



The Printer Working Group

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Working Draft

## IPP Production Printing Extensions v2.0 (PPX)

Status: Prototype

Abstract: This specification defines attributes used for imposition, layout, and printing of covers, insert sheets, separator sheets, and different kinds of job sheets in high-volume "production" environments.

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

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

This specification is available electronically at:

<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippv20-20190626.docx>

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## 201 **1. Introduction**

202 High-volume "production" printing environments make use of covers, insert and separator  
203 sheets, special media, and Input Page transformations in order to deliver finished print  
204 products such as books, magazines, business cards, and so forth. Such environments also  
205 often use dedicated human operators and job tracking processes. This specification defines  
206 attributes used for printing in such high-volume "production" environments.

207 This specification obsoletes portions of the previous version of this specification  
208 [PWG5100.3-2001]. Finishing-specific attributes have been moved to the IPP Finishings 2.1  
209 specification [PWG5100.1]. The "media-col" Job Template and related attributes have been  
210 moved to the IPP Job Extensions v2.0 (JOBEXT) specification [PWG5100.7]. A list of  
211 changes can be found in section 12.

## 212 **2. Terminology**

### 213 **2.1 Conformance Terminology**

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

219 The term DEPRECATED is used for previously defined and approved protocol elements that  
220 SHOULD NOT be used or implemented. The term OBSOLETE is used for previously defined  
221 and approved protocol elements that MUST NOT be used or implemented.

### 222 **2.2 Printing Terminology**

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

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

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

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

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

233 *Physical Device*: a hardware implementation of a endpoint device, e.g., a marking engine, a  
234 fax modem, etc.

## 235 **2.3 Protocol Role Terminology**

236 The following protocol roles are defined to specify unambiguous conformance requirements:

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

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

## 242 **2.4 Other Terminology**

243 *Administrator*: An End User who is also authorized to manage all aspects of an Output  
244 Device or Printer, including creating the printer instances and controlling the authorization  
245 of other End Users and Operators [STD92].

246 *Document Data*: The data that represent an "original document" supplied with a Job Creation  
247 request. Typically Document Data is in the form of a Page Description Language (PDL).

248 *End User*: A person or software process that is authorized to perform basic printing functions,  
249 including finding/locating a Printer, creating a local instance of a Printer, viewing Printer  
250 status, viewing Printer capabilities, submitting a Print Job, viewing Print Job status, and  
251 altering the attributes of a Print Job [STD92].

252 *Imposition*: The process of laying out Impressions on the sides of one or more larger Media  
253 Sheets. The Media Sheets can be folded and/or cut in order to produce a series of Finished  
254 Pages.

255 *Impression*: Content imposed upon one side of a Media Sheet by a marking engine,  
256 independent of the number of times that the sheet side passes any marker. An Impression  
257 contains one or more Input Pages that are imposed (scaled, translated, and/or rotated)  
258 during processing of the Document Data [STD92].

259 *Input Page*: A page according to the definition of "pages" in the language used to express  
260 the Document Data [STD92].

261 *Insert Sheet*: A Media Sheet that the Printer inserts into an output document, on which no  
262 Input Pages are imaged.

263 *i<sup>th</sup>*: Referring to a specific IPP '1setOf' value - the first value, the second value, and so forth.

264 *Job Creation Operation*: Any operation that causes the creation of a Job, e.g., Create-Job,  
265 Print-Job, and Print-URI [STD92].

266 *Logical Device*: A print server, software service, or gateway that processes Jobs and either  
267 forwards or stores the processed Job or uses one or more Physical Devices to render output  
268 [STD92].

269 *Media Sheet*: A single instance of a medium, whether printing on one or both sides of the  
270 medium. Media Sheets also include sections of roll media [STD92].

271 *Number Up*: The process of laying out multiple consecutive Input Pages to produce an  
272 Impression.

273 *Operator*: An End User that also has special rights on the Output Device or Printer. The  
274 Operator typically monitors the status of the Printer and manages and controls the Jobs at  
275 the Output Device. The Operator is allowed to query and control the Printer, Jobs, and  
276 Documents based on site policy [STD92].

277 *Output Device*: a single Logical or Physical Device [STD92].

278 *Physical Device*: A hardware implementation of an endpoint device, e.g., a marking engine,  
279 a fax modem, etc. [STD92]

280 *Set*: A logical boundary between the delivered Media Sheets of a printed Job. For example,  
281 in the case of a ten-page single Document with collated pages and a request for 50 copies,  
282 each of the 50 printed copies of the Document constitute a Set. If the pages were uncollated,  
283 then 50 copies of each of the individual pages within the Document would represent each  
284 Set. Finishing processes operate on Sets [STD92].

