documents included with the job.  
434

435 The enumeration of print-stream pages is NOT affected by the "page-ranges" Job Template attribute, if supplied.  
436 The "page-ranges" attribute merely affects which Input-Document pages are actually printed. For example, if an  
437 insert sheet is to be inserted after print-stream page number is 5 of a 10-page document, the insert page will be  
438 inserted after page 5 with respect to the Input-Document as long as page 5 is included in the "page-ranges"  
439 attribute. If the "page-ranges" attribute does not include Input-Document page 5, then the insert sheet will not be  
440 inserted. Thus a user can supply the "page-ranges" attribute without having to change any other attributes in order  
441 to print a part of a document.  
442

## 443 2.6 Collection Attributes

444

445 An attribute of type 'collection' has a value that is a set of attributes, called *member* attributes. The definition for  
446 each member attribute is specified as a sub-section of the collection attribute definition. Each member attribute  
447 MAY in turn be single-valued or multi-valued. The Printer validates and processes each member attribute of a Job  
448 Template collection attribute in the same way that it validates and processes Job Template attributes. The  
449 collection merely serves as a container for the member attributes. In other words, the 'collection' attribute type  
450 serves the same purpose as the 'map' data type in the Java programming language and the dictionary mechanism in  
451 PostScript. See [ipp-coll] for a complete definition and encoding of the 'collection' attribute syntax with examples.  
452

## 453 2.7 Definition of 'none' values

454

455 For most Job Template attributes, the client needs a way to indicate that the Printer MUST NOT perform the  
456 feature associated with the attribute, including not performing the default action indicated by the Printer's "xxx-  
457 default" attribute. If the client omits the "xxx" Job Template attribute, a corresponding value is used from the PDL  
458 data, if present. Otherwise, the Printer's "xxx-default" attribute value is used.  
459

460 For each attribute definition, the representation of none is specified or is explicitly disallowed. For string attribute  
461 syntax types, such as 'text', 'name', 'uri', 'uriScheme', 'charset', 'naturalLanguage', 'mimeType', and  
462 'octetString', the client supplies a zero-length value to indicate an explicit none. For 'enum', 'keyword', or 'keyword  
463 | name' a specific 'none' enum or keyword value is defined. For 'integer' or 'rangeOfInteger' values, a particular  
464 distinguished value, such as 0 or -1 is defined to mean none. The client can supply the defined none value in order  
465 to override a Printer's "xxx-default" value. The Printer MUST return the 'no-value' out-of-band value for Printer  
466 Description attributes that have 'dateTime' or 'integer' time values that do not yet have a value (see [RFC2911]  
467 sections 4.3.14 and 4.4.30).  
468

469 Similarly, for the corresponding Printer's "xxx-default", the Printer MUST use the same none value to indicate that  
470 there is no default value that will be applied. Thus the defined values for the "xxx-default" attribute are the same as



471 those that a client can supply, including the none case. Consequently, no special mention is made of the none case  
 472 in each "xxx-default" attribute definition. However, a Printer implementation MUST support the defined none value  
 473 for each Job Template attribute in job submission, as a value of the "xxx-default" Printer attribute, and as one of the  
 474 values of the "xxx-supported" Printer attribute, if the Printer supports the "xxx" Job Template attribute. Also the  
 475 administrator SHOULD be able to remove the 'none' value from the list of supported values if the site policy is to  
 476 disallow the none case. See [ipp-set-ops] for means to set the values of the "xxx-supported" and "xxx-default"  
 477 Printer attributes using the Set-Printer-Attributes operation.

478

479 There are a few Job Template attributes for which there is no none value defined, because of the inherent nature of  
 480 the semantics associated with the attribute the Printer always supplies some value. Examples of such attributes (see  
 481 [RFC2911]) are: "media" (type3 keyword | name) and "sides" (keyword). There is no 'none' keyword value  
 482 defined for use with the media and a zero-length string will not match any supported values. Similarly, there is no  
 483 'none' keyword value defined for the "sides" attribute. All jobs that print use some media instance and either print  
 484 on one side or on both sides. Thus this kind of attribute does not have a defined none value. Because some  
 485 attributes do not have none values defined, while most do, the definition document MUST specify the distinguished  
 486 none value in each attribute definition or explicitly state that there is no distinguished none value.

487

### 488 3. Job Template Attributes

489

490 This section defines Job Template Attribute extensions for production printing. Table 1 summarizes the Job and  
 491 Printer Job Template attributes.

492

**Table 1 - Summary of Job Template Attributes**

| Job Attribute                                   | Printer: Default Value Attribute                        | Printer: Supported Values Attribute   |
|---|---|---|
| cover-back (collection)                         | cover-back-default (collection)                         | cover-back-supported (1setOf type2 keyword)   |
| cover-front (collection)                        | cover-front-default (collection)                        | cover-front-supported (1setOf type2 keyword)  |
| finishings-col (collection)                     | finishings-col-default (collection)                     | finishings-col-supported (1setOf type2 keyword)<br>finishings-col-ready (1setOf collection) |
| force-front-side (1setOf integer(1:MAX))        | force-front-side-default (1setOf integer(1:MAX))        | force-front-side-supported (rangeOfInteger(1:MAX))  |
| imposition-template (type3 keyword   name(MAX)) | imposition-template-default (type3 keyword   name(MAX)) | imposition-template-supported (1setOf (type3 keyword   name(MAX)))                          |
| insert-sheet (collection)                       | insert-sheet-default (collection)                       | insert-sheet-supported (1setOf type2 keyword)   |
| job-account-id (name(MAX))                      | job-account-id-default (name(MAX))                      | job-account-id-supported (boolean)  |

|  |   |  |
|--|---|--|
| job-accounting-user-id<br>(name(MAX))                    | job-accounting-user-id-default<br>(name(MAX))                 | job-accounting-user-id-supported<br>(boolean)  |
| job-accounting-sheets<br>(collection)                    | job-accounting-sheets-default<br>(collection)                 | job-accounting-sheets-supported (1setOf<br>type2 keyword)                            |
| job-error-sheet<br>(collection)                          | job-error-sheet-default (collection)                          | job-error-sheet-supported (1setOf type2<br>keyword)                                  |
| job-message-to-operator<br>(text(MAX))                   | job-message-to-operator-default<br>(text(MAX))                | job-message-to-operator-supported<br>(boolean)                                       |
| job-sheets-col<br>(collection)                           | job-sheets-col-default (collection)                           | job-sheets-col-supported (1setOf type2<br>keyword)                                   |
| job-sheet-message<br>(text(MAX))                         | job-sheet-message-default<br>(text(MAX))                      | job-sheet-message-supported (boolean)  |
| media-col (collection)                                   | media-col-default (collection)                                | media-col-supported (1setOf type2<br>keyword)<br>media-col-ready (1setOf collection) |
| media-input-tray-check<br>(type3 keyword  <br>name(MAX)) | media-input-tray-check-default<br>(type3 keyword   name(MAX)) | media-input-tray-check-supported<br>(1setOf (type3 keyword   name(MAX)))             |
| page-delivery (type2<br>keyword)                         | page-delivery-default (type2<br>keyword)                      | page-delivery-supported (1setOf type2<br>keyword)                                    |
| page-order-received<br>(type2 keyword)                   | page-order-received-default (type2<br>keyword)                | page-order-received-supported (1setOf<br>type2 keyword)                              |
| presentation-direction-<br>number-up (type2<br>keyword)  | presentation-direction-number-up-<br>default (type2 keyword)  | presentation-direction-number-up-<br>supported (1setOf type2 keyword)                |
| separator-sheets<br>(collection)                         | separator-sheets-default (collection)                         | separator-sheets-supported (1setOf type2<br>keyword)                                 |
| x-image-position (type2<br>keyword)                      | x-image-position-default (type2<br>keyword)                   | x-image-position-supported (1setOf type2<br>keyword)                                 |
| x-image-shift (integer<br>(MIN:MAX))                     | x-image-shift-default (integer<br>(MIN:MAX))                  | x-image-shift-supported (rangeOfInteger<br>(MIN:MAX))                                |
| x-side1-image-shift<br>(integer (MIN:MAX))               | x-side1-image-shift-default (integer<br>(MIN:MAX))            | x-side1-image-shift-supported<br>(rangeOfInteger (MIN:MAX))                          |
| x-side2-image-shift<br>(integer (MIN:MAX))               | x-side2-image-shift-default (integer<br>(MIN:MAX))            | x-side2-image-shift-supported<br>(rangeOfInteger (MIN:MAX))                          |
| y-image-position (type2<br>keyword)                      | y-image-position-default (type2<br>keyword)                   | y-image-position-supported (1setOf type2<br>keyword)                                 |
| y-image-shift (integer<br>(MIN:MAX))                     | y-image-shift-default (integer<br>(MIN:MAX))                  | y-image-shift-supported (rangeOfInteger<br>(MIN:MAX))                                |
| y-side1-image-shift<br>(integer (MIN:MAX))               | y-side1-image-shift-default (integer<br>(MIN:MAX))            | y-side1-image-shift-supported<br>(rangeOfInteger (MIN:MAX))                          |

|  |  |   |
|--|--|---|
| y-side2-image-shift<br>(integer (MIN:MAX)) | y-side2-image-shift-default (integer<br>(MIN:MAX)) | y-side2-image-shift-supported<br>(rangeOfInteger (MIN:MAX)) |
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### 3.1 cover-front (collection) and cover-back (collection)

These two attributes specify how covers are to be applied to each copy of each printed document within a job. Presence of the "cover-front" attribute indicates that a front cover is requested, and similarly, the presence of the "cover-back" attribute indicates that a back cover is requested. Each of the "cover-front" and "cover-back" attributes includes where printing should be applied on the cover (if any), and what media should be used for the cover.

Both the "cover-front" and "cover-back" attributes are affected by the "multiple-document-handling" attribute. In the case of the 'single-document' and 'single-document-new-sheet' values, the covers MUST be applied to each copy of the composite (single) document. When the value is either 'separate-documents-collated-copies' or 'separate-documents-uncollated-copies', then the covers MUST be applied to each document copy individually.

The sheets in the rendered output that represent the covers are treated like any other sheet in the document copy. For example, if the "finishings" attribute (see [RFC2911] section 4.2.6) has a value of 'staple,' then the staple would bind the covers, along with all of the other sheets in the output.

A client SHOULD use this attribute rather than the "page-overrides" attribute with the "media" attribute overridden for the first and last page of each Output-Document. A Printer MAY perform some special function with covers that it wouldn't perform for "page-overrides".

Both the "cover-front" and "cover-back" attributes are defined by the following collection:

**Table 2 - "cover-front" and "cover-back" member attributes**

| Attribute name | attribute syntax          | request                                | Printer Support |
|----------------|---------------------------|--|-----------------|
| media          | type3 keyword   name(MAX) | MAY be neither or one of, but NOT both | MUST            |
| media-col      | collection                |  | MAY             |
| cover-type     | type2 keyword             | MUST                                   | MUST            |

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#### 3.1.1 media (type3 keyword | name(MAX)) or media-col (collection)

Either the "media" (defined in [RFC2911] section 4.2.11) or the "media-col" member attribute is used to indicate what media that the Printer MUST use for the specified cover. The member attributes are the same as those for the "media-col" attribute shown in Table 10.

526 If the client omits both the "media" and the "media-col" member attributes, then the media currently being  
 527 used by the Printer object for the document copy SHOULD also be used for the cover. The client MUST  
 528 NOT supply both the "media" and the "media-col" member attributes. If the client supplies such a mal-  
 529 formed request by supplying both, the Printer MUST either (1) reject the request and return the 'client-  
 530 error-bad-request' status code (see [RFC2911] section 13.1.4.1) or (2) use either the "media" or the  
 531 "media-col" member attribute, independent of the value of the "ipp-attribute-fidelity" attribute supplied by  
 532 the client.  
 533

534 Since this "media" member attribute has the same name as the "media" Job Template attribute defined in  
 535 [RFC2911] section 4.2.11), the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer  
 536 attribute (also defined in [RFC2911] section 4.2.11) identifies the values of this "media" member attribute  
 537 (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the names of the  
 538 supported media.  
 539

540 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute  
 541 defined in section 3.13), the "media-col-supported" Printer attribute (defined in section 3.13.14) identifies  
 542 the keyword names of the member attributes supported in this "media-col" member attribute (as well as the  
 543 keyword names of the "media-col" Job Template attribute), i.e., the names of the member attributes in  
 544 Table 10 that the Printer supports.  
 545

546 **3.1.2 cover-type (type2 keyword)**  
 547

548 The "cover-type" member attribute indicates whether covers are wanted and which sides of the cover  
 549 MUST contain print-stream pages. The print-stream pages used for printing on a cover come from the  
 550 document data.  
 551

552 Standard keyword values for "cover-type" are:  
 553

|               |   |
|---------------|---|
| 'no-cover'    | No covers are to be produced.   |
| 'print-none'  | No printing on either side of the cover.  |
| 'print-front' | The front side (side one) of the cover MUST contain a print-stream page.<br><br>For a front cover ("cover-front") the first print-stream page MUST be placed on side one of the front cover sheet (this is the outside of the front cover). The Printer MUST place the second print stream page on side one of the first sheet of the output document.<br><br>For back cover ("cover-back") the last print-stream page MUST be placed on side one of the back cover sheet (this is the inside of the back cover). The Printer MUST place the second to last print stream page on the front or back side of the last sheet of the output document depending on whether there are an odd or an even number of print stream pages. |

|              |  |
|--------------|--|
| 'print-back' | <p>The back side (side two) of the cover <b>MUST</b> contain a print-stream page.</p> <p>For a front cover ("cover-front") the first print-stream page <b>MUST</b> be placed on side two of the front cover sheet (this is the inside of the front cover). The Printer <b>MUST</b> place the second print stream page on side one of the first sheet of the output document.</p> <p>For a back cover ("cover-back") the last print-stream page <b>MUST</b> be placed on side two of the back cover sheet (this is the outside of the back cover). The Printer <b>MUST</b> place the second to last print stream page on the front or back side of the last sheet of the output document depending on whether there are an odd or an even number of print stream pages.</p> |
| 'print-both' | <p>Both the front and back sides of the cover <b>MUST</b> contain a print-stream page.</p> <p>The front cover <b>MUST</b> contain the first and second print-stream pages on the front and back sides of the front cover sheet, respectively. The Printer <b>MUST</b> place the third print stream page on side one of the first sheet of the output document.</p> <p>The back cover <b>MUST</b> contain the second to last and last print-stream pages on the front and back sides of the back cover sheet, respectively. The Printer <b>MUST</b> place the third to last print stream page on the front or back side of the last sheet of the output document depending on whether there are an odd or an even number of print stream pages.</p>                         |

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When printing on the back side (side two) of a cover, the value of the "sides" attribute **SHOULD** be used to determine which edge is the reference edge (i.e., long or short edge). In the case where the "sides" attribute is 'one-sided,' then the reference edge **SHOULD** be the long edge.

NOTE: If referencing the "sides" attribute is insufficient for determining the reference edge printing on the back side of a cover, then an additional member attribute could be defined that indicates which edge to reference. However, the predominate use cases are covered without this additional member attribute.

In cases where the document data does not contain enough print-stream pages to satisfy the "cover-front" or "cover-back" request, the behavior is implementation dependent.

The "cover-type-supported" (1setOf type2 keyword) Printer attribute identifies the values that the Printer supports, i.e., the keyword cover types supported.

**3.1.3 cover-front-default (collection) and cover-back-default (collection)**

The "cover-front-default" and "cover-back-default" specify the cover that the Printer will provide, if any, if

572 the client omits the "cover-front" or "cover-back" Job Template attribute, respectively. The member  
573 attributes are defined in Table 2. A Printer MUST support the same member attributes and values for  
574 these default attributes as it supports for the corresponding "cover-front" and "cover-back" Job Template  
575 attributes.

576

#### 577 **3.1.4 cover-front-supported (1setOf type2 keyword), cover-back-supported (1setOf type2** 578 **keyword)**

579

580 The "cover-front-supported" and "cover-back-supported" attributes identify the keyword names of the  
581 member attributes supported in the "cover-front" and "cover-back" collection Job Template attributes,  
582 respectively, i.e., the keyword names of the member attributes in Table 2 that the Printer supports.

583

### 584 **3.2 finishings-col (collection) - augments IPP "finishings"**

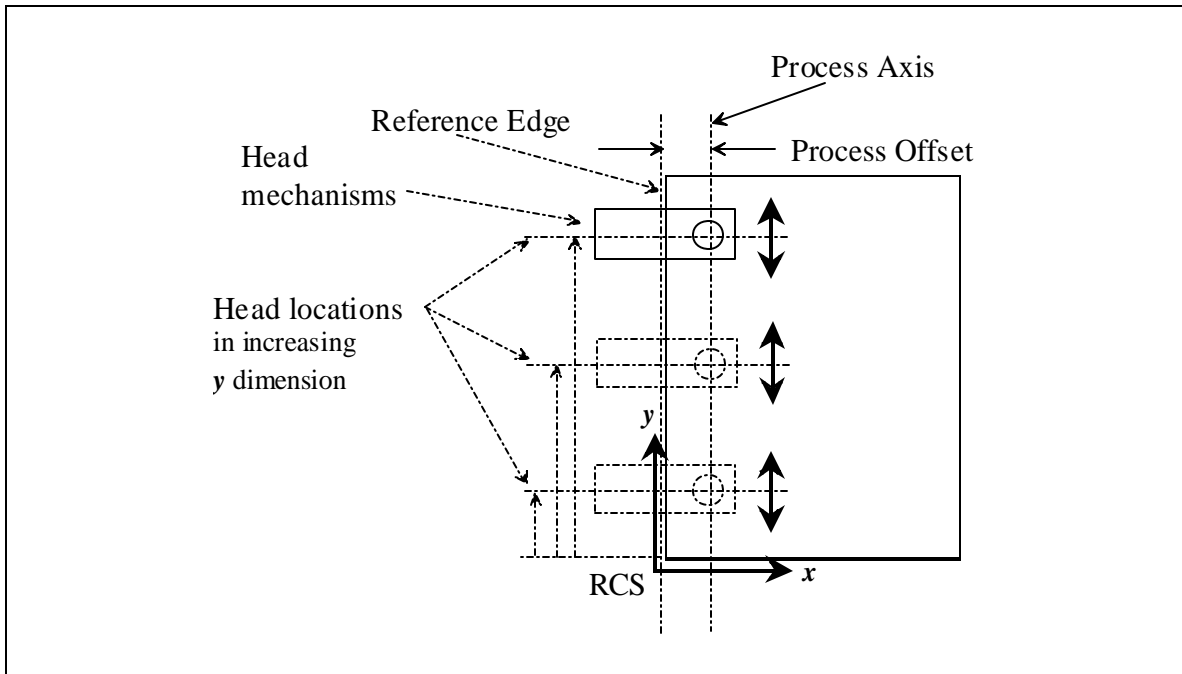
585

586 This attribute augments the IPP "finishings" Job Template attribute (defined in [RFC2911] section 4.2.6). This  
587 "finishings-col" Job Template collection attribute enables a client end user to specify detailed finishing operations  
588 that cannot be specified using simple enumerated finishing values of the IPP "finishings" Job Template attribute.  
589 Figure 6 shows the general finishing coordinate system used by the member attributes of the "finishing-col"  
590 collection attribute and relates to the general coordinate system defined in section 2.3 for all Job Template  
591 attributes. A Printer MAY support the "finishings" attribute without supporting the "finishings-col" attribute.  
592 However, if a Printer supports the "finishings-col" attribute, it MUST also support the "finishings" attribute.  
593 Otherwise, clients that support only the IPP/1.0 or IPP/1.1 "finishings" Job Template attribute would not be able to  
594 interoperate with a Printer that supports only the "finishings-col" Job Template attribute.

595

596 Note: The "finishings-col" (and the IPP/1.1 "finishing" ) Job Template attribute MAY be applied to page ranges  
597 using the "pages-per-subset" Job Template attribute (see [ipp-override]) in order to achieve so-called "subset  
598 finishing".

599



**Figure 6 - General Finishing Coordinate System**

Table 3 lists the member attributes of the "finishings-col" (collection) attribute. Some of these member attributes are themselves collection attributes.

**Table 3 - The "finishings-col" member attributes**

| Attribute                      | Request | Printer Support |
|--------------------------------|---------|-----------------|
| finishing-template (name(MAX)) | MAY     | MAY             |
| stitching (collection)         | MAY     | MAY             |

Note: other collection member attributes will be defined in the future, such as "binding", "drilling", "folding", "trimming", and "offsetting", etc. There may also be some future non-collection member attributes that are simply 'keyword | name'.

**3.2.1 finishing-template (name(MAX))**

The "finishing-template" member attribute contains a string value that specifies some particular finishing operation. The value MAY be a list of parameters used by some implementation defined finishing software or finishing device, e.g. a third party finisher. Alternatively, the value MAY be the name of a file containing finishing parameters.

The "finishing-template-supported" (1setOf name(MAX)) Printer attribute identifies the values of this "finishing-template" member attribute that the Printer supports, i.e., the implementation-specific parameter values supported.