## 285 **2.5 Acronyms and Organizations**

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

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

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

289 [PDL: Page Description Language](#)

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

291

## 292 **3. Requirements**

### 293 **3.1 Rationale**

294 Given the following existing specifications:

- 295 1. Internet Printing Protocol/1.1 [STD92]
- 296 2. IPP Finishings v2.1 (FIN) [PWG5100.1]

297 And given the desire for specifying printing intent in high-volume "production" printing  
298 environments, the IPP Production Printing Extensions v1.1 (PPX) should:

- 299 1. Define attributes and values for specifying printed covers;
- 300 2. Define attributes and values for specifying how Input Pages are mapped to the  
301 front side of a Media Sheet;
- 302 3. Define attributes and values for specifying how Input Pages are imposed on  
303 Impressions;
- 304 4. Define attributes and values for specifying insert sheets;
- 305 5. Define attributes and values for specifying Job accounting, error handling,  
306 operator, and summary information;
- 307 6. Define attributes and values for specifying the ordering and layout of Input  
308 Pages; and
- 309 7. Define attributes and values for specifying how Input Pages are offset when  
310 imposed on Impressions.

### 311 **3.2 Use Cases**

#### 312 **3.2.1 Printing Bound Books with Printed Covers**

313 Jane wants to print a small run of 100 books from a document that contains pages for the  
314 front and back covers. She opens the document in her client software and initiates a print  
315 action, specifying the number of copies (100), desired output media, two-sided printing  
316 intent, binding of output media pages, and the cover media with content from the input  
317 document. The printer uses the first and last pages from the document for the covers of each  
318 copy of the book that is printed.

#### 319 **3.2.2 Printing Folded Booklets**

320 Bill wants to print a booklet from his word processing software, which does not know how to  
321 layout pages for booklet printing. He initiates the print action from the software and specifies  
322 that the printer should reorder and position the input pages so they appear in the correct  
323 locations for a folded booklet.

### 324 **3.2.3 Separating Copies with Colored Paper**

325 David is printing multiple copies of a test and wants to separate each copy with a piece of  
326 colored paper. He initiates the print action from his test software and specifies that each  
327 copy should be separated by a yellow sheet.

## 328 **3.3 Exceptions**

### 329 **3.3.1 Printing a Report on Error**

330 Bob manages a small printing shop and needs to know when a job fails to print correctly. He  
331 uses his printer management software to always print an error summary on pink sheets.

## 332 **3.4 Out of Scope**

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

- 334 1. Definition of new file formats; and
- 335 2. Definition of new protocol bindings.

## 336 **3.5 Design Requirements**

337 The design requirements for this specification are:

- 338 1. Define attributes and values for specifying printed covers;
- 339 2. Define attributes and values for specifying how Input Pages are mapped to the  
340 front side of a Media Sheet;
- 341 3. Define attributes and values for specifying how Input Pages are imposed on  
342 Impressions;
- 343 4. Define attributes and values for specifying Insert Sheets;
- 344 5. Define attributes and values for specifying Job accounting, error reporting,  
345 operator, and summary information;
- 346 6. Define attributes and values for specifying the ordering and layout of Input  
347 Pages;
- 348 7. Define attributes and values for specifying how Input Pages are offset when  
349 imposed on Impressions; and
- 350 8. Define sections to register all attributes, values, and operations with IANA.

351

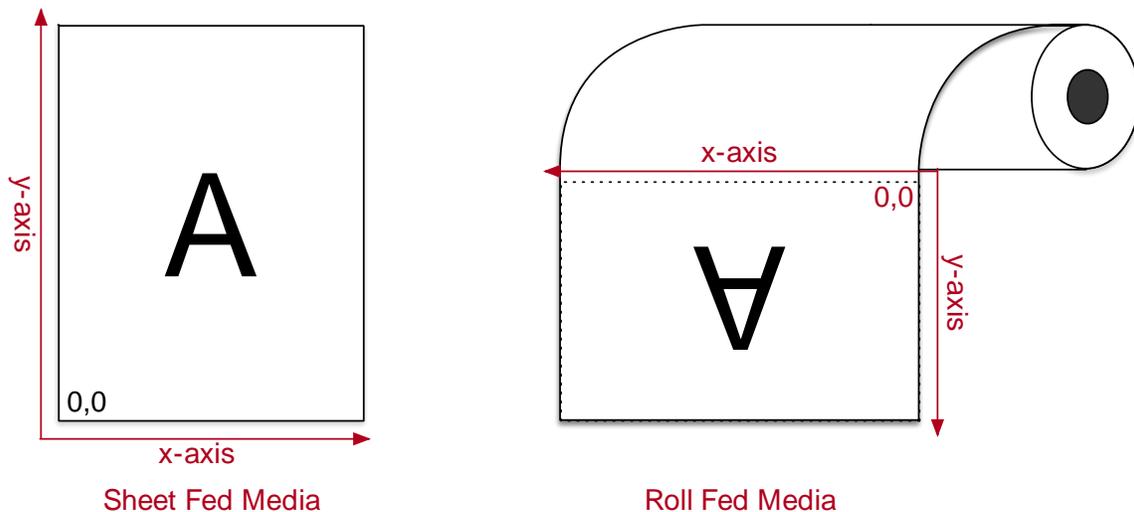
## 352 4. Model

353 This specification extends the Internet Printing Protocol/1.1 [STD92] model to include Job  
354 Template attributes for production printing that specify:

- 355 1. Front and back covers;
- 356 2. Which Input Pages are placed on the front side of a Media Sheet;
- 357 3. How Input Pages are imposed on each Impression;
- 358 4. How Input Pages are ordered prior to imposition;
- 359 5. How Input Pages are offset during imposition;
- 360 6. Where and what Insert Sheets are placed in the output;
- 361 7. Job accounting information;
- 362 8. Job error reporting requirements; and
- 363 9. A message to the operator.