### 621 3.2.2 stitching (collection)

622

623 The "stitching" member attribute is used to specify that each copy of each document in the job MUST be  
 624 stitched or stapled using the detailed stitching parameters provided in the collection. The stitching member  
 625 attribute is used whether the implementation uses wire stitches or staples. Table 4 lists the member  
 626 attributes of the "stitching" (collection) attribute.

627

**Table 4 - The "stitching" member attributes**

| Attribute                                   | Request | Printer Support |
|---|---------|-----------------|
| stitching-reference-edge (type2 keyword)    | MUST    | MUST            |
| stitching-offset (integer(0:MAX))           | MUST    | MUST            |
| stitching-locations (1setOf integer(0:MAX)) | MUST    | MUST            |

628

629 While the "stitching-reference-edge," "stitching-offset", and "stitching-locations" member attributes  
 630 are required to completely specify all possible stitching locations, it may not be possible to specify  
 631 all of these (or to specify all of them independently) for every stitching device.

632

633 A Printer that chooses to support the "stitching" collection attribute MUST support the "stitching-  
 634 reference-edge", the "stitching-offset", and the "stitching-locations" member attributes (in order to  
 635 provide programmable stitching capability beyond that available through the IPP "finishings" Job  
 636 Template attribute - see [RFC2911] section 4.2.6)

637 A client that chooses to request custom stitching using the "stitching" collection attribute MUST  
 638 specify the "stitching-reference-edge", the "stitching-offset", and the "stitching-locations". If the  
 639 client supplies a mal-formed request by not supplying all three member attributes, the Printer  
 640 MUST (depending on implementation) either (1) reject the request and return the "client-error-  
 641 bad-request" (see [RFC2911] section 13.1.4.1) or (2) default the omitted member attributes,  
 642 independent of the value of the "ipp-attribute-fidelity" attribute supplied by the client.

643

#### 644 3.2.2.1 stitching-reference-edge (type2 keyword)

645

646 The "stitching-reference-edge" member attribute specifies the Stitching Reference Edge of the  
 647 output media relative to which the stapling or stitching MUST be applied. The individual staples or  
 648 stitches will be situated along a line or axis parallel to the Stitching Reference Edge that is called the  
 649 Stitching Axis.

650

651 Notice that the "stitching-reference-edge" member attribute is single valued, and thus prohibits  
 652 specification of location by a combination of values (e.g., top-left is not allowed).

653

654 The standard keyword values are:

655 'bottom': The bottom edge coincides with the x-axis of the coordinate system.

656 'top': The top edge is opposite and parallel to the bottom edge.

657 'left': The left edge coincides with the y-axis of the coordinate system.



658 'right': The right edge is opposite and parallel to the left edge.  
659

660 A Printer MUST support this member attribute and at least the 'left' value, however, which  
661 additional values depend on implementation.  
662

663 Note that the 'left' value works with 'portrait' and 'landscape' documents, since 'landscape'  
664 documents are rotated anti-clock-wise 90 degrees, i.e., plus 90 degrees, with respect to 'portrait'  
665 documents, if landscape documents are stapled along the long edge (which becomes the top edge  
666 when the human reader orients the 'landscape' document for reading). If the documents to be  
667 stapled are two-sided, then the client supplies the 'two-sided-long' and 'two-sided-short' values for  
668 the "sides" attribute for the 'portrait' and 'landscape' documents, respectively. Note: the client can  
669 supply the proper value for the "sides" attribute for the user, by knowing whether the document is  
670 portrait or landscape, thereby relieving the user of having to distinguish between the two values for  
671 two-sided printing.  
672

673 If the 'landscape' documents are to be stapled on the short edge (which becomes the left edge  
674 when the human reader orients the 'landscape' document for reading), the client supplies the  
675 'bottom' and 'two-sided-short' values for the "stitching-reference-edge" and "sides" attributes,  
676 respectively.  
677

678 For 'reverse-landscape' documents (ones rotated clock-wise 90 degrees, i.e., minus 90 degrees,  
679 the client supplies 'right' and 'two-sided-long' values for the "stitching-reference-edge" and "sides"  
680 attributes, respectively, if landscape documents are stapled along the long edge (which becomes  
681 the top edge when the human reader orients the 'landscape' document for reading). If the 'reverse-  
682 landscape' documents are to be stapled on the short edge (which becomes the left edge when the  
683 human reader orients the 'landscape' document for reading), the client supplies the 'top' and 'two-  
684 sided-short' values for the "stitching-reference-edge" and "sides" attributes, respectively.  
685

686 The "stitching-reference-edge-supported" (1setOf type2 keyword) Printer attribute identifies the  
687 values of this "stitching-reference-edge" member attribute that the Printer supports, i.e., the stitching  
688 reference edges supported.  
689

### 690 **3.2.2.2 stitching-offset (integer (0:MAX))** 691

692 The "stitching-offset" member attribute specifies the perpendicular distance of the Stitching Axis  
693 from the Stitching Reference Edge. Since the "stitching-offset" member attribute is positive or zero,  
694 the offset is always in the direction that is both away from the Stitching Reference Edge and toward  
695 the center of the media sheet.  
696

697 The unit of measure for the "stitching-locations" member attribute is one hundredth of a millimeter.  
698 This unit is equivalent to 1/2540 th of an inch resolution.  
699

700 If the client specifies a "stitching-offset" then the Printer MUST produce a stitch (or stitches) along  
701 a line that is the specified number of hundreds of millimeters specified by the "stitching-offset"  
702 attribute away from the "stitching-reference-edge".  
703

704 The "stitching-offset-supported" (1setOf (integer (0:MAX) | rangeOfInteger(0:MAX))) Printer  
705 attribute identifies the values of this "stitching-offset" member attribute that the Printer supports, i.e.,  
706 the stitching offsets supported which can be a series of discrete numbers and/or ranges. No  
707 relationship between values of this attribute and the number of stitching locations that the device  
708 supports can be inferred.  
709

### 710 **3.2.2.3 stitching-locations (1setOf integer(0:MAX))**

711 Each value of "stitching-locations" specifies an absolute offset along the Stitching Axis at which a  
712 stitch MUST occur. Each value in the 1setOf MUST be in order of increasing distance.  
713

714  
715 If the "stitching-reference-edge" is either 'top' or 'bottom', then each value in the "stitching-  
716 locations" represents an offset in hundreds of millimeters from the left edge along the Stitching Axis  
717 toward the center of the medium. If the "stitching-reference-edge" is either 'left' or 'right', then each  
718 value in the "stitching-locations" represents an offset in hundreds of millimeters from the bottom  
719 edge along the Stitching Axis toward the center of the medium.  
720

721 The unit of measure for the "stitching-locations" member attribute is one hundredth of a millimeter.  
722 This unit is equivalent to 1/2540 th of an inch resolution.  
723

724 The "stitching-locations-supported" (1setOf (integer(0:MAX) | rangeOfInteger(0:MAX))) Printer  
725 attribute identifies the values of this "stitching-locations" member attribute that the Printer supports,  
726 i.e., the stitching locations supported which can be a series of discrete numbers and/or ranges. No  
727 relationship between values of this attribute and the number of stitching locations that the device  
728 supports can be inferred.  
729

730 The "max-stitching-locations-supported" (integer(1:MAX)) Printer Description attribute indicates  
731 the maximum number of stitches or staples that the implementation is capable of inserting into an  
732 Output Document, even if that number would require human intervention in order to configure the  
733 (manual configured) stitcher. See section 5.2. In other words, "max-stitching-locations-supported"  
734 attribute specifies the maximum number of values that the client can supply in the "stitching-  
735 locations" member attribute.  
736

### 737 **3.2.2.4 stitching-supported (1setOf type2 keyword)**

738  
739 The "stitching-supported" Printer attribute identifies the keyword names of the member attributes  
740 supported in the "stitching" collection member attribute, i.e., the keyword names of the member  
741 attributes in Table 4 that the Printer supports.

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**3.2.3 finishings-col-default (collection)**

The "finishings-col-default" Printer attribute specifies the finishing that the Printer uses, if any, if the client omits the "finishings-col" Job Template attribute in the Job Creation operation (and the PDL doesn't include a finishing specification). The member attributes are defined in Table 3. A Printer MUST support the same member attributes for this default collection attribute as it supports for the corresponding "finishings-col" Job Template attribute.

**3.2.4 finishings-col-ready (1setOf collection)**

The "finishings-col-ready" Printer attribute identifies the finishings configurations that do not require human intervention in order to be used. Table 5 lists the member attributes, their attribute syntaxes, and the corresponding "xxx-supported" Printer attributes. The member attributes have the same names as the member attributes that the client can supply in the "finishing-col" collection attribute (see Table 4), but have the attribute syntaxes of the corresponding "xxx-supported" Printer attributes. The member attribute values will differ from the corresponding "xxx-supported" Printer attribute values to the extent that human intervention is needed, such as running out of staples (or stitching wire) and/or a stapler that requires manual position setting. The rangeOfInteger value is used to indicate the range that can be selected by the client without human intervention, if the finisher is programmable.

**Table 5 - The "finishings-col-ready" member attributes**

| member attribute  | section | corresponding supported attribute   |
|---|---------|---|
| finishing-template (1setOf name(MAX))                                 | 3.2.1   | finishing-template-supported (1setOf name(MAX))                                 |
| stitching (1setOf collection) which contains:                         | 3.2.2   | stitching-supported (1setOf type2 keyword)                                      |
| stitching-reference-edge (1setOf type2 keyword)                       | 3.2.2.1 | stitching-reference-edge-supported (1setOf type2 keyword)                       |
| stitching-offset (1setOf (integer (0:MAX)   rangeOfInteger(0:MAX)))   | 3.2.2.2 | stitching-offset-supported" (1setOf (integer (0:MAX)   rangeOfInteger(0:MAX)))  |
| stitching-locations (1setOf (integer(0:MAX)   rangeOfInteger(0:MAX))) | 3.2.2.3 | stitching-locations-supported (1setOf (integer(0:MAX)   rangeOfInteger(0:MAX))) |

**3.2.5 finishings-col-supported (1setOf type2 keyword)**

The "finishings-col-supported" Printer attribute identifies the keyword names of the member attributes supported in the "finishings-col" collection Job Template attribute, i.e., the keyword names of the member attributes in Table 3 that the Printer supports.

### 771 3.3 force-front-side (1setOf integer(1:MAX))

772

773 This attribute forces the identified Input-Pages (numbered 1 to n) to be imaged on the front side of a sheet in the  
774 Finished Document. This attribute is typically used to start a new chapter or section of a document. For each  
775 identified Input-Page, if that page:

- 776 (1) would have been imaged on the back side of a sheet in the Finished Document, that back side is left  
777 blank and the page is imaged on the front side of the next sheet in the Finished Document
- 778 (2) Otherwise, the Printer prints the identified page as usual.

779

780

#### 781 3.3.1 Interaction between the “force-front-sided” and “number-up” attributes

782

783 If the “number-up” attribute (see [RFC2911] section 4.2.9) is also supplied and the specified page image would  
784 have been in the first position on the front side of a sheet anyway, this attribute has no effect. Otherwise, the  
785 Printer places the specified page image in the first position of the front side of next sheet in the Finished Document  
786 and the intervening page positions are left blank.

787

### 788 3.4 imposition-template (type3 keyword | name(MAX))

789

790 This attribute identifies which imposition method the Printer MUST use to layout Finished-Page Images onto the  
791 surface of a series of one or more sheets (see section 2.3 for a more detailed definition of Imposition and  
792 examples). The value of this attribute identifies the Imposition method to be used in an IMPLEMENTATION-  
793 DEFINED manner. For example, the value (1) can identify a known algorithm implemented in software or (2) can  
794 be mapped to a file which contains the imposition parameters or a script.

795

796 Standard keyword values are:

797

|             |  |
|-------------|--|
| 'none'      | No imposition template is applied.                 |
| 'signature' | The standard site signature template MUST be used. |

798

799 See section 2.3 for examples of different kinds of imposition. See section 3.19.1.2 for the interaction of this  
800 attribute with the Image Shifting and “number-up” attributes.

801

#### 802 3.4.1 Interaction between the “imposition-template” and “sides” attributes

803

804 Whether or not the “sides” attribute (see [RFC2911] section 4.2.8) is overridden by this attribute DEPENDS ON  
805 IMPLEMENTATION, including the value supplied.

806

#### 807 3.4.2 Interaction between the “imposition-template” and “number-up” attributes

808

809 See section 3.19.1.2 for the interaction between Imposition attributes and the “number-up” attribute (see  
810 [RFC2911] section 4.2.9).

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**3.5 insert-sheet (1setOf collection)**

This attribute specifies how Insert-Sheets are to be inserted into the sequence of media sheets that are produced for each copy of each printed document in the job. Insert-Sheets are sheets on which no Input-Pages from the Input-Document are imaged. However, the media specified for Insert-Sheets can be pre-printed media. How the sheet is inserted is implementation dependent, and could be as sophisticated as insertion hardware, or as simple as using media from an existing input-tray.

The order of the values of the "insert-sheet" attribute is important. In the case where more than one value refers to the same page (i.e., multiple values contain the same value for the "insert-after-page-number" member attribute), the values of "insert-sheet" are to be applied in the order that they occur.

This attribute is affected by the "multiple-document-handling" attribute. For values of 'single-document' and 'single-document-new-sheet', the sheet is inserted in the composite (single) document created by the concatenation of all the print-stream pages in all of the documents. In the case of 'separate-documents-collated-copies' and 'separate-documents-uncollated-copies', the inserted sheets are applied to the print-stream in each document separately. The collection consists of:

**Table 6 - "insert-sheet" member attributes**

| Attribute name           | attribute syntax          | request                                | Printer Support |
|--------------------------|---------------------------|--|-----------------|
| insert-after-page-number | integer (0:MAX)           | MUST                                   | MUST            |
| insert-count             | integer (0:MAX)           | MAY                                    | MUST            |
| media                    | type3 keyword   name(MAX) | MUST be one or the other, but NOT both | MUST            |
| media-col                | collection                |  | MAY             |

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**3.5.1 insert-after-page-number (integer(0:MAX))**

The "insert-after-page-number" member attribute specifies the page in the Input-Document (see sections 2.2 and 2.5) print-stream after which the Insert-Sheet(s) is(are) to be placed. The inserted sheet(s) does not affect the numbering of print-stream pages. For-example, to insert a single sheet after both pages 2 and 3 of a given document, the value of "input-after-page-number" would be 2 and 3 respectively (not 2 and 4, as it would be if the inserted sheet affected the Input-Document print-stream page count). For a complete description of the enumeration of print-stream pages see section 2.5.

If the value of the "insert-after-page-number" member attribute is 0, then the sheet is inserted before the first page. If the value is MAX, then the sheet is inserted after the last sheet in the document.

845 If the "insert-after-page-number" member attribute is not a valid input document page reference in the print-  
846 stream, then the IPP Printer SHOULD ignore the request. For example, (1) the page number is beyond  
847 the last page of the document AND is not MAX or (2) the "page-ranges" Job Template attribute does not  
848 include the specified page number (see section 2.5). There is no way to validate the "insert-after-page-  
849 number" attribute with the Validate-Job operation, since the validation cannot occur until the pages of the  
850 documents have arrived at the printer.

851  
852 Since the "insert-after-page-number" member attribute refers to a specific Input-Document print-stream  
853 page, it is possible to specify a page that would not be the last page on a sheet, e.g. an insertion occurs  
854 after the page that is on the front side of a two sided document. In this case, the Printer MUST force a new  
855 Sheet after the specified page, insert the specified sheet, place the following pages starting on the first side  
856 of the next Sheet, and issue a warning by adding 'job-warnings-detected' to the "job-state-reasons" and  
857 by increasing the value of the "job-warnings-count" Job Description attribute by 1. See [ipp-override] for  
858 this error handling specification under "Common Behavior for Sheet Attributes".

859  
860 The "insert-after-page-number-supported" (rangeOfInteger(0:MAX)) Printer attribute indicates the range  
861 of page numbers supported in the "insert-after-page-number" member attribute, i.e., the minimum  
862 (SHOULD be 0) and the maximum (SHOULD be MAX) page numbers supported.

### 863 **3.5.2 insert-count (integer(0:MAX))**

864  
865  
866 The "insert-count" member attribute indicates how many sheets to insert. If the "insert-count" attribute is  
867 omitted, then the printer assumes a value of 1. The value 0 indicates that no inserts sheets are to be  
868 inserted.

869  
870 The "insert-count-supported" (rangeOfInteger(0:MAX)) Printer attribute specifies the range of values that  
871 the Printer supports, i.e., the minimum number and the maximum number of pages.

### 872 **3.5.3 media (type3 keyword | name(MAX)) or media-col (collection)**

873  
874  
875 Either the "media" (defined in [RFC2911] section 4.2.11) or the "media-col" member attribute is used to  
876 indicate the media that the Printer MUST use for the insert sheet. The member attributes are the same as  
877 those for the "media-col" attribute shown in Table 10.

878  
879 The client MUST supply either the "media" or the "media-col" member attribute, but NOT both. If the  
880 client supplies such a mal-formed request by supplying neither or both, the Printer MUST (depending on  
881 implementation) either (1) reject the request and return the 'client-error-bad-request' status code (see  
882 [RFC2911] section 13.1.4.1) or (2) use either the "media" or the "media-col" member attribute,  
883 independent of the value of the "ipp-attribute-fidelity" attribute supplied by the client.

884  
885 Since this "media" member attribute has the same name as the "media" Job Template attribute defined in  
886 [RFC2911] section 4.2.11), the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer

887 attribute (also defined in [RFC2911] section 4.2.11) identifies the values of this "media" member attribute  
888 (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the names of the  
889 supported media.  
890

891 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute  
892 defined in section 3.13), the "media-col-supported" Printer attribute (defined in section 3.13.14) identifies  
893 the keyword names of the member attributes supported in this "media-col" member attribute (as well as the  
894 keyword names of the "media-col" Job Template attribute), i.e., the names of the member attributes in  
895 Table 10 that the Printer supports.  
896

### 897 **3.5.4 insert-sheet-default (1setOf collection)**

898  
899 The "insert-sheet-default" Printer attributes specify the insert sheet(s) that the Printer MUST provide, if any,  
900 if the client omits the "insert-sheet" Job Template attribute. The member attributes are defined in Table 6.  
901 A Printer MUST support the same member attributes for this default collection attribute as it supports for  
902 the corresponding "insert-sheet" Job Template attribute.  
903

### 904 **3.5.5 insert-sheet-supported (1setOf type2 keyword)**

905  
906 The "insert-sheet-supported" attribute identifies the keyword names of the member attributes supported in  
907 the "insert-sheet" collection Job Template attribute, i.e., the keyword names of the member attributes in  
908 Table 6 that the Printer supports.  
909

## 911 **3.6 job-account-id (name(MAX))**

912  
913 The "job-account-id" attribute is a character string representing the account associated with the job. The "job-  
914 account-id" attribute could be a customer name, a sequence of digits referencing an internal billing number, or even  
915 a credit card number. How the printer uses the "job-account-id" attribute is implementation dependent.  
916

917 A zero-length value indicates that there is no account name.  
918

## 919 **3.7 job-accounting-user-id (name(MAX))**

920  
921 The "job-accounting-user-id" attribute specifies the user ID associated with the account specified by the "job-  
922 account-id" attribute (see section 3.6) used for this job. These two attributes are used for authentication and  
923 account tracking either by a mechanism internal to the printer, or by tracking software external to the printer such  
924 as Equitrac. Account tracking systems will usually support a job account ID as having multiple job accounting user  
925 IDs, as well as, a job accounting user ID to be used with multiple job account IDs. It is allowable for value of the  
926 "job-originating-user-name" (see RFC 2911 section 4.3.6) to be the same as the "job-accounting-user-id".  
927

928 A zero-length value indicates that there is no user accounting ID.

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**3.8 job-accounting-sheets (collection)**

This attribute specifies which job accounting sheets **MUST** be printed with the job. Job accounting sheets typically contain information such as the value of the "job-account-id" attribute (see section 3.6) and the "job-accounting-user-id" attribute (see section 3.7), and the number and type of media sheets used while printing the job. The exact information contained on a job accounting sheet is implementation dependent, but should always be a reflection of the account information associated with the job. Typically, job accounting sheets are printed after the job and are not finished (e.g., not stapled) with the document(s).

The 'collection' syntax allows a client to specify media for job accounting sheets that is different than the current media being used for the print-stream page impressions. The collection consists of:

**Table 7 - "job-accounting-sheets" member attributes**

| Attribute name             | attribute syntax          | request                                | Printer Support |
|----------------------------|---------------------------|--|-----------------|
| job-accounting-sheets-type | type3 keyword   name(MAX) | MUST                                   | MUST            |
| media                      | type3 keyword   name(MAX) | MAY be neither or one of, but NOT both | MUST            |
| media-col                  | collection                |  | MAY             |
| job-accounting-output-bin  | type3 keyword   name(MAX) | MAY                                    | MAY             |

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**3.8.1 job-accounting-sheets-type (type3 keyword | name(MAX))**

The "job-accounting-sheets-type" member attribute specifies which job accounting sheets format the Printer **MUST** use to print on the specified media. Standard keyword values are:

|            |  |
|------------|--|
| 'none'     | No accounting sheets are to be printed (i.e. printing of job accounting sheets is totally suppressed). |
| 'standard' | The standard site accounting sheet <b>MUST</b> be printed with the job.                                |

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The "job-accounting-sheets-type-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this "job-accounting-sheets-type" member attribute that the Printer supports, i.e., the names of the job accounting sheets supported.

**3.8.2 media (type3 keyword | name(MAX)) or media-col (collection)**

Either the "media" (defined in [RFC2911] section 4.2.11) or the "media-col" member attribute is used to indicate the media that the Printer **SHOULD** use for the job accounting sheet. The member attributes are the same as those for the "media-col" attribute shown in Table 10.



959 If both the "media" and the "media-col" member attributes are omitted, then the media currently being used  
960 by the Printer object for the document copy SHOULD also be used for the accounting sheet. The client  
961 MUST NOT supply both the "media" and the "media-col" member attribute. If the client supplies such a  
962 mal-formed request by supplying both, the Printer MUST (depending on implementation) either (1) reject  
963 the request and return the 'client-error-bad-request' status code (see [RFC2911] section 13.1.4.1) or (2)  
964 use either the "media" or the "media-col" member attribute, independent of the value of the "ipp-attribute-  
965 fidelity" attribute supplied by the client.  
966

967 Since this "media" member attribute has the same name as the "media" Job Template attribute defined in  
968 [RFC2911] section 4.2.11), the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer  
969 attribute (also defined in [RFC2911] section 4.2.11) identifies the values of this "media" member attribute  
970 (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the names of the  
971 media supported.  
972

973 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute  
974 defined in section 3.13), the "media-col-supported" Printer attribute (defined in section 3.13.14) identifies  
975 the keyword names of the member attributes supported in this "media-col" member attribute (as well as the  
976 keyword names of the "media-col" Job Template attribute), i.e., the names of the member attributes in  
977 Table 10 that the Printer supports.  
978

### 979 **3.8.3 job-accounting-output-bin (type3 keyword | name(MAX))**

980  
981 The "job-accounting-output-bin" member attribute specifies the output bin in which the accounting sheets  
982 are to be placed (see [pwg-output-bin]). If this member attribute is not supplied by the client or not  
983 supported by the Printer, then the Printer places the accounting sheets in the same output-bin as the rest of  
984 the job.  
985

986 The "job-accounting-output-bin-default" (type3 keyword | name(MAX)) Printer attribute is configured to  
987 contain the default output bin for job accounting sheets. If this attribute is not configured (has the 'no-value'  
988 out-of-band value), then the accounting sheets are printed with the job when not specified otherwise by the  
989 client.  
990

991 The "job-accounting-output-bin-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute is  
992 configured to contain the supported output bins for accounting sheets. As with any member attribute of a  
993 Job Template attribute, if the administrator wants to force accounting sheets into a specific output bin, then  
994 the administrator configures the "job-accounting-output-bin-default" and "job-accounting-output-bin-  
995 supported" Printer attributes to contain only that value.  
996

### 997 **3.8.4 job-accounting-sheets-default (collection)**

998  
999 The "job-accounting-default" Printer attributes specify the job accounting that the Printer MUST provide, if  
1000 any, if the client omits the "job-accounting" Job Template attribute. The member attributes are defined in

1001 Table 7. A Printer MUST support the same member attributes and value for this default collection attribute  
 1002 as it supports for the corresponding "job-accounting-sheets" Job Template attribute.

1003  
 1004 **3.8.5 job-accounting-sheets-supported (1setOf type2 keyword)**

1005  
 1006 The "job-accounting-supported" attribute identifies the keyword names of the member attributes supported  
 1007 in the "job-accounting-sheets" Job Template collection attribute, i.e., the keyword names of the member  
 1008 attributes in Table 7 that the Printer supports.

1009  
 1010 As with any Job Template attribute, if the system administrator wishes to force job accounting sheets to  
 1011 always be printed, then he/she configures the Printer's "job-accounting-sheets-default" (collection) Printer  
 1012 attribute and the "job-accounting-sheet-type-supported" Printer attribute to contain only the desired value  
 1013 and not contain the 'none' value.

1014  
 1015 **3.9 job-error-sheet (collection)**

1016  
 1017 This attribute specifies which job error sheet MUST be printed with the job. This is a printer specific sheet  
 1018 enumerating any known errors or warnings that occurred during processing. For example: a printer could put the  
 1019 text 'warning: image off page 2,' on the error sheet to indicate a possible image processing defect. The printer  
 1020 vendor defines the content of the error sheet. If necessary the error sheet can consist of more than one page of  
 1021 output.

1022  
 1023 If the Printer is producing a job sheet for this job (see section 3.11 and [RFC2911] section 4.2.3), then the Printer  
 1024 object MAY print any error and warning information on that same job sheet, i.e., merge the error sheet with the  
 1025 job sheet. This use of the job sheet for errors only applies if the "job-error-sheet" attribute is supplied without  
 1026 either a "media" or "media-col" member attribute. If the "media" or "media-col" member attribute is supplied, a  
 1027 separate error sheet MUST always be used to print errors and warnings.

1028  
 1029 The 'collection' syntax allows a client to specify media for job error sheets that is different than the current media  
 1030 being used for the print-stream page impressions. The collection consists of:

1031  
 1032 **Table 8 - "job-error-sheet" member attributes**

| Attribute name       | attribute syntax          | request                                      | Printer Support |
|----------------------|---------------------------|--|-----------------|
| job-error-sheet-type | type3 keyword   name(MAX) | MUST   | MUST            |
| job-error-sheet-when | type2 keyword             | MAY  | MAY             |
| media                | type3 keyword   name(MAX) | MAY be neither or<br>one of, but NOT<br>both | MUST            |
| media-col            | collection                |  | MAY             |

1033

1034 **3.9.1 job-error-sheet-type (type3 keyword | name(MAX))**

1035  
1036  
1037  
1038

The "job-error-sheet-type" member attribute specifies which job error sheets format that the Printer SHOULD to print error information. Standard keyword values are:

|            |   |
|------------|---|
| 'none'     | No error sheet information is to be printed. (i.e., printing of error sheets is totally suppressed – even if errors or warnings occurred during job processing).        |
| 'standard' | The standard site or vendor defined error sheet information MUST be printed with the job depending on the conditions specified by the "job-error-sheet-when" attribute. |

1039  
1040  
1041  
1042  
1043

The "job-error-sheet-type-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this "job-error-sheet-type" member attribute that the Printer supports, i.e., the names of the job error sheets.

1044  
1045

**3.9.2 job-error-sheet-when (type2 keyword)**

1046  
1047  
1048

The "job-error-sheet-when" member attribute specifies the conditions under which the error sheet information is to be produced. The standard keyword values are:

|            |  |
|------------|--|
| 'on-error' | Print the error sheet information if and only if errors or warnings occurred during the life of the job.   |
| 'always'   | Always print the error sheet information, i.e., error sheets are printed even if no errors or warnings occurred during job processing – when no errors or warnings occurred a suitable message will be printed on the sheet to indicate this. The 'always' value gives an explicit indication of whether or not there were errors or warnings detected during the processing of the job. |

1049  
1050  
1051  
1052  
1053

The "job-error-sheet-when-supported" (1setOf type2 keyword) Printer attribute identifies the values of this "job-error-sheet-when" member attribute that the Printer supports, i.e., the possible conditions under which the job error sheet will be printer.

1054  
1055

**3.9.3 media (type3 keyword | name(MAX)) or media-col (collection)**

1056  
1057  
1058  
1059

Either the "media" (defined in [RFC2911] section 4.2.11) or the "media-col" member attribute is used to indicate the media that the Printer SHOULD be use for the job error sheets. The member attributes are the same as those for the "media-col" attribute shown in Table 10.

1060  
1061  
1062  
1063

If the client omits both of the "media" or the "media-col" member attributes, the Printer prints any job sheet error information on either the job sheet, if it is being produced, or a separate sheet using the media of the document, depending on implementation.

1064

The client MUST NOT supply both the "media" and the "media-col" member attribute. If the client

1065 supplies such a mal-formed request by supplying both, the Printer MUST (depending on implementation)  
1066 either (1) reject the request and return the 'client-error-bad-request' status code (see [RFC2911] section  
1067 13.1.4.1) or (2) use either the "media" or the "media-col" member attribute, independent of the value of the  
1068 "ipp-attribute-fidelity" attribute supplied by the client.  
1069

1070 Since this "media" member attribute has the same name as the "media" Job Template attribute defined in  
1071 [RFC2911] section 4.2.11), the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer  
1072 attribute (also defined in [RFC2911] section 4.2.11) identifies the values of this "media" member attribute  
1073 (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the names of the  
1074 supported media.  
1075

1076 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute  
1077 defined in section 3.13), the "media-col-supported" Printer attribute (defined in section 3.13.14) identifies  
1078 the keyword names of the member attributes supported in this "media-col" member attribute (as well as the  
1079 keyword names of the "media-col" Job Template attribute), i.e., the names of the member attributes in  
1080 Table 10 that the Printer supports.  
1081

#### 1082 **3.9.4 job-error-sheet-default (collection )** 1083

1084 The "job-error-sheet-default" Printer attributes specify the job error sheets that the Printer MUST provide,  
1085 if any, if the client omits the "job-error-sheet" Job Template attribute. The member attributes are defined in  
1086 Table 8. A Printer MUST support the same member attributes and values for this default attribute as it  
1087 supports for the corresponding "job-error-sheet" Job Template attribute.  
1088

1089 An implementation SHOULD be configured out-of-the-box so that the "job-error-sheet-default" Printer  
1090 Attribute has the collection value consisting of the "job-error-sheet-type" with a value of: 'standard' rather  
1091 than 'none'. Then the Administrator and End Users have to explicitly turn off error information.  
1092

#### 1093 **3.9.5 job-error-sheet-supported (1setOf type2 keyword)** 1094

1095 The "job-error-sheet-supported" attribute identifies the names of the member attributes supported in the  
1096 "job-error-sheet" Job Template collection attribute, i.e., the keyword names of the member attributes in  
1097 Table 8 that the Printer supports.  
1098

### 1099 **3.10 job-message-to-operator (text(MAX))** 1100

1101 This attribute carries a message from the user to the operator to indicate something about the processing of the  
1102 print job. A zero length text value indicates no message.  
1103

1104 Note: this attribute may be used in conjunction with the IPP "job-hold-until" Job Template attribute (see  
1105 [RFC2911] section 4.2.2); specifically with the 'indefinite' value. This combination allows a client to specify  
1106 instructions to the operator, while simultaneously preventing the job from being processed until some operator

1107 intervention occurs. This combination is particularly useful in production printing environments, where printer  
 1108 configuration may be required to properly print the job.

1109

1110 **3.11 job-sheets-col (collection) - augments IPP "job-sheets" attribute**

1111

1112 This attribute augments the IPP "job-sheets" Job Template attribute (define in [RFC2911] section 4.2.3). The  
 1113 'collection' attribute syntax allows a client to specify media for job sheets that is different than the current media  
 1114 being used for the print stream images. An example of where this is useful is for separator sheets, which may allow  
 1115 easier distinction of document copies.

1116

1117 Table 9 lists the member attributes of the "job-sheets-col" collection attribute:

1118

1119

**Table 9 - "job-sheets-col" member attributes**

| Attribute name | attribute syntax          | request                    | Printer Support |
|----------------|---------------------------|----------------------------|-----------------|
| job-sheets     | type3 keyword   name(MAX) | MUST                       | MUST            |
| media          | type3 keyword   name(MAX) | MUST be one or             | MUST            |
| media-col      | collection                | the other, but<br>NOT both | MAY             |

1120

1121 **3.11.1 job-sheets (type3 keyword | name(MAX))**

1122

1123 The "job-sheets" member attribute specifies which job sheets to print on the specified media. The values  
 1124 for this member attribute are identical to the keyword and name values for the "job-sheets" Job Template  
 1125 attribute itself, including the 'none' value, and convey the same semantics.

1126

1127 Since this "job-sheets" member attribute has the same name as the "job-sheets" Job Template attribute  
 1128 defined in [RFC2911] section 4.2.3), the "job-sheets-supported" (1setOf (type3 keyword | name(MAX)))  
 1129 Printer attribute specifies which are the values of this "job-sheets" member attribute (as well as the values of  
 1130 the IPP/1.1 "job-sheets" Job Template attribute) that the Printer supports.

1131

1132 **3.11.2 media (type3 keyword | name(MAX)) or media-col (collection)**

1133

1134 Either the "media" (defined in [RFC2911] section 4.2.11) or the "media-col" member attribute is used to  
 1135 indicate the media that the Printer SHOULD use for the job sheet. The member attributes are the same as  
 1136 those for the "media-col" attribute shown in Table 10.

1137

1138 The client MUST supply either the "media" or the "media-col" member attribute, but NOT both. If the  
 1139 client supplies such a mal-formed request by supplying neither or both, the Printer MUST (depending on  
 1140 implementation) either (1) reject the request and return the 'client-error-bad-request' status code (see  
 1141 [RFC2911] section 13.1.4.1) or (2) use either the "media" or the "media-col" member attribute,

1142 independent of the value of the "ipp-attribute-fidelity" attribute supplied by the client.

1143

1144 Since this "media" member attribute has the same name as the "media" Job Template attribute defined in  
1145 [RFC2911] section 4.2.11), the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer  
1146 attribute (also defined in [RFC2911] section 4.2.11) identifies the values of this "media" member attribute  
1147 (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the names of the  
1148 supported media.

1149

1150 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute  
1151 defined in section 3.13), the "media-col-supported" Printer attribute (defined in section 3.13.14) identifies  
1152 the keyword names of the member attributes supported in this "media-col" member attribute (as well as the  
1153 keyword names of the "media-col" Job Template attribute), i.e., the names of the member attributes in  
1154 Table 10 that the Printer supports.

1155

### 1156 **3.11.3 job-sheets-col-default (collection)**

1157

1158 The "job-sheets-default" (see [RFC2911] section 4.2.3) attribute and the "job-sheets-col-default" Printer  
1159 attribute specify the job sheets that the Printer MUST provide, if the client omits both the "job-sheets" and  
1160 the "job-sheets-col" Job Template attribute in the Job Creation operation (and the PDL doesn't include a  
1161 job sheets specification). The member attributes are defined in Table 9. A Printer MUST support the  
1162 same member attributes for this default collection attribute as it supports for the corresponding "job-sheets-  
1163 col" Job Template attribute.

1164

1165 The "job-sheets-default" and "job-sheets-col-default" Printer attributes MUST both be configured to  
1166 specify the same job sheet instance. If the administrator sets one of them to a value (either locally or with  
1167 the Set-Printer-Attributes operation - see [ipp-set]), the Printer MUST set the other attribute's value to  
1168 specify the same job sheet instance or to the 'unknown' out-of-band value, if there isn't a corresponding  
1169 value to be set for the other attribute. If a client attempts to set both attributes, but their values specify  
1170 different job sheet instances, the Printer MUST reject the Set-Printer-Attributes operation and return the  
1171 'client-error-conflicting-attributes' status code. The reason to have both default attributes configured, is so  
1172 that clients that only know about the "job-sheets" attribute will see the "job-sheets-default" attribute, while  
1173 clients that know about the "job-sheets-col" attribute will be able to determine the characteristics of the job  
1174 sheet default.

1175

### 1176 **3.11.4 job-sheets-col-supported (1setOf type2 keyword)**

1177

1178 The "job-sheets-col-supported" attribute identifies the keyword names of the member attributes supported  
1179 in the "job-sheets-col" collection Job Template attribute, i.e., the keyword names of the member attributes  
1180 in Table 9 that the Printer supports.

1181

## 1182 **3.12 job-sheet-message (text(MAX))**

1183

1184 This attribute is used to convey a message that is delivered with the job, and may be printed on a job sheet (e.g.,  
1185 the 'standard' job sheet). The message may contain any type of information, but typically includes either  
1186 instructions for offline processing (e.g., finishing), or a message for the job recipient.  
1187

### 1188 **3.13 media-col (collection) - augments IPP "media"**

1189  
1190 This attribute augments the "media" Job Template attribute (defined in [RFC2911] section 4.2.11). This "media-  
1191 col" Job Template collection attribute enables a client end user to submit a list of media characteristics to the Printer  
1192 as a way to more completely specify the media to be used. Each member attribute of the collection identifies a  
1193 media characteristic. A Printer MAY support the "media" attribute without supporting the "media-col" attribute.  
1194 However, if a Printer supports the "media-col" attribute, it MUST also support the "media" attribute. Otherwise,  
1195 clients that support only the IPP/1.0 or IPP/1.1 "media" Job Template attribute would not be able to interoperate  
1196 with a Printer that supports only the "media-col" Job Template attribute.  
1197

1198 Each value of the "media" (type3 keyword | name) Job Template attribute uniquely identifies an instance of media.  
1199 Each combination of values of the "media-col" collection attribute also uniquely identify an instance of media. In  
1200 other words, each media instance supported by a Printer MUST have a combination of member attribute values  
1201 that differs from the combination of values for all other supported media instances.  
1202

1203 When associating standard media keywords with media instances to be used with the "media" attribute, the  
1204 implementation and/or the administrator SHOULD associate them with media instances whose characteristics are  
1205 what users would normally expect. For example, the 'iso-a4-white' keyword SHOULD be associated with a  
1206 media instance that is A4 in size, 20 pound or 24 pound in weight, white in color, with 'stationery' media type, no  
1207 holes, etc.  
1208

1209 The standard media keywords that identify media sizes, such as 'iso-a4' and 'na-letter', are associated with any  
1210 media in an input tray that is configured for that media size. Thus specifying media size keywords with the "media"  
1211 attribute does not guarantee reproducible results from one job submission to another, since different media of the  
1212 same size may be present from one time to the next. If none of the input trays are configured for that size, the  
1213 association with a media instance is IMPLEMENTATION DEPENDENT.  
1214

1215 The client MUST NOT supply both the "media" and the "media-col" Job Template attributes in a Job Creation  
1216 request. If the client supplies such a mal-formed request by supplying both, the Printer MUST (depending on  
1217 implementation) either (1) reject the request and return the 'client-error-bad-request' status code (see [RFC2911]  
1218 section 13.1.4.1) or (2) use either the "media" or the "media-col" attribute, independent of the value of the "ipp-  
1219 attribute-fidelity" attribute supplied by the client.  
1220

1221 A number of collection Job Template attributes defined in this document have both the "media" and "media-col"  
1222 member attributes. The same rule against supplying both in a request holds for those collection attributes. Those  
1223 Job Template attributes whose sole purpose is to specify the media are defined so that the Printer MUST use the  
1224 requested media, while those that have additional purposes as well are defined so that the Printer SHOULD use  
1225 the requested media.

1226

1227 Each “media-col” value in a Printer MUST contain a value for each “media-col” member attribute supported by the  
1228 Printer. That is, all “media-col” values in a Printer contain the same member attributes. The “media-col” values  
1229 supported by a Printer MUST be either all combinations of supported member attribute values or a subset thereof.  
1230 When a client supplies a “media-col” attribute in a Job Creation or Validate-Job request, the client NEED NOT  
1231 include all “media-col” member attributes supported by the Printer.

1232

1233 When a Printer receives a “media-col” attribute in a Job Creation or Validate-Job request, it finds the specified  
1234 “media-col” value in the Printer using the following “*matching algorithm*”: (this algorithm effectively fills in the  
1235 member attributes not supplied by the client)

1236

1237 1) Find all “media-col” values where each member attribute value is identical to the corresponding member  
1238 attribute in the client supplied “media-col” attribute. Any member attribute not supplied by the client  
1239 matches any value of the corresponding member attribute in the Printer. The Printer ignores those member  
1240 attributes supplied by the client and not supported by the Printer.

1241

1242 2) If the number of *matched* “media-col” values is:

1243

1244 **0:** the Printer MUST either

1245 a) treat the client-supplied “media-col” value as an unsupported value (see [RFC2911] Print-Job  
1246 operation) if “media-col” is not a value of the “user-defined-values-supported” attribute (see  
1247 section 5.1), or

1248 b) accept the “media-col” value and put the Job in the ‘pending-held’ state if “media-col” is a  
1249 value of the “user-defined-values-supported” attribute, and if the Job is otherwise accepted.

1250

1251 **1:** a Printer implementation MUST either

1252 a) use this single value of “media-col” as the value specified by the client, or

1253 b) use step “2 or more” below to confirm the single matched value or to eliminate it.

1254

1255 **2 or more:** a Printer MUST reduce the number “media-col” values in an implementation-defined manner  
1256 to 1 or 0. If the number of values from this step is 1, the Printer implementation MUST go to step  
1257 ‘1a)’ above. If the number of values from this step is 0, the Printer implementation MUST go to step  
1258 ‘0’ above.

1259

1260 To reduce the number of “media-col” values, an implementation SHOULD pick an algorithm that gives  
1261 reproducible results. For example, an algorithm that picks one value at random does not give  
1262 reproducible results. The following are some possible algorithms. Others are possible too.

1263 a) A Printer MAY apply implementation-defined defaults for member attributes not specified by  
1264 the client and perform the matching algorithm again on the matched values. This algorithm may  
1265 result in 0 matches.

1266 b) A Printer MAY find the “closest” or “best” match of the matched “media-col” values. This  
1267 document doesn’t attempt to define “closest” or “best”, but the result MUST be a single match.



- c) A Printer MAY find the “closest” or “best” match of the matched “media-col” values that are also ready (i.e. loaded in trays). This algorithm has a chance of being less reproducible, but may still be sufficiently reproducible to be useful. This algorithm may yield 0 matches unless there is a fallback, such as to the preceding algorithm (b).

A Printer MUST implement either the above algorithm or one that produces equivalent results.

Table 10 lists the member attributes of the "media-col" collection attribute:

**Table 10 - "media-col" member attributes**

| Attribute name      | attribute syntax          | request | Printer Support |
|---------------------|---------------------------|---------|-----------------|
| media-key           | type3 keyword   name(MAX) | MAY     | MAY             |
| media-type          | type3 keyword   name(MAX) | MAY     | MAY             |
| media-info          | text(255)                 | MAY     | MAY             |
| media-color         | type3 keyword   name(MAX) | MAY     | MAY             |
| media-pre-printed   | type3 keyword   name(MAX) | MAY     | MAY             |
| media-hole-count    | integer(0:MAX)            | MAY     | MAY             |
| media-order-count   | integer(1:MAX)            | MAY     | MAY             |
| media-size          | collection                | MAY     | MUST            |
| media-weight-metric | integer(0:MAX)            | MAY     | MAY             |
| media-back-coating  | type3 keyword   name(MAX) | MAY     | MAY             |
| media-front-coating | type3 keyword   name(MAX) | MAY     | MAY             |
| media-recycled      | type3 keyword   name(MAX) | MAY     | MAY             |

The "media-col" collection member attributes definitions are:

**3.13.1 media-key (type3 keyword | name(MAX))**

The "media-key" member attribute contains the name of the media represented as a keyword or name. Values MUST be the same as the keyword and name values for the "media" Job Template attribute and represent the same media, except for media size and input tray keywords (see section 6.3 in this document and [RFC2911] Appendix C) which MUST NOT be "media-key" values.

The value of this member attribute MUST be unique for each media supported by an IPP Printer instance, i.e., no two media instances can have the same "media-key" value on the same IPP Printer instance. However, the same "media-key" value can represent the same or different media on different IPP Printer instances. For example, the 'iso-a4-white' keyword might represent recycled 80 gm/mm on two Printer instances and non-recycled, 72 gm/mm on a third Printer instance. An administrator or a number of administrators within an organization MAY choose to have "media-key" values represent the same media instances across a set of Printers.

1295 Note: Since the above requires that each media instance have a unique "media-key" value (if "media-key"  
 1296 attribute is supported), then the Printer automatically meets the requirement (see section 3.13) that each  
 1297 media instance have a unique combination of member attribute values.  
 1298

1299 Note: As with any combination of supported "media-col" member attributes, if a client supplies the "media-  
 1300 key" member attribute and other member attributes, the Printer will attempt to match all of the supplied  
 1301 member attributes, including the "media-key" value, following the algorithm defined in section 3.13. So if  
 1302 the supplied collection value does not match any supported "media-col" value, the Printer treats the "media-  
 1303 col" attribute as having an undefined attribute value. Thus, a client can ensure that the Printer maps a  
 1304 standard media name keyword to certain expected member attribute values.  
 1305

1306 The "media-key-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values  
 1307 of this "media-key" member attribute that the Printer supports.  
 1308

1309 For Printers that support a large number of media (and the "media-key" attribute), the burden of an  
 1310 administrator to define unique "media-key" values for each media instance could be quite large. Therefore,  
 1311 it is RECOMMENDED that such a Printer assign a unique "media-key" value in an  
 1312 IMPLEMENTATION-DEFINED manner for each media instance for which the administrator has not  
 1313 defined a "media-key" value, rather than refusing the media definition. The Printer also adds such  
 1314 generated values to its "media-key-supported" attribute. A client can supply such a Printer-generated value  
 1315 with either (1) the "media-key" member attribute or (2) the "media" Job Template attribute.  
 1316

### 1317 **3.13.2 media-type (type3 keyword | name(MAX))**

1318  
 1319 The "media-type" member attribute identifies the type of media, i.e., the media instance's predominate  
 1320 characteristic. Depending on implementation, the Printer MAY need to behave differently or perform  
 1321 different validation, depending on the type of the media. For example, prohibiting stapling transparencies  
 1322 or selecting a different paper path for an envelope.  
 1323

1324 The values and descriptions indicated with 'yes' are taken verbatim from the Printer MIB [RFC1759] and  
 1325 "Media Features for Display, Print, and Fax" [RFC2534] documents. Bracketed text indicates additions  
 1326 to these Descriptions taken from other standards. Additional values MAY be registered according to both  
 1327 [REG] and [RFC2911].  
 1328

| Keyword         | Description  | Printer MIB | RFC 2534 |
|-----------------|--|-------------|----------|
| stationery      | Separately cut sheets of an opaque material                  | yes         | yes      |
| transparency    | Separately cut sheets of a transparent material              | yes         | yes      |
| envelope        | Envelopes that can be used for conventional mailing purposes | yes         | yes      |
| envelope-plain  | Envelopes that are not preprinted and have no windows        | yes         | yes      |
| envelope-window | Envelopes that have windows for addressing purposes          | yes         | no       |

|                  |  |     |     |
|------------------|--|-----|-----|
| continuous       | Continuously connected sheets of an opaque material - which edge is connected is not specified   | no  | yes |
| continuous-long  | Continuously connected sheets of an opaque material connected along the long edge  | yes | no  |
| continuous-short | Continuously connected sheets of an opaque material connected along the short edge   | yes | no  |
| tab-stock        | Media with tabs [either pre-cut or full-cut]   | yes | no  |
| pre-cut-tabs     | Media with tabs that are cut so that more than one tab is visible extending out beyond the edge of non-tabbed media in an Output-Document.   | no  | no  |
| full-cut-tabs    | Media with a tab that runs the full length of the sheet so that only one tab is visible extending out beyond the edge of non-tabbed media in an Output-Document.   | no  | no  |
| multi-part-form  | Form medium composed of multiple layers not pre-attached to one another; each sheet may be drawn separately from an input source   | yes | no  |
| labels           | Label stock [For example, a sheet of peel-off labels].   | yes | no  |
| multi-layer      | Form medium composed of multiple layers which are pre-attached to one another; e.g., for use with impact printers.   | yes | no  |
| screen           | A refreshable display  | no  | yes |
| screen-paged     | A refreshable display which cannot scroll  | no  | yes |
| photographic     | Separately cut sheets of an opaque material to produce photographic quality images   | no  | no  |
| cardstock        | Separately cut sheets of a heavier or stiffer opaque material than stationery  | no  | no  |
| other            | <p>The 'other' keyword value is used when the media instance does not correspond to any of the Printer's supported media types (keyword or name).</p> <p>The 'other' keyword value SHOULD NOT be used to refine the defined values. For example, the "media-type" member attribute SHOULD use the 'envelope' value for both self-sealing and moisture-required envelopes in combination with the "media-info" attributes indicating the difference, rather than using the value 'other'. Alternatively, if the Printer supports the name attribute syntax for the "media-type" member attribute and allows the 'name' attribute syntax for envelopes, the administrator could define two new "media-type" name values: 'envelope-self-sealing' and 'envelope-moisture-required'.</p> | no  | no  |

1329

1330

The "media-type-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values

1331 of this "media-type" member attribute that the Printer supports, i.e., the media types supported.

1332

1333 Note: The Administrator can define custom media types using the 'name' (MAX) attribute syntax of the  
 1334 "media-type-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute, if the Printer supports  
 1335 the 'name' attribute syntax for this attribute. As with other Job Template and member attributes, the user  
 1336 can also supply user-defined media type names that are not among the values of the "media-type-  
 1337 supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-  
 1338 supported" attribute to contain the 'media-type' attribute keyword value (see section 5.1).

1339

1340 **3.13.3 media-info (text(255))**

1341

1342 The "media-info" member attribute specifies information that helps describe the media instance for human  
 1343 consumption. This attribute can also be used to distinguish two media instances for which all other member  
 1344 attributes (except "media-key", if implemented) are the same. For example, this member attribute could be  
 1345 used to distinguish between self-sticking and moisture-required envelopes, both of which have a "media-  
 1346 type" value of 'envelope'.

1347

1348 The "media-info-supported" (boolean) Printer attribute indicates whether or not the Printer supports the  
 1349 "media-info" member attribute.

1350

1351 **3.13.4 media-color (type3 keyword | name(MAX))**

1352

1353 The "media-color" member attribute indicates the desired color of the media being specified.

1354

1355 Standard keyword values for "media-color" are:

1356

|             |   |
|-------------|---|
| 'no-color'  | The specified media should have no color. |
| 'white'     | The specified media should be white.      |
| 'pink'      | The specified media should be pink.       |
| 'yellow'    | The specified media should be yellow.     |
| 'blue'      | The specified media should be blue.       |
| 'green'     | The specified media should be green.      |
| 'buff'      | The specified media should be buff.       |
| 'goldenrod' | The specified media should be goldenrod.  |
| 'red'       | The specified media should be red.        |
| 'gray'      | The specified media should be gray.       |
| 'ivory'     | The specified media should be ivory.      |
| 'orange'    | The specified media should be orange.     |

1357

1358 Note: The standard keyword values for the "media-color" attribute are derived primarily from the Printer  
 1359 MIB [RFC1759] prtInputMediaColor standard values with the addition of 'blue', 'red', 'gray', 'ivory',  
 1360 'orange', and 'no-color' (instead of 'transparent' - see 'transparency' in "media-type", section 3.13.2).

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The "media-color-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this "media-color" member attribute that the Printer supports, i.e., the colors supported.

The Administrator can define custom paper colors using the 'name' (MAX) attribute syntax of the "media-color-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member attributes, the user can also supply user-defined color names that are not among the values of the "media-color-supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported" attribute to contain the 'media-color' attribute keyword value (see section 5.1).

**3.13.5 media-pre-printed (type3 keyword | name(MAX))**

The "media-pre-printed" member attribute indicates that the pre-printed characteristics of the desired media. Examples of pre-printed media include forms and company letterhead. The standard keyword values for "media-pre-printed" are:

|               |  |
|---------------|--|
| 'blank'       | The desired medium is not pre-printed. The Printer MAY use an electronic representation of a form, if the medium has some imaged information already associated with it. |
| 'pre-printed' | The desired medium is pre-printed; the other attributes identify which medium instance and so what is actually pre-printed.  |
| 'letter-head' | The site-defined letter head pre-printed is desired.   |

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The "media-pre-printed-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this "media-pre-printed" member attribute that the Printer supports.

**3.13.6 media-hole-count (integer(0:MAX))**

The "media-hole-count" member attribute indicates the number of pre-drilled holes in the desired media. A value of 0 (zero) indicates that no holes should be present in the media.

The "media-hole-count-supported" (1setOf rangeOfInteger(0:MAX)) Printer attribute identifies the ranges of values of this "media-hole-count" member attribute that the Printer supports.

**3.13.7 media-order-count (integer(1:MAX))**

The "media-order-count" member attribute indicates the number of sheets, within an ordered sequence of sheets; after which the sequence begins to repeat. For example, third cut tab stock in which all three forms are present has an order count of 3 (this is also sometimes called the modulus of the ordered media). Full-cut tab stock MAY have an order count greater than 1 if it has an ordered sequence, such as a cycle of colors or cycle of pre-printing.

1397

1398

If the "media-order-count" is 1, then all media is the same.

1399

1400

The "media-order-count-supported" (1setOf rangeOfInteger(1:MAX)) Printer attribute identifies the range of values of this "media-order-count" member attribute that the Printer supports.

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### 3.13.8 media-size (collection)

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1405

The "media-size" member attribute is a collection that explicitly specifies the numerical media width and height dimensions.

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It is RECOMMENDED that a client localize the collection values to the size names that users are familiar with, such as 'letter' and 'A4', possibly also including the exact dimensions as well (and in the units appropriate for the user's locale). If a client does not recognize a pair of numbers as a named size, it can simply display the two numbers instead. Thus the pair of size dimensions serve the same function as keyword values, except that the client has an obvious fallback display for an unrecognized pair, namely, the actual dimension numbers.

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The "media-size" collection member attributes are:

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1417

**Table 11 - "media-size" member attributes**

| Attribute name | attribute syntax | request | Printer Support |
|----------------|------------------|---------|-----------------|
| x-dimension    | integer (0:MAX)  | MUST    | MUST            |
| y-dimension    | integer (0:MAX)  | MUST    | MUST            |

1418

1419

#### 3.13.8.1 x-dimension (integer(0:MAX))

1420

1421

Indicates the size of the media in hundredths of a millimeter along the bottom edge of the media.

1422

See section 2.4 regarding the coordinate system. This unit is equivalent to 1/2540 th of an inch resolution.

1423

1424

1425

#### 3.13.8.2 y-dimension (integer(0:MAX))

1426

1427

Indicates the size of the media in hundredths of a millimeter along the left edge of the media. See section 2.4 regarding the coordinate system. This is equivalent to 1/2540 th of an inch resolution.

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1429

1430

#### 3.13.8.3 media-size-supported (1setOf collection)

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1432

Indicates the sizes supported by the Printer. A requested media size dimension matches a supported media dimension if it is within an implementation-defined tolerance. For example,

1433

1434 PostScript [redbook] specifies a tolerance of 5 points (5/72 of an inch = 1.7 mm) of a supported  
 1435 dimension, i.e., within 176 units of the value of the dimension.

1436  
 1437 The "media-size-supported " collection member attributes are:  
 1438

1439 **Table 12 - "media-size-supported" member attributes**

| Attribute name | attribute syntax                         | request | Printer Support |
|----------------|--|---------|-----------------|
| x-dimension    | integer (1:MAX)   rangeOfInteger (1:MAX) | MUST    | MUST            |
| y-dimension    | integer (1:MAX)   rangeOfInteger (1:MAX) | MUST    | MUST            |

1440  
 1441 **3.13.8.3.1 x-dimension (integer(1:MAX) | rangeOfInteger(1:MAX))**  
 1442

1443 Indicates the size of the media in hundredths of a millimeter along the bottom edge of the  
 1444 media. This is equivalent to 1/2540 th of an inch resolution. The rangeOfInteger attribute  
 1445 syntax accommodated variable size implementations, such as printers supporting adjustable  
 1446 input trays and web printers. See section 2.4 regarding the coordinate system and section  
 1447 5.1 regarding user-define media sizes.

1448  
 1449 **3.13.8.3.2 y-dimension (integer(1:MAX) | rangeOfInteger(1:MAX))**  
 1450

1451 Indicates the size of the media in hundredths of a millimeter along the left edge of the media.  
 1452 This is equivalent to 1/2540 th of an inch resolution. The rangeOfInteger attribute syntax  
 1453 accommodated variable size implementations, such as printers supporting adjustable input  
 1454 trays and web printers. See section 2.4 regarding the coordinate system and section 5.1  
 1455 regarding user-defined media sizes.

1456  
 1457 **3.13.9 media-weight-metric (integer(0:MAX))**  
 1458

1459 The "media-weight-metric" member attribute indicates the weight of the desired media rounded to the  
 1460 nearest whole number of grams per square meter.

1461  
 1462 The "media-weight-metric-supported" (1setOf rangeOfInteger(1:MAX)) Printer attribute identifies the  
 1463 values of this "media-weight-metric" member attribute that the Printer supports, i.e., the weights supported  
 1464 in metric units.

1465  
 1466 **3.13.10 media-front-coating (type3 keyword | name(MAX)) and media-back-coating (type3  
 1467 keyword | name(MAX))**  
 1468

1469 The "media-front-coating" and "media-back-coating" member attributes indicate what pre-process coating  
 1470 has been applied to the front and back of the desired media, respectively.

1471

1472 Standard keyword values for "media-front-coating" and "media-back-coating" are:

1473

|              |  |
|--------------|--|
| 'none'       | Indicated that the media MUST not have any coating.        |
| 'glossy'     | Indicates that the media MUST have a "glossy" coating.     |
| 'high-gloss' | Indicates that the media MUST have a "high-gloss" coating. |
| 'semi-gloss' | Indicates that the media MUST have a "semi-gloss" coating. |
| 'satin'      | Indicates that the media MUST have a "satin" coating.      |
| 'matte'      | Indicates that the media MUST have a "matte" coating.      |

1474

1475 The "media-front-coating-supported" (1setOf (type3 keyword | name(MAX))) and "media-back-coating-  
 1476 supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of these "media-  
 1477 front-coating" and "media-back-coating" member attributes that the Printer supports.

1478

### 1479 **3.13.11 media-recycled (type3 keyword | name(MAX))**

1480

1481 The "media-recycled" member attribute indicates the recycled characteristics of the media. The standard  
 1482 keyword values are:

1483

|            |   |
|------------|---|
| 'none'     | The media MUST NOT be recycled.                             |
| 'standard' | The media MUST be the site-defined standard recycled stock. |

1484

1485 If this member attribute is supported, the Printer MUST support at least the 'none' and 'standard' values.

1486

1487 The "media-recycled-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the  
 1488 values of this "media-recycled" member attribute that the Printer supports, i.e., the recycled characteristics  
 1489 supported, which MUST include the 'none' keyword value so that validation follows the normal rules.

1490

### 1491 **3.13.12 media-default (type3 keyword | name(MAX)) and media-col-default (collection)**

1492

1493 The "media-default" (see [RFC2911] section 4.2.11) and the "media-col-default" Printer attributes specify  
 1494 the media that the Printer uses, if the client omits both the "media" and the "media-col" Job Template  
 1495 attributes in the Job Creation operation (and the PDL doesn't include a media specification). The member  
 1496 attributes are defined in Table 10. A Printer MUST support the same member attributes for this default  
 1497 collection attribute as it supports for the corresponding "media-col" Job Template attribute.

1498

1499 The "media-default" and "media-col-default" Printer attributes MUST both be configured to specify the  
 1500 same media instance. If the administrator sets one of them to a value (either locally or with the Set-Printer-  
 1501 Attributes operation - see [ipp-set]), the Printer MUST set the other attribute's value to specify the same  
 1502 media instance or to the 'unknown' out-of-band value, if there isn't a corresponding value to be set for the



1503 other attribute. If a client attempts to set both attributes, but their values specify different media instances,  
1504 the Printer MUST reject the Set-Printer-Attributes operation and return the 'client-error-conflicting-  
1505 attributes' status code. The reason to have both default attributes configured, is so that clients that only  
1506 know about the "media" attribute will see the "media-default" attribute, while clients that know about the  
1507 "media-col" attribute will be able to determine the characteristics of the media default.  
1508

### 1509 **3.13.13 media-ready (1setOf (type3 keyword | name(MAX))) and media-col-ready (1setOf** 1510 **collection)**

1511  
1512 The "media-ready" (see [RFC2911] section 4.2.11) and "media-col-ready" Printer attribute identifies the  
1513 media that are available for use without human intervention, i.e., the media that are ready to be used  
1514 without human intervention. The collection value MUST have all of the member attributes that are  
1515 supported in Table 10. If this attribute is supported, the Printer MUST support the IPP/1.1 "media-ready"  
1516 (1setOf (type3 keyword | name(MAX))) Printer attribute also. The *i* th value of the "media-ready"  
1517 corresponds to the *i* th value of the "media-col-ready" attribute, so that the client can correlate the media  
1518 name or keywords with the collection values, i.e., determine the characteristics of each ready media  
1519 instance.  
1520

### 1521 **3.13.14 media-col-supported (1setOf type2 keyword)**

1522  
1523 The "media-col-supported" Printer attribute identifies the keyword names of the member attributes  
1524 supported in the "media-col" collection Job Template attribute, i.e., the keyword names of the member  
1525 attributes in Table 10 that the Printer supports.  
1526

## 1527 **3.14 media-input-tray-check (type3 keyword | name(MAX))**

1528  
1529 The "media-input-tray-check" Job Template attribute indicates that the Printer MUST check that the  
1530 characteristics of the media in the identified input tray are the same as characteristics of the media identified by the  
1531 Job's "media" Job Template attribute or *matched* (see section 3.13) by the Job's "media-col" Job Template  
1532 attribute. The keyword values are the same input tray keyword values as are defined for the "media" Job Template  
1533 attribute (see section 6.3 in this document and [RFC2911] Appendix C), i.e., 'top', 'middle', 'bottom', etc.  
1534

1535 Independent of the "ipp-attributes-fidelity" operation attribute supplied by the client, if the characteristics differ, the  
1536 Printer adds the 'resources-are-not-ready' value (see section 6.1) to the job's "job-state-reasons" attribute and  
1537 MAY either (1) put the job into the 'pending-held' state or (2) start to process the job normally, but immediately  
1538 stop the job ("job-state" = 'processing-stopped') and the Printer ("printer-state" = 'stopped'). In either  
1539 implementation, the operator can change the media in the input tray to agree with the job or can modify the job's  
1540 "media" or "media-col" attributes to agree with the input tray, depending on policy.  
1541

## 1542 **3.15 page-delivery (type2 keyword)**

1543  
1544 This attribute indicates whether print-stream pages of the job are to be delivered to the output bin or finisher in the

1545 same page order as the original document, or, in reverse of that order, and, whether the print-stream pages are  
 1546 delivered face up or face down. The "page-delivery" attribute specifies the intent based on the "original document"  
 1547 page order. See section 2.5 for a complete discussion on the ordering of print-stream pages.

1548  
 1549 Standard keyword values for page delivery are:  
 1550

|                           |  |
|---------------------------|--|
| 'same-order-face-up'      | The media sheets that represent the printed document MUST be delivered to the output bin or finishing device in the same order as defined by the "page-order-received" attribute. Further, side one of each sheet MUST be delivered face up to the output bin or finishing device.   |
| 'same-order-face-down'    | The media sheets that represent the printed document MUST be delivered to the output bin or finishing device in the same order as defined by the "page-order-received" attribute. Further, side one of each sheet MUST be delivered face down to the output bin or finishing device. |
| 'reverse-order-face-up'   | The media sheets that represent the printed document MUST be delivered to the output bin or finishing device in the reverse order by the "page-order-received" attribute. Further, side one of each sheet MUST be delivered face up to the output bin or finishing device.           |
| 'reverse-order-face-down' | The media sheets that represent the printed document MUST be delivered to the output bin or finishing device in the reverse order by the "page-order-received" attribute. Further, side one of each sheet MUST be delivered face down to the output bin or finishing device.         |
| 'system-specified'        | The Printer selects the most efficient delivery order based on other Job Template attributes supplied by the client, such as "finishings", "finishings-col", and "page-order-received".  |

1551  
 1552 The "page-delivery" attribute is often used in conjunction with on-line and off-line finishing devices. The intent is to  
 1553 be able to deliver the media sheets in either the order of the page-stream pages as defined in the "original  
 1554 document" or in the reverse of that order.

1555  
 1556 **3.15.1 Interaction with the "page-order-received" attribute**

1557  
 1558 The "page-order-delivery" attribute is dependent on the value of the "page-order-received" attribute  
 1559 (defined in section 3.16 below):  
 1560

| "page-order-received" | "page-delivery" | Description of behavior |
|-----------------------|-----------------|-------------------------|
|                       |                 |                         |

|                |                           |   |
|----------------|---------------------------|---|
| '1-to-n-order' | 'same-order-face-up'      | The first print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing up.          |
| '1-to-n-order' | 'same-face-order-down'    | The first print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing down.        |
| '1-to-n-order' | 'reverse-order-face-up'   | The last print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second to last "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing up.   |
| '1-to-n-order' | 'reverse-order-face-down' | The last print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second to last "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing down. |
| 'n-to-1-order' | 'same-order-face-up'      | The first print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing up.          |
| 'n-to-1-order' | 'same-order-face-down'    | The first print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing down.        |
| 'n-to-1-order' | 'reverse-order-face-up'   | The last print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second to last "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing up.   |
| 'n-to-1-order' | 'reverse-order-face-down' | The last print-stream page in the "document data" MUST be the first print-stream page delivered, followed by the second to last "print-stream" page, and so on. Further, each media sheet MUST be delivered with side one of the sheet facing down. |

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### 3.16 page-order-received (type2 keyword)

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This attribute specifies the page order of the print-stream pages defined in the document data. The "page-order-received" attribute does not provide any direct processing instructions, it only provides information about the page order so that the client can specify ordinal page numbers with respect to the original source document, rather than having to take into account whether the print stream pages are being sent "one to N" or "N to one". For example, consider such Job Template attributes as "insert-sheet" (section 3.5) and "page-overrides" (see [ipp-override]). See section 2.5 for a complete discussion of print-stream page order.

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1572  
1573

Standard keyword values for "page-order-received" are:

|                |  |
|----------------|--|
| '1-to-n-order' | The print-stream pages defined in the document data are in the same order as the original document.    |
| 'n-to-1-order' | The print-stream pages defined in the document data are in the reverse order of the original document. |

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The "page-order-received" attribute applies to all documents in a Job Creation or Document Creation request. If a job consists of multiple documents, and all of the documents are not in the same page order, either '1-to-n-order' or 'reverse,' then inconsistent processing of other Job Template attributes that depend on "page-order-received" may occur.

If the "page-order-received" attribute is not present in a Job Creation or Document Creation request, then the printer SHOULD assume a value of '1-to-n-order.'

### 3.17 presentation-direction-number-up (type2 keyword)

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This attribute specifies the order that the Printer places page images on a Finished-Page Image with the "number-up" attribute. This attribute is especially useful to control the presentation direction in languages or multi-lingual documents that have more than one presentation direction, but may be used with any language. For example of the former, in Japanese text on pages can have a presentation direction that is either top-to-bottom-right-to-left or left-to-right-top-to-bottom. For an example of the latter, a mixed English and Hebrew document, text on pages can have a presentation direction that is either left-to-right-top-to-bottom or right-to-left-top-to-bottom. This attribute allows the client to specify the placement of page images on Finished-Page Images to mirror the direction of the text on pages.

1593  
1594  
1595  
1596

Each keyword value that a client supplies for this attribute MUST be a value of the "presentation-direction-number-up-supported (1setOf type2 keyword)" attribute. Table 13 below shows the standard values. A Printer MUST support at least one of value of Table 13. It MAY support any additional values from Table 13.

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1599  
1600  
1601  
1602  
1603  
1604

Table 13 shows the 8 standard values for this attribute. The name of each attribute value suggests the order of laying out page images on a Finished-Page Image when a human reader is holding the sheet in the proper orientation (i.e., oriented so text is oriented for normal reading). For each 'toxxx-toyyy' value, the images are placed according to the 'toxxx' direction, and then according to the 'toyyy' direction, and the first image is placed in the corner diagonally opposite the 'xxx-yyy' corner. For example, 'tright-tobottom' starts in the upper-left corner (which is diagonally opposite the 'right-bottom' corner). The images are placed from left to right in a line, and the line progression is from top to bottom.

1606  
1607  
1608

Table 13 has a separate column to show the order for each orientation. For example, if the orientation is 'landscape', then the order of pages appears to be the same as portrait if the viewer rotates the sheet 90 degrees clockwise. Note: the coordinate system for this attribute is relative to the orientation of the sheets, unlike other Job

1609 Template attributes, such as “finishings”, “finishing-col” (see section 3.2), and the image shifting attributes (see  
1610 section 3.19) which are absolute (i.e., as if the sheets were ‘portrait’ - see section 2.3). The reason that this  
1611 attribute has a relative coordinate system, is that the client may not know what the orientation of the document  
1612 actually is, especially if the client did not generate the document.

1613

1614 The Printer determines the orientation in the following way:

1615

1616 1) The value of the “orientation-requested” attribute is determined as follows:

1617

a) If the client supplies the “orientation-requested” attribute, that attribute specifies the orientation.

1618

b) If the client doesn't supply the “orientation-requested” attribute and the Printer is able to determine  
1619 the orientation by inspecting the document, that is the orientation.

1620

c) If the client doesn't supply the “orientation-requested” attribute and the Printer is not able to  
1621 determine the orientation by inspecting the document, the orientation is the value specified by the  
1622 “orientation-requested-default” Printer attribute.

1623

2) The value of orientation used by the “presentation-direction-number-up” attribute for laying out pages  
1624 on the Finished-Page Image is as follows:

1625

a) If the value of the “number-up” attribute is a power of 4, e.g. 1 and 4, the value from step 1 is the  
1626 value.

1627

b) If the value of the “number-up” attribute is 2 times the power of 4, e.g. 2 and 8, the value is:

1629

i) ‘landscape’ if the value from step 1 is ‘portrait’

1630

ii) ‘portrait’ if the value from step 1 is ‘landscape’

1631

iii) ‘reverse-landscape’ if the value from step 1 is ‘reverse-portrait’

1632

iv) ‘reverse-portrait’ if the value from step 1 is ‘reverse-landscape’

1633

c) If the value of “number-up” is any other value, e.g. 3, 6 or 12, the value is IMPLEMENTATION  
1634 DEFINED.

1635

1636  
1637  
1638 When a Printer lays out page images for a Finished-Page Image, the “presentation-direction-number-up” attribute  
1639 determines the order of laying out each page and the frame of reference for that order is specified by the  
1640 orientation determined from the above algorithm. For example, if the value of “presentation-direction-number-up”  
1641 is ‘toright-tobottom’ (English order), the Printer lays out 4 page images in the order of top-left, top-right, bottom-  
1642 left and bottom-right in the frame of reference specified by the determined orientation. The top row of Table 13  
1643 shows this sample presentation direction.

1644

1645 If the Printer supports the “page-order-received” attribute and the value of the attribute is ‘n-to-1-order’, then the  
1646 Printer MUST place the pages in reverse order on each Finished-Page Image. For example, if the “number-up”  
1647 attribute has the value of 4, the first page of each Finished-Page Image is placed in the position labeled “4” in Table  
1648 13. If a Printer knows the number of pages in the document, it MUST treat the first Finished-Page Image as the

1649 logical last Finished-Page Image and place the first page according to the following formula:

1650

1651 
$$P = ((N-1) \text{ mod } n) + 1$$

1652 Where P is the number of pages on the logical last Finished-Page Image (first Finished-Page Image  
1653 printed).

1654 Where N is the number of pages in the document

1655 Where n is the value of the “number-up” attribute

1656 On the logical last Finished-Page Image (first Finished-Page Image printed), the Printer MUST put the first  
1657 page at position ‘P’ on the Finished-Page Image.





1658

1659 A pictorial representation of each "presentation-direction-number-up" value for a "number-up" value of 4 and the  
1660 orientation as shown below:

1661

**Table 13 - Standard Values for the “presentation direction” Attribute**

| Value              | Portrait | Landscape | Reverse-Landscape | Reverse-Portrait |
|--------------------|----------|-----------|-------------------|------------------|
| 'toright-tobottom' |          |           |                   |                  |
| 'tobottom-toright' |          |           |                   |                  |
| 'toleft-tobottom'  |          |           |                   |                  |
| 'tobottom-toleft'  |          |           |                   |                  |
| 'toright-totop'    |          |           |                   |                  |
| 'totop-toright'    |          |           |                   |                  |
| 'toleft-totop'     |          |           |                   |                  |

| Value          | Portrait  | Landscape   | Reverse-Landscape   | Reverse-Portrait  |
|----------------|---|---|---|---|
| 'totop-toleft' |  |  |  |  |

1662

1663

1664 **3.18 separator-sheets (collection)**

1665

1666 This attribute specifies which separator sheets MUST be printed with the job. Separator sheets are used to  
 1667 separate individual copies of a multiple copy job (i.e., when the "copies" attribute is greater than 1). The  
 1668 "separator-sheets" attribute is dependent both on the value of "multiple-document-handling" and on the value of  
 1669 "sheet-collate" (see [ipp-prog]). See sections 2.2 and 3.18.1 for a detailed description and examples of what  
 1670 constitutes a "set."

1671

1672 Separator sheets may either be non-imaged sheets, or may contain Printer generated information.

1673

1674 The 'collection' attribute syntax allows a client to specify media for job separator sheets that is different than the  
 1675 current media being used for the print-stream page impressions. The collection consists of:

1676

1677

**Table 14 - "separator-sheets" member attributes**

| Attribute name        | attribute syntax          | request                                      | Printer Support |
|-----------------------|---------------------------|--|-----------------|
| separator-sheets-type | type3 keyword   name(MAX) | MUST   | MUST            |
| media                 | type3 keyword   name(MAX) | MAY be neither<br>or one of, but<br>NOT both | MUST            |
| media-col             | collection                |  | MAY             |

1678

1679

1680 **3.18.1 separator-sheet-type (type3 keyword | name(MAX))**

1681

1682 The "separator-sheets-type" member attribute specifies which separator sheets type the Printer MUST use  
 1683 for the separator sheets. Standard keyword values are:

1684

|               |   |
|---------------|---|
| 'none'        | No separator sheets are to be delivered with the printed output.                              |
| 'slip-sheets' | A separator sheet MUST be printed between "sets" of the job.                                  |
| 'start-sheet' | A separator sheet MUST be printed to indicate the start of each "set" of the job.             |
| 'end-sheet'   | A separator sheet MUST be printed to indicate the end of each "set" of the job.               |
| 'both-sheets' | Separator sheets MUST be printed to indicate both the start and end of each "set" of the job. |

1685

1686 Example 1: A job is created consisting of a single document, with the

- 1687 a) the value of the "copies" attribute is '3',  
 1688 b) the value of "job-sheets" attribute is 'job-both-sheets' (see section 6.2), and  
 1689 c) the value of the "separator-sheets-type" attribute is 'slip-sheets'.

1690 If each of the 3 "sets" is denoted by (J1), (J2), (J3), a job-sheet is denoted by X, and a separator sheet is  
 1691 denoted by S, then the delivered output would be: X (J1) S (J2) S (J3) X If the value of the "separator-  
 1692 sheets-type" is 'start-sheet' instead, then the delivered output would be: X S (J1) S (J2) S (J3) X  
 1693

1694 Example 2: A job is created consisting of two documents J and K, with

- 1695 a) the value of "copies" attribute is '3',  
 1696 b) the value of "job-sheets" attribute is 'job-both-sheets' (see section 6.2),  
 1697 c) the value of the "separator-sheets-type" attribute is 'slip-sheets',  
 1698 d) the value of the "sheet-collate" attribute is 'collated' and  
 1699 e) the value of the "multiple-document-handling" attribute is 'separate-documents-uncollated-  
 1700 copies.

1701 If each of the "sets" is denoted by (J1), (J2), (J3), (K1), (K2), (K3), a job-sheet is denoted by X, and a  
 1702 separator sheet is denoted by S, then the delivered output would be: X (J1) S (K1) S (J2) S (K2) S (J3) S  
 1703 (K3) X  
 1704

1705 If for example 2, the value of the "separator-sheets-type" is 'start-sheet' instead, then the delivered output  
 1706 would be: X S (J1) S (K1) S (J2) S (K2) S (J3) S (K3) X.  
 1707

1708 If for example 2, the value of the "multiple-document-handling" attribute is 'separate-documents-  
 1709 uncollated-copies', then the delivered output would be: X (J1) S (J2) S (J3) S (K1) S (K2) S (K3) X.  
 1710

1711 If for example 2, the value of the "sheet-collate" attribute is 'uncollated', then the delivered output would  
 1712 be: X (JP1) S (JP2) S (JP3) S (KP1) S (KP2) X where JPn are 3 copies of page n of Job J and KPn are  
 1713 3 copies of page n of Job K. Job J has 3 pages and Job K has two in this example.  
 1714

1715 The "separator-sheets-type-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies  
 1716 the values of this "separator-sheet-type" member attribute that the Printer supports, i.e., the type names of  
 1717 the separator sheets.  
 1718

### 1719 3.18.2 media (type3 keyword | name(MAX)) or media-col (collection)

1720  
 1721 Either the "media" (defined in [RFC2911] section 4.2.11) or the "media-col" member attribute is used to  
 1722 indicate the media that the Printer MUST use for the job separator sheet. The member attributes are the  
 1723 same as those for the "media-col" attribute shown in Table 10.  
 1724

1725 If the client omits both the "media" and the "media-col" member attributes, then the implementation selects a  
 1726 media instance (by means outside the scope of this document) that is appropriate for separator sheets. The  
 1727 client MUST NOT supply both the "media" and the "media-col" member attribute. If client supplies such a  
 1728 mal-formed request by supplying both, the Printer MUST (depending on implementation) either (1) reject



1729 the request and return the 'client-error-bad-request' status code (see [RFC2911] section 13.1.4.1) or (2)  
1730 use either the "media" or the "media-col" member attribute, independent of the value of the "ipp-attribute-  
1731 fidelity" attribute supplied by the client.  
1732

1733 Since this "media" member attribute has the same name as the "media" Job Template attribute defined in  
1734 [RFC2911] section 4.2.11), the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer  
1735 attribute (also defined in [RFC2911] section 4.2.11) identifies the values of this "media" member attribute  
1736 (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the names of the  
1737 supported media.  
1738

1739 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute  
1740 defined in section 3.13), the "media-col-supported" Printer attribute (defined in section 3.13.14) identifies  
1741 the keyword names of the member attributes supported in this "media-col" member attribute (as well as the  
1742 keyword names of the "media-col" Job Template attribute), i.e., the names of the member attributes in  
1743 Table 10 that the Printer supports.  
1744

### 1745 **3.18.3 separator-sheets-default (collection)** 1746

1747 The "separator-sheets-default" Printer attributes specify the separator sheets that the Printer MUST  
1748 provide, if any, if the client omits the "separator-sheets" Job Template attribute. The member attributes are  
1749 defined in Table 14. A Printer MUST support the same member attributes for this default collection  
1750 attribute as it supports for the corresponding "separator-sheets" Job Template attribute.  
1751

### 1752 **3.18.4 separator-sheets-supported (1setOf type2 keyword)** 1753

1754 The "separator-sheets-supported" attribute identifies the keyword names of the member attributes  
1755 supported in the "separator-sheets" collection Job Template attribute, i.e., the names of the member  
1756 attributes in Table 14 that the Printer supports.  
1757

## 1758 **3.19 Image Shifting Attributes** 1759

1760 The attributes defined in this sub-section shift the Finished-Page Images as specified in the attribute definition, i.e.,  
1761 shift the pages that the end user sees in the Finished Document. Typical use cases for shifting of Finished-Page  
1762 Images are (1) to compensate for an application or scanning in some consistent direction for each Finished-Page  
1763 Image and (2) to shift the Finished-Page Images toward or away from a binding edge.  
1764

### 1765 **3.19.1 Common Semantics for Image Shifting Attributes** 1766

1767 Note: To help understanding, the definitions of the Image Shifting Attributes are specified without the complication  
1768 of Imposition attributes, such as "imposition-template" (see section 3.4). In order to take into account the  
1769 interaction of the Image Shifting attributes with Imposition attributes, the reader should change the word *media* to  
1770 *Finished-Page-Image Cell* in the definitions in this section. See section 2.3 for detailed definitions of Finished-

1771 Page-Image Cell and Imposition. The coordinate system for the Image Shifting attributes is relative to the Finished-  
1772 Page-Image Cell. See section 2.4 for details of the coordinate system.

1773

1774 The Printer determines the value for each attribute in this section as follows:

- 1775 a) if the client supplies a value and the Printer supports the attribute, the Printer uses that value,
- 1776 b) otherwise, if the corresponding “xxx-default” attribute is configured, the Printer uses that value,
- 1777 c) otherwise, the Printer uses the value of 0 for each integer valued attribute and ‘none’ for each  
1778 keyword-valued attribute. These values cause the Printer to position the image as it normally would  
1779 without these attributes.

1780

1781 To implement these attributes, the Printer first positions the Finished-Page Image using the values it obtains for the  
1782 “x-image-position” and “y-image-position” attributes. Then it shifts the Finished-Page Image by the amount it  
1783 obtains for the “x-image-shift” and “y-image-shift” attributes. Finally, for a Finished-Page Image that would be  
1784 placed on the front side of a sheet in the Finished Document, it shifts the Finished-Page Image by the amount it  
1785 obtains for the “x-side1-image-shift” and “y-side1-image-shift”. For a Finished-Page Image that would be placed  
1786 on the back side of a sheet in the Finished Document, it shifts the Finished-Page Image by the amount it obtains for  
1787 the “x-side2-image-shift” and “y-side2-image-shift” attributes.

1788

### 1789 **3.19.1.1 Side1 and Side2**

1790

1791 For the “\*-image-shift” attributes, the terms “side1” and “side2” describe those Finished-Page Images that would  
1792 be on the front side or back side of a sheet in the Finished Document, respectively. If the document is to be  
1793 printed one-sided, all Finished-Page Images will be “side1” pages. If the document is to be printed two-sided  
1794 with one Finished-Page Image on each side of the sheet of paper, this would result in odd Finished-Page Images  
1795 printed on side1 (or right side in a book format) and even Finished-Page Images printed on side2 (or left side in a  
1796 book format), with an exception noted below.

1797

### 1798 **3.19.1.2 Interaction between the Image Shifting and “number-up” and Imposition attributes**

1799

1800 Usually a print job will not combine the “number-up”, image shifting, and Imposition attributes (such as the  
1801 “imposition-template” attributes - see section 3.4), in a single document. However, this section defines the  
1802 interaction in case a client does supply more than one of these attributes.

1803

1804 The Printer MUST apply “number-up”, image shifting, and Imposition attributes in the following order:

1805

- 1806 (1) Create a Finished-Page Image by laying out the number of page images specified by the “number-up”  
1807 attribute (see [RFC2911] sections 4.2.9 and 15.3). If “number-up” is unsupported or not applied, the  
1808 Finished-Page Image is the same as the single page image.
- 1809 (2) shift the Finished-Page Image as specified by the image shifting attributes. If the image-shifting attributes are  
1810 unsupported or not applied, the Finished-Page Image is not shifted.  
1811

1812

1813 (3) layout the Finished-Page Images onto the surfaces (i.e. sides) of a number of (larger) sheets according to  
 1814 the Imposition attributes, such as the “imposition-template” attribute (see section 3.4). If Imposition  
 1815 attributes are unsupported or not applied, an Impression is a single Finished-Page Image and the "sides"  
 1816 attribute specifies whether one or both sides of the sheet are imaged. See section 3.4.1 for the interaction  
 1817 of the “imposition-template” attribute and the “sides” attribute.

1818

1819 *Note: As with all Image Shifting attributes, if an Imposition attribute, such as “imposition-*  
 1820 *template” (see section 3.4) is also supplied, the word “media” in these Image Shifting definitions*  
 1821 *should be interpreted to mean the Finished-Page-Image Cell (see section 3.19.1.2).*

1822

### 1823 3.19.1.3 Interaction between the Image Shifting and “force-front-side” attributes

1824

1825 If the “force-front-side” attribute (see section 3.3) is used, “side1” and “side2” apply to the Finished-Page images  
 1826 AFTER the “force-front-side” values are applied. For example, a typical document without "number-up" starts  
 1827 with page 1 as a “side1” page and page 2 as a “side2” page. If “force-front-side” attribute is applied to Input Page  
 1828 2, then Input Page 2 (and subsequent even pages) will become “side1” pages. Input Page 3 (and subsequent odd  
 1829 pages) will become “side2” pages.

1830

### 1831 3.19.2 x-image-position (type2 keyword)

1832

1833 This attribute causes the specified point of the Finished-Page Image to be positioned at a specified location. One  
 1834 standard value causes the Finished-Page Image to be centered along the x-axis on the media to which it is applied.  
 1835 Two other standard values specify that the location is co-incident with the specified edge of the printable area by  
 1836 moving the image parallel to the x-axis on the media to which it is applied.

1837

1838 Standard keyword values are:

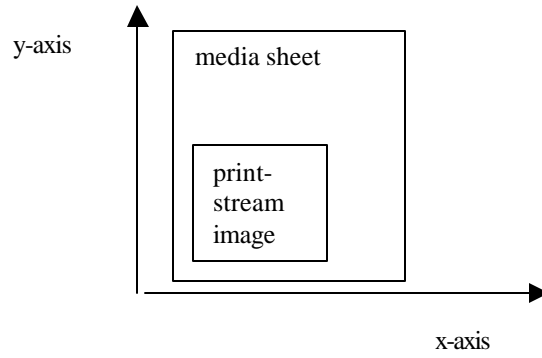
|          |   |
|----------|---|
| ‘none’   | Place the Finished-Page Image wherever the print data specifies on the medium.  |
| ‘center’ | Center the Finished-Page Image between the physical edges of the medium by moving the Finished-Page Image in a direction parallel to the x-axis |
| ‘left’   | Position the left edge of the Finished-Page Image so that it is co-incident with the left edge of the printable area of the medium.             |
| ‘right’  | Position the right edge of the Finished-Page Image so that it is co-incident with the right edge of the printable area of the medium.           |

1839

1840 Note: the ‘center’ value is centered with respect to the physical edges of the medium rather than the printable area  
 1841 of it because the printable area may have different left and right margins. If this specification defined two separate  
 1842 attributes, one for values that are medium-relative and one for values that are relative to printable area, the rules for  
 1843 defaulting would be too complicated.

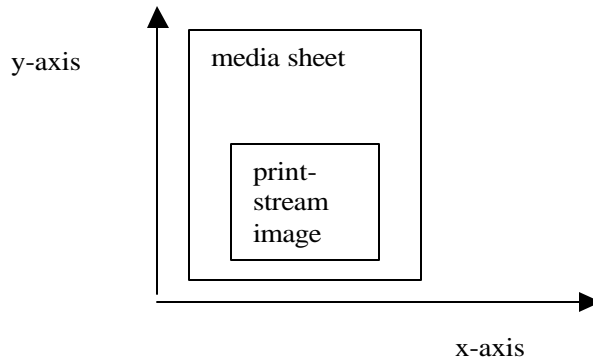
1844

1845 For example, if the Finished-Page Image normally is placed on the media sheet as follows:



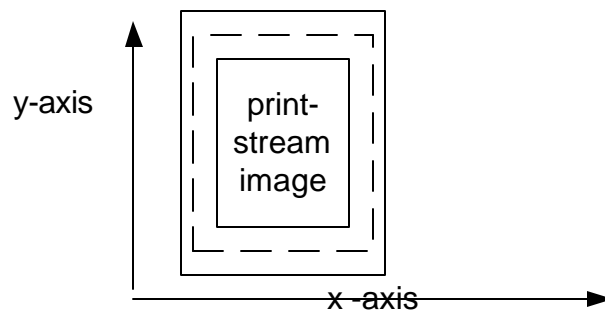
1846  
1847  
1848  
1849

with the value of 'center', the result would be:



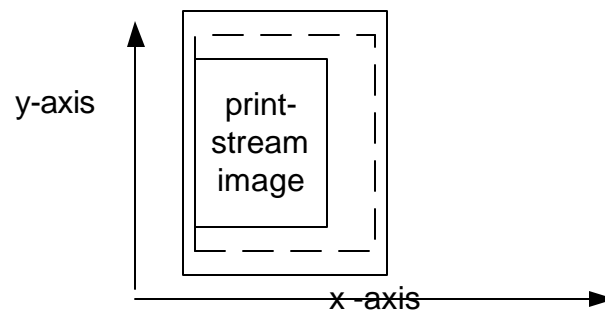
1850  
1851  
1852  
1853  
1854

If the Finished-Page Image normally is placed on the media sheet as follows where the dashed line indicates the edge of the printable area on the media sheet:



1855  
1856  
1857

with the value of 'left', the result would be:



1858  
 1859 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
 1860 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
 1861 3.19.1.2).

### 1862 1863 **3.19.3 x-image-shift (integer(MIN:MAX))**

1864  
 1865 This attribute causes the Finished-Page Image (whether it will be on the front side or back side of a sheet of the  
 1866 Finished Document) to be shifted in position with respect to the media on which the Finished-Page Image is to be  
 1867 rendered. The direction of shift **MUST** be along the x-axis of the Coordinate System (see section 2.4) with  
 1868 respect to the medium. The sign of the value indicates the direction of the shift.

1869  
 1870 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to 1/2540<sup>th</sup> of an inch  
 1871 resolution.

1872  
 1873 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
 1874 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
 1875 3.19.1.2).

### 1876 1877 **3.19.4 x-side1-image-shift (integer(MIN:MAX))**

1878  
 1879 This attribute causes each Finished-Page Image that would be placed on the front side of a sheet of the Finished  
 1880 Document to be shifted in position with respect to the media on which the Finished-Page Image is to be rendered.  
 1881 The direction **MUST** be along the x-axis of the Coordinate System (see section 2.4) with respect to the medium.  
 1882 The sign of the value indicates the direction of the shift.

1883  
 1884 If the bind edge is along the y-axis, then a bind edge image shift can be accomplished by applying shifts of equal  
 1885 magnitude, and opposite sign, to the "x-side1-image-shift" and "x-side2-image-shift" attributes, respectively  
 1886 (assuming that the "sides" attribute is 'two-sided-long-edge' or imposition has equivalent behavior).

1887  
 1888 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to 1/2540<sup>th</sup> of an inch  
 1889 resolution.

1890

1891 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
 1892 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
 1893 3.19.1.2).

1894

### 1895 **3.19.5 x-side2-image-shift (integer(MIN:MAX))**

1896

1897 This attribute causes a Finished-Page Image that would be placed on the back side of a sheet of the Finished  
 1898 Document to be shifted in position with respect to the media on which the Finished-Page Image is to be rendered.  
 1899 The direction of shift **MUST** be along the x-axis of the Coordinate System (see section 2.4) with respect to the  
 1900 medium. The sign of the value indicates the direction of the shift.

1901

1902 If the bind edge is along the y-axis, then a bind edge image shift can be accomplished by applying shifts of equal  
 1903 magnitude, and opposite sign, to the "x-side1-image-shift" and "x-side2-image-shift" attributes, respectively  
 1904 (assuming that the "sides" attribute is 'two-sided-long-edge' or imposition has equivalent behavior).

1905

1906 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to 1/2540<sup>th</sup> of an inch  
 1907 resolution.

1908

1909 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
 1910 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
 1911 3.19.1.2).

1912

### 1913 **3.19.6 y-image-position (type2 keyword)**

1914

1915 This attribute causes the specified point of the Finished-Page Image to be positioned at a specified location. One  
 1916 standard value causes the Finished-Page Image to be centered along the y-axis on the media to which it is applied.  
 1917 Two other standard values specify that the location is co-incident with the specified edge of the printable area by  
 1918 moving the image parallel to the y-axis on the media to which it is applied.

1919

1920 Standard keyword values are:

1921

|          |   |
|----------|---|
| 'none'   | Place the Finished-Page Image wherever the print data specifies on the medium.  |
| 'center' | Center the Finished-Page Image between the physical edges of the medium by moving the Finished-Page Image in the direction parallel to the y-axis |
| 'top'    | Position the top edge of the Finished-Page Image so that it is co-incident with the top edge of the printable area of the medium.                 |
| 'bottom' | Position the bottom edge of the Finished-Page Image so that it is co-incident with the bottom edge of the printable area of the medium.           |

1922

1923 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
 1924 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section

1925 3.19.1.2).

1926

1927 **3.19.7 y-image-shift (integer(MIN:MAX))**

1928

1929 This attribute causes the Finished-Page Image (whether it will be on the front side or back side of a sheet of the  
1930 Finished Document) to be shifted in position with respect to the media on which the Finished-Page Image is to be  
1931 rendered. The direction of shift **MUST** be along the y-axis of the Coordinate System (see section 2.4) with  
1932 respect to the medium. The sign of the value indicates the direction of the shift.

1933

1934 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to 1/2540<sup>th</sup> of an inch  
1935 resolution.

1936

1937 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
1938 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
1939 3.19.1.2).

1940

1941 **3.19.8 y-side1-image-shift (integer(MIN:MAX))**

1942

1943 This attribute causes each Finished-Page Image that would be placed on the front side of a sheet of the Finished  
1944 Document to be shifted in position with respect to the media on which the Finished-Page Image is to be rendered.  
1945 The direction of shift **MUST** be along the y-axis of the Coordinate System (see section 2.4) with respect to the  
1946 medium. The sign of the value indicates the direction of the shift.

1947

1948 If the bind edge is along the x-axis, then a bind edge image shift can be accomplished by applying shifts of equal  
1949 magnitude, and opposite sign, to the "y-side1-image-shift" and "y-side2-image-shift" attributes, respectively  
1950 (assuming that the "sides" attribute is 'two-sided-short-edge' or imposition has equivalent behavior).

1951

1952 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to 1/2540<sup>th</sup> of an inch  
1953 resolution.

1954

1955 As with all Image Shifting attributes, if an Imposition attribute (such as “imposition-template” - see section 3.4) is  
1956 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
1957 3.19.1.2).

1958

1959 **3.19.9 y-side2-image-shift (integer(MIN:MAX))**

1960

1961 This attribute causes each Finished-Page Image that would be placed on the back side of a sheet of the Finished  
1962 Document to be shifted in position with respect to the media on which the Finished-Page Image is to be rendered.  
1963 The direction of shift **MUST** be along the y-axis of the Coordinate System (see section 2.4) with respect to the  
1964 medium. The sign of the value indicates the direction of the shift.

1965

1966 If the bind edge is along the x-axis, then bind edge image shift can be accomplished by applying shifts of equal

1967 magnitude, and opposite sign, to the "y-side1-image-shift" and "y-side2-image-shift" attributes, respectively  
 1968 (assuming that the "sides" attribute is 'two-sided-short-edge' or imposition has equivalent behavior).

1969  
 1970 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to 1/2540<sup>th</sup> of an inch  
 1971 resolution.

1972  
 1973 As with all Image Shifting attributes, if an Imposition attribute (such as "imposition-template" - see section 3.4) is  
 1974 also supplied, the word *media* in this definition should be interpreted as *Finished-Page-Image Cell* (see section  
 1975 3.19.1.2).

### 1976 1977 **3.20 Usage in Document-Overrides and Page-Overrides**

1978  
 1979 Most of the Job Template attributes defined in this document are defined so that they MAY be used in the  
 1980 "document-overrides" (collection) and/or "page-overrides" (collection) Job Template attributes (see [ipp-  
 1981 override]). According to that document, any Job Template attribute document MUST indicate the syntax and  
 1982 semantics for applying each Job Template attribute in any Document and/or Page overrides.

1983  
 1984 Table 16 augments the definitions of each Job Template attribute defined in this document by indicating with which  
 1985 parts of a job, the attribute "associates with" and "affects" (see [ipp-override]). All Job Template attributes  
 1986 associate with the Job, so that is not indicated in Table 16. A subset of the Job Template attributes are defined to  
 1987 be used in Document-Overrides to affect Input-Document and are associated with Input-Documents only via the  
 1988 "document-overrides" attribute. Another subset affect Output-Documents and are associated with either Input-  
 1989 Documents or Output-Documents via the "document-overrides" attribute. A final subset of Job Template attributes  
 1990 affects Sheets, Pages, Finished-Page Images or Impressions and are associated with Pages of an Input-Document  
 1991 or an Output-Document by the "page-overrides" attribute or associated with Input-Document or Output-Document  
 1992 via a "document-overrides" attribute. See [ipp-override] for the syntax of the "document-overrides" (1setOf  
 1993 collection), "page-overrides" (1setOf collection) and "pages-per-subset" (1setOf integer(1:MAX)) and semantics  
 1994 of association with Document-Overrides, Page-Overrides, Sheets, and Pages. The "pages-per-subset" attribute  
 1995 defines Output-Document to be subsets of pages within Input-Documents.

1996  
 1997 Table 15 lists the possible attribute override semantics for Job Template attributes and shows what clients can  
 1998 supply in Job Creation operations.

1999 **Table 15 - Job Template Attribute Override Semantics**

| Affects            | Associates With | Override attribute   | member attributes           |
|--------------------|-----------------|----------------------|-----------------------------|
| Job                | Job             | none                 | N/A                         |
| Input-Document     | Input-Document  | "document-overrides" | "input-documents"           |
| Output-Document    | Output-Document | "document-overrides" | "output-documents"          |
|                    |                 | "pages-per-subset"   | N/A                         |
|                    | Input-Document  | "document-overrides" | "input-documents"           |
| sheet, impression, | Output-Page     | "page-overrides"     | "output-documents", "pages" |



| Affects | Associates With | Override attribute   | member attributes          |
|---------|-----------------|----------------------|----------------------------|
|         | Input-Page      | "page-overrides"     | "input-documents", "pages" |
|         | Output-Document | "document-overrides" | "output-documents"         |
|         |                 | "pages-per-subset"   | N/A                        |
|         | Input-Document  | "document-overrides" | "input-documents"          |

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A client MUST NOT submit and a Printer MUST NOT support a Job Creation request with "document-overrides" (collection), "page-overrides" (collection), or "pages-per-subset" containing member attributes not indicated in Table 15 depending on what the Job Template attribute is defined to affect as indicated in Table 16. If a client submits a Job Creation request with such a member attribute and "ipp-attribute-fidelity" = 'true', the Printer MUST reject the request and return the 'client-error-bad-request' status code. If a client submits a Job Creation request with such a member attribute and "ipp-attribute-fidelity" = 'false' or omitted, the Printer MUST accept the request and return the 'successful-ok-ignored-or-substituted-attributes' status code, along with the collection and only those member attributes.

**Table 16 - Document and Page Override Semantics by Attribute**

| Section or Attribute   | Affects:             |
|--|----------------------|
| 3.1 cover-front (collection) and cover-back (collection)   | Output-Documents     |
| 3.2 finishings-col (collection)  | Output-Documents     |
| 3.3 force-front-side (1setOf integer(1:MAX))   | Input-Documents      |
| 3.4 imposition-template (type3 keyword   name(MAX))  | Finished-Page Images |
| 3.5 insert-sheet (1setOf collection)   | Output-Documents     |
| 3.6 job-account-id (name(MAX))   | Job                  |
| 3.7 job-accounting-user-id (name(MAX))   | Job                  |
| 3.8 job-accounting-sheets (collection)   | Job                  |
| 3.9 job-error-sheet (collection)   | Job                  |
| 3.10 job-message-to-operator (text(MAX))   | Job                  |
| 3.11 job-sheets-col (collection) - augments IPP "job-sheets" attribute                           | Job                  |
| 3.12 job-sheet-message (text(MAX))   | Job                  |
| 3.13 media-col (collection) - augments IPP "media"   | Sheets               |
| 3.14 media-input-tray-check (type3 keyword   name(MAX))  | Sheets               |
| 3.15 page-delivery (type2 keyword)   | Output-Documents     |
| 3.16 page-order-received (type2 keyword)   | Input-Documents      |
| 3.17 presentation-direction-number-up (type2 keyword)  | Finished-Page Images |
| 3.18 separator-sheets (collection)   | Job                  |
| 3.19.2 x-image-position (type2 keyword) through<br>3.19.9 y-side2-image-shift (integer(MIN:MAX)) | Finished-Page Images |

2011

2012

## 2013 **4. Job Description Attributes**

2014

2015 This section defines Job Description attributes for use with IPP/1.0 [RFC 2566] and IPP/1.1 [RFC2911].

2016

### 2017 **4.1 current-page-order (type2 keyword)**

2018

2019 This attribute represents the current page order of the document data supplied with the job. Initially "current-page-order" is set to the value of the Job Template attribute "page-order-received." The value of "current-page-order" may change based on processing and the value of the "page-order-delivery" attribute. If the Printer changes the value of a Job's "current-page-order" Job Description attribute, then it is assumed that the associated document data has been transformed in some way to reflect this change. It should be noted that the document data that "current-page-order" refers to is not always the document data sent with the Job Creation request, but may also refer to the processed images that are to be delivered to the printer. The standard values for this attribute are the same as for of the "page-order-received" attribute (see section 3.16), namely, '1-to-n-order' and 'n-to-1-order'.

2027

2028

## 2029 **5. Printer Description Attributes**

2030

2031 This section defines Printer Description attributes for use with IPP/1.0 [RFC 2566] and IPP/1.1 [RFC2911].

2032

### 2033 **5.1 user-defined-values-supported (1setOf type2 keyword)**

2034

2035 This Printer attribute identifies the Job Template and Job Template member attributes for which the client can supply any value in a Job Creation request, i.e., any custom or user-defined value. The values of this attribute are any "xxx" attribute names that are Job Template attributes or member attributes of a Job Template collection attributes for which the Printer will accept any value in a Job Creation request. In effect, the presence of the 'xxx' keyword value in this attribute suspends validation of the "xxx" attribute supplied by the client with the values of the corresponding "xxx-supported" Printer attribute. This feature MAY be used to specify any 'name', 'integer', or 'collection' (whose member attributes are 'name' or 'integer') attributes supplied by the client. Thus a user can supply a custom name for this "xxx" attribute. If there are no Job Template attributes that will accept any value, the value of this attribute MUST be the keyword 'none'.

2044

2045 For any "xxx" Job Template or Job Template member attributes identified by this attribute, the Printer suspends validation for values of type 'name', 'integer', and 'collection' and the job is created containing the user-defined value, even when the client supplied the "ipp-attribute-fidelity" with a 'true' value (which would otherwise, have caused the Printer to reject the request, if the "xxx" value had not been among those of the Printer's "xxx-supported" attribute).

2049

2050 For example, the system administrator could add the 'media' keyword attribute name value to the "user-defined-

2051

2052 values-supported" Printer attribute in order to allow the user to supply any media name value for the "media"  
2053 attribute even if that name wasn't one of the media names in the Printer's "media-supported" (1setOf (type3  
2054 keyword | name(MAX))) attribute. As another example, the system administrator could add the 'media-size'  
2055 keyword attribute name value to the "user-defined-values-supported" Printer attribute in order to allow the user to  
2056 supply any media size x and y dimensions in the "media-size" member attribute of the "media-col" Job Template  
2057 attribute, even if that pair wasn't one of the pairs in the Printer's "media-size-supported" (1setOf collection)  
2058 attribute.

2059

2060 Keyword values include the IPP/1.1 Job Template attribute name keywords: 'job-priority', 'job-sheets', 'job-hold-  
2061 until', 'number-up', and 'media', along with the Job Template and member attributes defined in this document:  
2062 'finishings-col', 'stitching-offset', 'stitching-locations', 'job-error-sheet-type', 'media-type', 'media-color', 'media-  
2063 pre-punched', 'media-hole-count', 'media-order-count', 'media-size', 'media-weight-metric', 'media-front-coating',  
2064 'media-back-coating', 'media-recycled', and 'separator-sheet-type'.

2065

2066 Note: The requirement that the "media-key" member attribute values of the "media-col" attribute be unique and that  
2067 each supported media have a distinct value precludes the 'media-key' from being a value of the "user-defined-  
2068 values-supported" Printer attribute.

2069

2070 When the client supplies a 'yyy' value for the "xxx" attribute that is not in the "xxx-supported" Printer attribute, the  
2071 Printer does not return the "xxx" value in the Unsupported Attributes group in the response. Instead, the Printer  
2072 stores the requested attribute and value unmodified on the Job object for subsequent queries as with any supported  
2073 value. Subsequently, a user or operator can query the Job using the Get-Job-Attributes or Get-Jobs operations to  
2074 see what user-defined value was requested. Depending on implementation and/or site policy, the Printer schedules  
2075 the job following one of the following options:

2076

- 2077 1. Add the 'resources-are-not-supported' value (see section 6.1) to the Job's "job-state-reasons" attribute  
2078 and move the job to the 'pending-held' state until either the operator adds the requested value to the  
2079 Printer's "xxx-supported" attribute or the user or operator modifies the job to contain a value that is in  
2080 the Printer's "xxx-supported" attribute; then releases the job using the Release-Job operation (see  
2081 [RFC2911] section 3.3.6).
- 2082 2. Add the 'resources-are-not-supported' value (see section 6.1) to the Job's "job-state-reasons" attribute  
2083 but keep the job in the 'pending' state and start to process the job as if the requested media were  
2084 ready, but stop the job ("job-state" = 'processing-stopped') and the Printer ("printer-state" = 'stopped')  
2085 and request immediate operator intervention. The operator loads the requested media and continues  
2086 the Printer, using the Resume-Printer operation (see [RFC2911] section 3.2.8).

2087

2088

2089

## 5.2 max-stitching-locations-supported (integer(1:MAX))

2090

2091 This attribute indicates the maximum number of stitches or staples that the implementation is capable of inserting  
2092 into an Output Document, even if that number would require human intervention in order to configure the (manual  
2093 configured) sticher. In other words, "max-stitching-locations-supported" attribute specifies the maximum number

2094 of values that the client can supply in the "stitching-locations" member attribute (see section 3.2.2.3).

2095

2096 Note: the client can determine the number of stitches or staples that the client can request without human  
2097 intervention by querying the "finishing-col-ready" attribute (see section 3.2.4).

2098

### 2099 **5.3 finishings-ready (1setOf type2 enum)**

2100

2101 This attribute differs from "finishings-supported" in that legal values only include the subset of "finishings-supported"  
2102 values that are physically ready for printing with no operator intervention required. The "finishings-ready" attribute  
2103 is useful for Printers where human intervention is required in order to change the finisher in order for a job to use  
2104 certain "finishings" values. If all "finishings-supported" values can be used without human intervention, a Printer  
2105 NEED NOT implement the "finishings-ready" attribute. If an IPP Printer supports "finishings-supported" (see  
2106 [RFC2911] section 4.2.6, it NEED NOT support "finishings-ready". However, if a Printer supports "finishings-  
2107 ready", it MUST support "finishings-supported".

2108

2109

## 2110 **6. Additional Values for Existing Attributes**

2111

2112 This section defines additional values for existing attributes.

2113

### 2114 **6.1 Additional values for the "job-state-reasons" Job attribute**

2115

2116 This section defines additional values for the "job-state-reasons" (1setOf type2 keyword) Job Description attribute  
2117 (see [RFC2911] section 4.3.8):

2118

2119 'resources-are-not-supported': At least one of the resources needed by the job, such as media, fonts,  
2120 resource objects, etc., is not supported on any of the physical printer's for which the job is a  
2121 candidate. This condition MAY be detected when the job is accepted, or subsequently while the job  
2122 is pending or processing, depending on implementation. The job may (1) remain in its current state,  
2123 (2) be moved to the 'pending-held' state, depending on implementation and/or job scheduling policy,  
2124 or (3) scheduled normally, but the Printer is put into the 'stopped' state when the job is attempted to  
2125 be processed on the Printer. This value is intended for use with an implementation that supports the  
2126 "user-defined-values-supported" Printer attribute (see section 5.1) which allows a job to be accepted  
2127 with an unsupported 'name' value.

2128

### 2129 **6.2 Additional values for the IPP "job-sheets" Job Template Attribute**

2130

2131 The following additional values are defined for the IPP/1.1 "job-sheets" Job Template attribute:

2132

2133

**Table 17 - Additional values for the "job-sheets" Job Template attribute**

|                         |   |
|-------------------------|---|
| job-start-sheet         | A job sheet <b>MUST</b> be printed to indicate the start of the job.  |
| job-end-sheet           | A job sheet <b>MUST</b> be printed to indicate the end of the job.  |
| job-both-sheets         | Job sheets <b>MUST</b> be printed to indicate the start and end of all the output associated with the job.  |
| first-print-stream-page | Some users have customized the banner sheets in their environment (Microsoft, Novell, etc.) and prefer them instead of the printer's standard ones. The custom banner sheet is the first page of the PDL. When the client supplies the 'first-print-stream-page' value, the first page in the document data is printed as the job sheet and the printer's standard job sheet is suppressed. |

2134

2135

2136

**6.3 Additional values for the IPP "media" Job Template and "media-key" member attributes**

2137

2138

2139

This section defines additional values for the "media" (type3 keyword | name(MAX)) Job Template attribute (see [RFC2911] section 4.2.11), the "media" member attribute defined in this document in a number of the collection attributes, and the "media-key" member attribute defined in section 3.13.1:

2140

2141

2142

2143

If the Printer implementation supports the use of tray name keywords to identify media, there **SHOULD** be one and only one keyword assigned for each input tray on the printer. If multiple keywords for the same tray exist in "media-supported", the client UI could potentially become very confusing to the user because the Printer would appear to have more input trays than it actually has. However, see the discussion in the Printer MIB [RFC1759] about a manual input tray that uses the same input slot as a regular input tray. Also, if using tray names, it is **RECOMMENDED** that the printer implementation use the most descriptive keyword for a logical tray in order to assist the user or operator to recognize the matching physical tray at the printer. There are three methods to choose the keyword: 1) If the printer trays aren't physically labeled, the keyword **SHOULD** best match the physical location of the tray (e.g. 'top', 'bottom'). 2) If the printer trays are physically labeled, the keyword **SHOULD** best match the label of the tray (e.g. 'tray-1', 'tray-2'), 3) If more than one keyword matches the label of the tray, the keyword **SHOULD** be used that best distinguishes the tray from the Printer's other trays.

2144

2145

2146

2147

2148

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2150

2151

2152

2153

2154

2155

If a Printer allows the media to be specified by tray name keyword, the Printer implementation **MUST NOT** use the 'name(MAX)' attribute syntax to create custom tray names, but rather **MUST** use the most appropriate tray name keyword value. This ensures interoperability among clients that submit jobs to multiple types of printers.

2156

2157

2158

2159

These are additional standard keyword values defined for input-trays.

2160

|               |  |
|---------------|--|
| 'bypass-tray' | The specified tray is used for handling odd or special paper. This paper tray usually has a small capacity and is physically located such that the paper travels through a shorter paper path. In some printer implementations, the 'bypass-tray' may also be used to bypass any marking device and be used for insert sheets. See the "insert-sheet" definition in section 3.5. |
| 'tray-N'      | The input tray that is best specified as a tray with values 'tray-1', 'tray-2'.... The correspondence between the 'tray-N' keyword and the actual input-tray is implementation dependent, as is the number of input trays. If this group of 'tray-N' values is supported, at least the 'tray-1' value MUST be supported.   |

2161

2162

These additional keyword values are provided for use in implementations that don't support the "media-col" attribute, since they represent some of the more important "media-col" member attributes:

2163

2164

|                |   |
|----------------|---|
| 'plain'        | The plain media as specified by the output device.  |
| 'pre-punched'  | The pre-punched media as specified by the output device.  |
| 'transparency' | The transparent media as specified by the output device.  |
| 'letterhead'   | The pre-printed letterhead media as specified by the output device.   |
| 'heavyweight'  | The heavyweight media as specified by the output device.  |
| 'recycled'     | The recycled media as specified by the output device.   |
| 'bond'         | The bonded media as specified by the output device.   |
| 'labels'       | The labels media as specified by the output device.   |
| 'pre-printed'  | The pre-printed media as specified by the output device.  |
| 'customN'      | A custom type of media understood by the user and the operator. It is simply specified to the Printer as the keyword values 'custom1', 'custom2'...'custom7'. |

2165

2166

These additional keyword values are the same as the "media-type" keywords (see section 3.13.2), except 'other', for use in implementations that don't support the "media-col" attribute:

2167

2168

2169

stationery

2170

envelope

2171

envelope-plain

2172

envelope-window

2173

continuous

2174

continuous-long

2175

continuous-short

2176

tab-stock

2177

pre-cut-tab

2178

full-cut-tab

2179

multi-part-form

2180

multi-layer

2181

screen

2182

screen-paged

2183 photographic  
 2184 cardstock

2185  
 2186 These are additional standard keyword values which are used by the implementation for specifying a pre-defined  
 2187 media size:

2188

|                     |   |
|---------------------|---|
| 'iso-a4-wide'       | Specifies the iso A4 cover size: 223 mm x 297 mm          |
| 'na-letter-cover'   | Specifies the letter cover size: 9 in x 11 in             |
| 'jp-reply-postcard' | Specifies the Ofuku-Hagaki postcard size: 148 mm x 200 mm |
| 'na-postcard'       | Specifies the North American postcard size: 4.5 in x 6 in |
|                     |   |
|                     |   |
| 'taiwan-815'        | Specifies the 815 Taiwan size: 267 mm x 388 mm            |
| 'iso-220x330'       | Specifies the 220 mm x 330 mm size                        |

2189

2190

## 2191 7. Conformance Requirements

2192

2193 This section summarizes the Conformance Requirements detailed in the definitions in this document for clients and  
 2194 Printer objects (servers or devices).

2195

### 2196 7.1 Conformance Requirements for Printer objects

2197

2198 In general each of the attributes defined in this document are OPTIONAL for a Printer to support, so that Printer  
 2199 implementers MAY implement any combination of attributes. Only the following conditional conformance  
 2200 requirements are defined:

2201

| If the Printer supports: | then the Printer MUST also support (but vice-versa is OPTIONAL): |
|--------------------------|--|
| "cover-back"             | "cover-front"  |
| "finishings-col"         | "finishings" (see [RFC2911] section 4.2.6)                       |
| "finishings-col-ready"   | "finishings-ready" (see section 5.3)                             |
| "job-sheets-col"         | "job-sheets" (see [RFC2911] section 4.2.3)                       |
| "media-col"              | "media" (see [RFC2911] section 4.2.11)                           |
| "media-col-ready"        | "media-ready" (see [RFC2911] section 4.2.11)                     |
| "media-input-tray-check" | "media" (see [RFC2911] section 4.2.11)<br>and/or "media-col"     |
| "x-side2-image-shift"    | "x-side1-image-shift"  |
| "y-side2-image-shift"    | "y-side1-image-shift"  |
| "x-side1-image-shift"    | "x-image-shift"  |

|                       |                 |
|-----------------------|-----------------|
| "y-side1-image-shift" | "y-image-shift" |
|-----------------------|-----------------|

2202

2203 Each of the collection attribute definitions indicate which member attributes are REQUIRED and which are  
 2204 OPTIONAL for a Printer to support and is not repeated here.

2205

2206 If a Printer supports the 'collection' attribute syntax of a Job Template attribute , then it MUST support the  
 2207 distinguished none value defined for that collection. See section 2.7.

2208

2209 Support of the 'name' attribute syntax for Job Template attributes and collection member attributes is OPTIONAL,  
 2210 as in IPP/1.1 [RFC2911].

2211

## 2212 7.2 Conformance Requirements for clients

2213

2214 Clients that support two Job Template attributes that control the same aspect, such as "media" and "media-col",  
 2215 MUST NOT supply both in a Job Creation request as indicated in the definitions of these attributes.

2216

2217 Clients that support a "xxx" collection Job Template attribute SHOULD use the Get-Printer-Attributes request to  
 2218 obtain the "xxx-default" collection and display that to the user, so that the user can make any changes before  
 2219 submitting the Job. Then the client submits values for all member attributes, rather than depending on the Printer's  
 2220 defaulting for omitted member attributes, since such defaulting is implementation dependent and will vary from  
 2221 Printer to Printer.

2222

## 2223 8. IANA Considerations

2224

### 2225 8.1 Attribute Registration

2226

2227 The attributes defined in this document will be published by IANA according to the procedures in RFC 2911  
 2228 [RFC2911] section 6.2 with the following path:

2229

2230 `ftp.isi.edu/iana/assignments/ipp/attributes/`

2231

2232 The registry entry will contain the following information:

2233

2234 Reference:

2235 `ftp://ftp.pwg.org/pub/pwg/ipp/new_PPE/pwg-ipp-prod-print-set1.pdf`

2236

2237 Job Template attributes:

2238 Section:

- 2239 `cover-front (collection) and cover-back (collection)` 3.1
- 2240 `finishings-col (collection) - augments IPP "finishings"` 3.2
- 2241 `force-front-side (1setOf integer(1:MAX))` 3.3
- 2242 `imposition-template (type3 keyword | name(MAX))` 3.4
- 2243 `insert-sheet (1setOf collection)` 3.5



|      |   |      |
|------|---|------|
| 2244 | job-account-id (name(MAX))  | 3.6  |
| 2245 | job-accounting-user-id (name(MAX))  | 3.7  |
| 2246 | job-accounting-sheets (collection)  |      |
| 2247 | 3.8   |      |
| 2248 | job-error-sheet (collection)  | 3.9  |
| 2249 | job-message-to-operator (text(MAX))   | 3.10 |
| 2250 | job-sheets-col (collection) - augments IPP "job-sheets" attribute   |      |
| 2251 | 3.11  |      |
| 2252 | job-sheet-message (text(MAX))   | 3.12 |
| 2253 | media-col (collection) - augments IPP "media"   | 3.13 |
| 2254 | media-input-tray-check (type3 keyword   name(MAX))  | 3.14 |
| 2255 | page-delivery (type2 keyword)   | 3.15 |
| 2256 | page-order-received (type2 keyword)   | 3.16 |
| 2257 | presentation-direction-number-up (type2 keyword)  | 3.17 |
| 2258 | separator-sheets (collection)   | 3.18 |
| 2259 | x-image-position (type2 keyword)  |      |
| 2260 | 3.19.2  |      |
| 2261 | x-image-shift (integer(MIN:MAX))  |      |
| 2262 | 3.19.3  |      |
| 2263 | x-side1-image-shift (integer(MIN:MAX))  |      |
| 2264 | 3.19.4  |      |
| 2265 | x-side2-image-shift (integer(MIN:MAX))  |      |
| 2266 | 3.19.5  |      |
| 2267 | y-image-position (type2 keyword)  |      |
| 2268 | 3.19.6  |      |
| 2269 | y-image-shift (integer(MIN:MAX))  |      |
| 2270 | 3.19.7  |      |
| 2271 | y-side1-image-shift (integer(MIN:MAX))  |      |
| 2272 | 3.19.8  |      |
| 2273 | y-side2-image-shift (integer(MIN:MAX))  |      |
| 2274 | 3.19.9  |      |
| 2275 |   |      |
| 2276 | Job Description attributes:   |      |
| 2277 | Section:  |      |
| 2278 | current-page-order (type2 keyword)  | 4.1  |
| 2279 |   |      |
| 2280 | Printer Description attributes:   |      |
| 2281 | Section:  |      |
| 2282 | user-defined-values-supported (1setOf type2 keyword)  | 5.1  |
| 2283 | max-stitching-locations-supported (integer(1:MAX))  | 5.2  |
| 2284 | finishings-ready (1setOf type2 enum)  | 5.3  |
| 2285 |   |      |
| 2286 | <b>8.2 Attribute Value Registration</b>   |      |
| 2287 |   |      |
| 2288 | The "job-state-reasons" type2, "job-sheets" type3, and "media" (and "media-key") type3 keyword attribute    |      |
| 2289 | values defined in this document will be published by IANA according to the procedures in RFC 2911 [RFC2911] |      |

2290 section 6.1 with the following paths:

2291  
 2292 [ftp.isi.edu/iana/assignments/ipp/attribute-values/job-state-reasons/](ftp://ftp.isi.edu/iana/assignments/ipp/attribute-values/job-state-reasons/)  
 2293 [ftp.isi.edu/iana/assignments/ipp/attribute-values/job-sheets/](ftp://ftp.isi.edu/iana/assignments/ipp/attribute-values/job-sheets/)  
 2294 [ftp.isi.edu/iana/assignments/ipp/attribute-values/media/](ftp://ftp.isi.edu/iana/assignments/ipp/attribute-values/media/)  
 2295

2296 The registry entries will contain the following information:

2297  
 2298 Reference:  
 2299 [ftp://ftp.pwg.org/pub/pwg/ipp/new\\_EXC/pwg-ipp-override-attributes.pdf](ftp://ftp.pwg.org/pub/pwg/ipp/new_EXC/pwg-ipp-override-attributes.pdf)  
 2300

2301 Additional type2 keyword values for "job-state-reasons": Section:  
 2302 [resources-are-not-supported](#) 6.1  
 2303

2304 Additional type3 keyword values for "job-sheets": Section:  
 2305 [job-start-sheet](#) 6.2  
 2306 [job-end-sheet](#) 6.2  
 2307 [job-both-sheet](#) 6.2  
 2308 [first-print-stream-page](#) 6.2  
 2309

2310 Additional type3 keyword values for "media" and "media-key": Section:  
 2311 [by-pass-tray](#) 6.3  
 2312 [tray-N](#) 6.3  
 2313 [plain](#) 6.3  
 2314 [pre-punched](#) 6.3  
 2315 [transparency](#) 6.3  
 2316 [letterhead](#) 6.3  
 2317 [heavyweight](#) 6.3  
 2318 [recycled](#) 6.3  
 2319 [bond](#) 6.3  
 2320 [labels](#) 6.3  
 2321 [pre-printed](#) 6.3  
 2322 [customN](#) 6.3  
 2323  
 2324

## 2325 9. Internationalization Considerations

2326  
 2327 The IPP extensions defined in this document require the same internationalization considerations as any of the Job  
 2328 Template attributes defined in IPP/1.1 [RFC2911].  
 2329  
 2330

## 2331 10. Security Considerations

2332

2333 The IPP extensions defined in this document require the same security considerations as any of the Job Template  
2334 attributes defined in IPP/1.1 [RFC2911].  
2335  
2336

## 2337 **11. References**

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2377

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2396

2397 IPP Web Page: <http://www.pwg.org/ipp/>  
2398 IPP Mailing List: [ipp@pwg.org](mailto:ipp@pwg.org)

2399

2400 To subscribe to the ipp mailing list, send the following email:

2401

1) send it to [majordomo@pwg.org](mailto:majordomo@pwg.org)

2402

2) leave the subject line blank

2403 3) put the following two lines in the message body:  
 2404 subscribe ipp  
 2405 end

2406

2407 Implementers of this specification document are encouraged to join IPP Mailing List in order to participate in any  
 2408 discussions of clarification issues and review of registration proposals for additional attributes and values.

2409

2410

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## 2413 **13. Appendix A: Change History**

2414

2415 This section summarizes the changes to the document. Each sub-section is in reverse chronological order. Adding  
 2416 or removing ISSUES that don't change the document are not listed here.

2417

### 2418 **13.1 Changes to the October 26, 2000 to create the December 18, 2000 version**

2419

2420 The following changes were made to the October 26, 2000 version to create the December 18, 2000 version  
 2421 based on discussions at the PWG-IPP WG meeting, December 7, 2000:

2422

- 2423 1. Changed the image shift attributes so that they affect images before imposition, instead of after wards,  
 2424 but continue to affect impressions after "number-up". In order to clarify this, introduced terms:  
 2425 Imposition, Number-Up, Finished Document, Finished Page, Finished-Page Image, and Finished-  
 2426 Page-Image Cell and indicated that the shifting attributes affect Finished-Page Images, i.e., what the  
 2427 human sees in the Finished Document.
- 2428 2. Added figures to help illustrate the concepts of "number-up" and Imposition.
- 2429 3. Added the "imposition-template" attribute so as to have a real, but open ended, Imposition attribute.
- 2430 4. Clarified that "force-front-side" also affects Finished-Page Images.
- 2431 5. Added 'photographic' and 'cardstock' values to the "media-type" member attribute.
- 2432 6. Deleted 'na-8x10' and 'na-5x7' media size keywords, since they were added to RFC 2911.
- 2433 7. Changed the name of "presentation-direction" back to "presentation-direction-number-up" to clarify

2434 that it affects only “number-up”. ISO DPA has “presentation-direction” that affects text direction,  
2435 while “presentation-direction-number-up” does not.  
2436

### 2437 **13.2 Changes to the June 5, 2000 to create the October 26, 2000 version**

2438

2439 The following changes were made to the June 5, 2000 version to create the October 26, 2000 version from the  
2440 PWG IPP WG review in Chicago, September 13, 2000 and subsequent IPP telecons:  
2441

2442

- 2443 1. Added "finishings-col" (collection) to control placement of staples which also requires the  
2444 implementation of the "media" Job Template attribute in RFC 2911.
- 2445 2. Added “force-front-side” (1setOf integer(1:MAX)) Job Template attribute to force a page to the front  
2446 side of the medium.
- 2447 3. Changed “job-account-id-supported” (integer(1:255)), “job-message-to-operator-supported”  
2448 (integer(0:1023)), and “job-sheet-message-supported” (integer(0:1023)) to boolean on the grounds  
2449 that conforming implementations are supposed to implement the maximum length and no one wanted to  
2450 shorten the maximum in the spec.
- 2451 4. Added "job-accounting-user-id" Job Template attribute to go with "job-account-id".
- 2452 5. Added "job-accounting-output-bin" member attribute to the "job-accounting-sheets" collection to  
2453 control the output bin.
- 2454 6. Removed “job-recipient-name” to a separate IETF spec, since it needs to be an IETF document, while  
2455 the Production Printing Extension remains a PWG document.
- 2456 7. Specified how the matching algorithm works for "media-col" and what is IMPLEMENTATION-  
2457 DEPENDENT.
- 2458 8. Added "media-key" member attribute to "media-col" collection as a unique key for media which must  
2459 be present if implemented and removed "media-description" member attribute (which was neither  
2460 unique nor required on all values when implemented - it was more like a “nick” name).
- 2461 9. Removed "media-opacity", "media-tabs", and "media-label-type" member attribute of the "media-col"  
2462 Job Template attribute and added "media-type" member attribute with Printer MIB and Internet FAX  
2463 Media type values to represent these media types. Added 'full-cut-tab' and 'pre-cut-tab' values to  
2464 disambiguate between these two forms of 'tab-stock' values. Also added 'other' to cover cases when  
2465 no supported keyword or name will do.
- 2466 10. Added "media-info" (text(255)) member attribute to give a text description of the media for human  
2467 consumption.
- 2468 11. Changed the 'clear' "media-color" to 'no-color' to be clearer.
- 2469 12. Clarified that full-cut tabs can have a "media-order-count".
- 2470 13. Changed the lower limit of the "media-size" dimension attributes from 0 to 1.
- 2471 14. Clarified that the rangeOfInteger in media-size-supported can be used by Printers with adjustable input  
2472 trays.
- 2473 15. Deleted “media-weight-english” member attribute as an unwanted supplemental attribute to “media-  
2474 weight-metric” which is in metric units.
- 2475 16. Deleted the 'any' value from the "media-front-coating" and "media-back-coating" member attributes of  
the "media-col" attribute. Matching a client supplied value of 'any' with 'any' in the supported list is

- 2476 straight forward, but then selecting the actual media instance is a special case. It is simpler to allow the  
2477 user to select one of the defined values.
- 2478 17. Added the "media-input-tray-check" Job Template attribute to control checking the media in a  
2479 specified input tray.
  - 2480 18. Added "presentation-direction" (type2 keyword) Job Template attribute to specify the direction that  
2481 number up page images are to be placed on a side.
  - 2482 19. Changed the 'wrap-sheets' value for "separator-sheet-type" to 'both-sheets'.
  - 2483 20. Renamed the "x-auto-center" and "y-auto-center" attributes to "x-image-position" and "y-image-  
2484 position" attributes with type2 keyword data types. The values are 'none', 'center-on-media', 'left',  
2485 'right' and 'none', 'center-on-media', 'top', 'bottom', respectively.
  - 2486 21. Renamed "user-defined-names-supported" Printer Description attribute to "user-defined-values-  
2487 supported" and generalized it to allow the administrator to establish the policy to allow users to supply  
2488 any integer values for integer attributes and collection values for collection attributes as well.
  - 2489 22. Added "max-stitching-locations-supported" Printer Description attribute to indicate the maximum  
2490 number to stitches/staples per sheet.
  - 2491 23. Added "finishings-ready" (1setOf type2 enum) to specify the finishing that doesn't require operator  
2492 intervention for use in systems where operator intervention MAY be required to changes the finisher.
  - 2493 24. Changes the 'job-wrap-sheets' value of "job-sheets" to 'job-both-sheets' to give a more understandable  
2494 name.
  - 2495 25. Added more "media" keyword values.

### 2497 **13.3 Changes to the May 9, 2000 to create the June 5, 2000 version**

2498  
2499 The following changes were made to the May 9, 2000 version to create the June 5, 2000 version:

- 2500  
2501 1. Added the "cover-type-supported" Printer attribute.
- 2502  
2503 2. REQUIRED (rather than RECOMMENDED) the Printer to make the "job-sheets-default" and "job-sheets-  
2504 col-default" Printer attributes identify the same job sheet instance or have one of them set to the 'unknown' out-  
2505 of-band value.
- 2506  
2507 3. REQUIRED (rather than RECOMMENDED) the Printer to make the "media-default" and "media-col-default"  
2508 Printer attributes identify the same media instance or have one of them set to the 'unknown' out-of-band value.
- 2509  
2510 4. Added the 'system-specified' keyword value to the "page-delivery" Job Template attribute.

### 2511 2512 2513 **13.4 Changes to the April 26, 2000 to create the May 9, 2000 version**

2514  
2515 The following changes were made to the April 26, 2000 version to create the May 9, 2000 version:

- 2516  
2517 1. Clarified that both the "job-sheets-default" and "job-sheets-col-default" Printer attributes SHOULD both be

- 2518 configured to specify the same job-sheet instance.
- 2519 2. Changed the "media-description" member attribute back to 'type3 keyword | name(MAX)' from 'text' so that  
2520 clients can localize the value and the "media-description-supported" back to '1setOf (type3 keyword |  
2521 name(MAX) from 'integer(0:255)'.  
2522 3. Deleted the "media-weight-type" attribute - don't have two ways to specify the same thing until there is a way  
2523 to indicate which one the Printer supports.  
2524 4. Replaced the "media-weight" and "media-weight-units" with "media-weight-metric" and "media-weight-english",  
2525 so that implementations can support "media-weight-metric" only or both and clients can request either.  
2526 5. Clarified that the "media-size" tolerance is implementation-defined. The 5 points tolerance for PostScript is  
2527 given as an example.  
2528 6. Removed "-supported" from the "x-dimension" and "y-dimension" member attributes to agree with the  
2529 collection specification.  
2530 7. Clarified that both the "media-default" and "media-col-default" Printer attributes SHOULD both be configured  
2531 to specify the same media instance.  
2532 8. Changed "job-separator-sheets" collection attribute so that if the client supplies neither the "media" or the  
2533 "media-col" member attributes, the implementation picks some appropriate separator sheet medium, rather than  
2534 using the document's media.  
2535 9. Added the 'first-print-stream-page' keyword value to the "job-sheets" Job Template attribute.  
2536

### 2537 **13.5 Changes to the April 11, 2000 to create the April 26, 2000 version**

2538  
2539 The following changes were made to the April 11, 2000 version to create the April 26, 2000 version:  
2540

- 2541 1. Added discussion about distinguished none values for all but a few Job Template attributes.  
2542 2. Clarified the table and language for collections that have both "media" and "media-col" around the client sending  
2543 neither (error for some collection attributes, not for others), one or the other, or both (error).  
2544 3. Removed the use of the 'none' out-of-band value and defined distinguished values for keywords (usually 'none',  
2545 or 'no-xxx'), strings (zero-length), and integers (usually 0) instead. Existing clients and Printers might get  
2546 confused with the (new) 'none' out-of-band value.  
2547 4. Broke "job-error-sheet-type" into two member attributes: "job-error-sheet-type" and "job-error-sheet-when".  
2548 5. Removed the "s" from "job-error-sheet".  
2549 6. Banned "media-default" and "media-col-default" from both having a value, even if one is the name of the other.  
2550 Required the Printer to set the other to 'no-value' out-of-band value.  
2551 7. Added "media-label-type" (type3 keyword | name(MAX)), and "media-recycled" (type3 keyword |  
2552 name(MAX)) member attributes to "media-col".  
2553 8. Changed the "xxx-supported" (boolean) to "xxx-supported" (integer(0:X) so that the maximum length of the  
2554 string could be queried by the client.  
2555 9. Added 'gray', 'ivory', and 'orange' colors  
2556 10. Changed media-pre-printed (boolean) to media-pre-printed (type3 keyword | name(MAX)) and defined  
2557 'blank', 'pre-printed', and 'letter-head'.  
2558 11. Removed -supported from the member attributes of the "media-col-supported" (1setOf collection).  
2559 12. Added 'none' keyword value to media-front-coating (type3 keyword | name(MAX)) and media-back-coating



2560 (type3 keyword | name(MAX))

2561 13. Replaced the 'user-define' and 'user-define-supported' out-of-band values with the "user-defined-names-  
2562 supported" Printer attribute. This will help existing clients that query the Printer.

2563 14. Added some "media" keyword values.

2564 15. Enhanced the Conformance Section with client requirements.

2565

### 2566 **13.6 Changes to the February 7, 2000 to create the April 11, 2000 version**

2567

2568 The following changes were made to the February 7, 2000 version to create the April 11, 2000 version:

2569

2570 1. Clarified that the "page-ranges" Job Template attribute does not affect the print-stream page numbering.

2571 2. Aligned the collection attribute definitions to agree with the updated Collection [ipp-coll] document:

2572 a) Changed "xxx-supported"(boolean) to "xxx-supported" (1setOf type2 keyword) to return the keyword  
2573 names of the member attributes.

2574 b) Removed the 'type3 keyword | name' attribute syntaxes from "xxx" (type3 keyword | name | collection)  
2575 attributes and moved those values into a new "xxx-type" member attribute in the collection for new  
2576 attributes. For the existing IPP/1.1 "job-sheets" (type3 keyword | name) and "media" (type3 keyword |  
2577 name) attributes created new "xxx-col" (collection) companion attributes.

2578 c) For each collection attribute that had a "media" (type3 keyword | name(MAX) | collection) member  
2579 attribute, removed the 'collection' and added a new OPTIONAL "media-col" (collection) member  
2580 attribute to carry the media characteristics.

2581 d) Clarified that a client MUST NOT supply both "media" and a "media-col" Job Template attributes or  
2582 member attributes. If a Printer receives such a bad request, it MUST either reject it or use one or the  
2583 other attributes depending on implementation.

2584 e) Add prefix names to member attributes when they are intended to be unique, such as "cover-" to "cover-  
2585 printed-sided" so that the "xxx-supported" would not be ambiguous. Same for "insert-" to insert-after-  
2586 page-number" and "insert-count".

2587 f) Added "xxx-default" (collection) for all collection attributes for consistency as required by [ipp-coll].

2588 g) Added "xxx-supported" Printer attributes for all member attributes for consistency as required by [ipp-  
2589 coll].

2590 3. Removed the prefix from the "media" and the "media-col" member attributes, so that they are the same as the  
2591 IPP/1.1 Job Template attributes.

2592 4. Added the insert-after-page-number-supported" (1setOf type2 keyword) Printer attribute for consistency.

2593 5. Added that a value of MAX for "insert-after-page-number" inserts a page after the last page in the document  
2594 no matter how many pages are in the document.

2595 6. Changed "insert-sheet" to agree with the Exceptions document [ipp-except], so that if a page number is not  
2596 the first on a sheet, the insert happens after that sheet, and the page is forced to the next sheet and a warning  
2597 given using the "job-warnings-count" Job Description attribute and the Job's 'job-warnings-detected' job-  
2598 state-reasons.

2599 7. Add the "insert-count-supported (integer(1:MAX)) Printer attribute for consistency.

2600 8. Clarified that the "media" attribute maps a name or keyword to a media instance, but that not all media  
2601 instances need have an associated media name or keyword. Also that no two media instances can have the

- 2602 same "media" attribute name or keyword.
- 2603 9. Clarified that that the "media-col" collection attribute maps a set of characteristics to a media instance and  
2604 that all media instances must have a distinct set of characteristics, not counting their names. The "media-  
2605 description" member attribute can be used as a characteristics to distinguish two otherwise identical media  
2606 instances.
- 2607 10. Changed the name of the "media-name" member attribute to "media-description" and its attribute syntax from  
2608 'type3 keyword | name(MAX)' to 'text(255)' to make sure that the value is just an arbitrary string with no  
2609 semantic content, such as a tray name or size.
- 2610 11. Clarified that several media instances can have the same "media-description" member attribute value.
- 2611 12. Specified the tolerance for media size matching of 5 points, same as PostScript.
- 2612 13. Removed the type3 keyword from the "media-size" (collection) member attribute, so as to have only one  
2613 way to specify size, namely a pair of integers. The client can use these integers to map to a media size name  
2614 in the locale of the user, similar to keywords.
- 2615 14. Added a rangeOfInteger to the "media-size-supported" (1setOf collection) member attributes and so added  
2616 a "-supported" suffix to "x-dimension" and "y-dimension" member attributes since they now have different  
2617 attribute syntaxes to the member attributes of the "media-size" member attribute.
- 2618 15. Added "media-col-ready" (1setOf collection) Job Template Printer attribute to show the characteristics of  
2619 the ready media.
- 2620 16. Clarified that the IPP/1.1 "media-ready" (1setOf (type3 keyword | name(MAX))) Printer attribute MUST  
2621 also be supported, and that the values correspond, so that the client can determine the mapping of the media  
2622 names/keywords to the media characteristics for the ready media at least.
- 2623 17. Deleted "sheet-collate", since it is already defined in the "Job Progress Attributes" document [ipp-prog].
- 2624 18. Added the section on Document and Page Exceptions to indicate the semantics of each Job Template  
2625 attribute as required by [ipp-except].
- 2626 19. Deleted the definition of the 'none' out-of-band attribute value, since it is defined in the [ipp-coll] document.
- 2627 20. Added the 'user-define' out-of-band attribute value for use as one of the values of the Printer's "xxx-  
2628 supported" attributes to indicate that a client can supply a name that is not in the Printer's supported list, i.e.,  
2629 can supply custom names.
- 2630 21. Added the 'user-define-supported' out-of-band value so that an implementation can indicate in the "xxx-  
2631 supported" returned by the Get-Printer-Supported-Values operation whether or not it will allow the  
2632 administrator to set the 'user-define' out-of-band value in the corresponding Printer's "xxx-supported"  
2633 attribute.
- 2634 22. Added the 'resources-are-not-supported' value for use with the "job-state-reasons" Job Description attribute  
2635 to indicate that a user has supplied a custom name.
- 2636 23. Clarified that if a Printer supports "job-sheets-col", it MUST also support the IPP/1.1 "job-sheets" Job  
2637 Template attribute.
- 2638 24. Clarified that if a Printer supports "media-col", it MUST also support the IPP/1.1 "media" Job Template  
2639 attribute.
- 2640 25. Clarified that if a Printer supports "media-col-ready", it MUST also support the IPP/1.1 "media-ready"  
2641 Printer attribute.
- 2642 26. Changed the attribute syntax for "job-account-id-supported", "job-message-to-operator-supported", "job-  
2643 recipient-name-supported", and "job-sheet-message-supported" from 'boolean' to 'integer(1:255)' to indicate

2644 the maximum string length supported, since IPP is often a gateway to another system that can't store the  
2645 string length required for conforming IPP Printers.

2646 27. Added notes about the conversion between English and metric for different types of media.

2647

2648

### 2649 **13.7 Changes to the January 30, 2000 to create the February 7, 2000 version**

2650

2651 The following changes were made to the January 30, 2000 version to create the February 7, 2000 version:

2652

- 2653 1. Changed the attribute syntax of "cover-front-supported" and "cover-back-supported" from 'collection' to  
2654 'boolean', since a Printer MUST support all (both) member attributes and any combinations of values.
- 2655 2. Changed the 'sheet' member attribute in each of the following collections to give them distinct names so that the  
2656 "xxx-supported" Printer attribute can indicate their respective (potentially different) values: "job-accounting-  
2657 sheets", "job-error-sheets", "job-sheets", and "separator-sheets".
- 2658 3. Added "media-" to the beginning of each member attribute of the "media" collection, so that ordinary "media-  
2659 xxx-supported" could be used to represent their individual supported values.
- 2660 4. Removed the 'name(MAX)' choice from the "media-size" member attribute. If the properties of a medium are  
2661 being given, either the keyword name or the exact numerical dimensions known to the implementation, not a  
2662 name made up by the administrator.
- 2663 5. Added "media-size-supported (1setOf collection) which contains the combinations of numerical sizes  
2664 supported (x-dimension and y-dimension) by the Printer. This "xxx-supported" attribute is the only one that  
2665 has a value of '1setOf collection' in order to list the pairs of x and y dimensions supported. The attribute syntax  
2666 of the "x-dimension" and "y-dimension" is a choice of 'integer(0:MAX)' or 'rangeOfInteger(0:MAX)' to cover  
2667 the case of continuous media and cut sheet printers that can cut the medium to any size within the specified  
2668 range.
- 2669 6. Changed the "media-supported" from containing a collection whose member attributes listed the supported  
2670 values that the client could supply as member attributes to just containing a new out-of-band 'any-collection'  
2671 value that indicates that the implementation allows any combination of member attributes that are indicated by  
2672 the corresponding "xxx-supported" Printer attributes.

2673

### 2674 **13.8 Changes to the January 28, 2000 to create the January 30, 2000 version**

2675

2676 The following changes were made to the January 28, 2000 version to create the January 30, 2000 version:

2677

- 2678 1. Ordered the Job Template attributes alphabetically.
- 2679 2. Add 'name(MAX)' to Job Template attributes that had (type3 keyword | collection) to be consistent with  
2680 IPP/1.1 that has (type3 keyword | name(MAX)).

2681

### 2682 **13.9 Changes to create the January 28, 2000 version**

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2684 Initial version.

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**14. Appendix B: Summary of other IPP documents**

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The full set of IPP documents includes:

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1. Design Goals for an Internet Printing Protocol [RFC2567]
2. Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
3. Internet Printing Protocol/1.1: Model and Semantics (this document)
4. Internet Printing Protocol/1.1: Encoding and Transport [RFC2910]
5. Internet Printing Protocol/1.1: Implementer's Guide [IPP-IIG]
6. Mapping between LPD and IPP Protocols [RFC2569]

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The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed printing functionality, and it enumerates real-life scenarios that help to clarify the features that need to be included in a printing protocol for the Internet. It identifies requirements for three types of users: end users, operators, and administrators. It calls out a subset of end user requirements that are satisfied in IPP/1.0. A few OPTIONAL operator operations have been added to IPP/1.1.

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The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document describes IPP from a high level view, defines a roadmap for the various documents that form the suite of IPP specification documents, and gives background and rationale for the IETF working group's major decisions.

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The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the abstract operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines the encoding rules for a new Internet MIME media type called "application/ipp". This document also defines the rules for transporting over HTTP a message body whose Content-Type is "application/ipp". This document defines a new scheme named 'ipp' for identifying IPP printers and jobs.

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The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some of the considerations that may assist them in the design of their client and/or IPP object implementations. For example, a typical order of processing requests is given, including error checking. Motivation for some of the specification decisions is also included.

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The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of gateways between IPP and LPD (Line Printer Daemon) implementations.

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## 15. Appendix C: Description of the IEEE Industry Standards and Technology (ISTO)

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The IEEE-ISTO is a not-for-profit corporation offering industry groups an innovative and flexible operational forum and support services. The IEEE-ISTO provides a forum not only to develop standards, but also to facilitate activities that support the implementation and acceptance of standards in the marketplace. The organization is affiliated with the IEEE (<http://www.ieee.org/>) and the IEEE Standards Association (<http://standards.ieee.org/>).

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For additional information regarding the IEEE-ISTO and its industry programs visit:

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<http://www.ieee-isto.org>.

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## 16. Appendix D: Description of the IEEE-ISTO PWG

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The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and Technology Organization (ISTO) with member organizations including printer manufacturers, print server developers, operating system providers, network operating systems providers, network connectivity vendors, and print management application developers. The group is chartered to make printers and the applications and operating systems supporting them work together better. All references to the PWG in this document implicitly mean “The Printer Working Group, a Program of the IEEE ISTO.” In order to meet this objective, the PWG will document the results of their work as open standards that define print related protocols, interfaces, procedures and conventions. Printer manufacturers and vendors of printer related software will benefit from the interoperability provided by voluntary conformance to these standards.

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In general, a PWG standard is a specification that is stable, well understood, and is technically competent, has multiple, independent and interoperable implementations with substantial operational experience, and enjoys significant public support.

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For additional information regarding the Printer Working Group visit:

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<http://www.pwg.org>

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