### 364 4.1 Imaging Coordinate System and Units

365 Figure 1 shows the coordinate system used by IPP when addressing locations on a Media  
366 Sheet or within an Impression. Coordinates are provided without respect to the orientation  
367 of the Input Page. For sheet fed media the X dimension is the short side and the Y dimension  
368 is the long side ("portrait" orientation). For roll fed media the X dimension is in the cross-feed  
369 direction and the Y dimension is in the feed direction, with the "top" of the page being the  
370 leading edge of the roll.



371

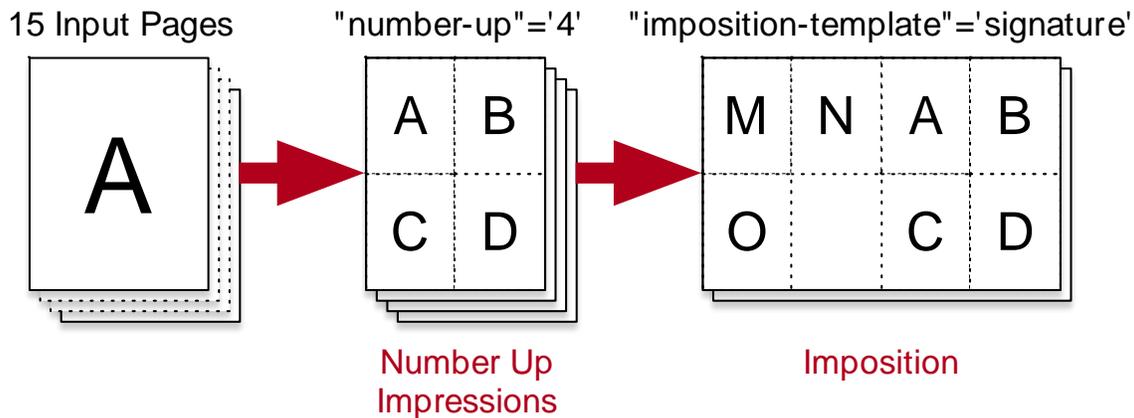
372

**Figure 1 - IPP Media Sheet Coordinate System**

373 Dimensions are always given in hundredths of millimeters (1/2540th of an inch) which are  
374 sometimes called "PWG units".

## 375 4.2 Number Up, Imposition, and Shifting

376 The concepts of Number Up (“number-up” [STD92]) layout and Imposition are related but  
 377 separate steps. Figure 2 shows these steps visually for "signature" (booklet) imposition.



378

379 **Figure 2 - Relationship Between Number Up and Imposition**

380 Aside from the "imposition-template" Job Template attribute (section 5.1.4), this specification  
 381 defines additional Job Template attributes to offset and position the imposed Impressions  
 382 on the Media Sheet, typically to compensate for an application or scanning in some  
 383 consistent direction, or to shift the Impressions toward or away from a binding edge.

384 The Printer MUST apply “number-up”, “page-delivery”, “presentation-direction-number-up”,  
 385 image shifting, and “imposition-template” attributes listed in Table 1 in the following order:

- 386 1. Order the Input Pages according to the "page-delivery" attribute (section 5.1.11).  
 387 If "page-delivery" is unsupported or not applied, Input Pages are processed in the  
 388 order they occur within the Document Data.
- 389 2. Create an Impression by laying out the number of Input Pages specified by the  
 390 "number-up" attribute [STD92] in the direction specified by the "presentation-  
 391 direction-number-up" attribute (section 5.1.12). If "number-up" and "presentation-  
 392 direction-number-up" are unsupported or not applied, the Impression consists of  
 393 a single Input Page.
- 394 3. Shift the Impression as specified by the "x-image-xxx" and "y-image-xxx" image  
 395 shifting attributes. If the image shifting attributes are unsupported or not applied,  
 396 the Impression is not shifted.
- 397 4. Layout the Impressions onto the surfaces (i.e. sides) of a number of (larger) Media  
 398 Sheets according to the "force-front-side" (section 5.1.3), "imposition-template",  
 399 and "sides" [STD92] attributes.

400

401

**Table 1 - Number Up, Imposition, and Offset Attributes**

<b>Template Attribute</b>	<b>Default Attribute</b>	<b>Supported Attribute</b>
force-front-side (1setOf integer(1:MAX))	N/A	force-front-side-supported (rangeOfInteger(1:MAX))
imposition-template (type2 keyword   name(MAX))	imposition-template-default (type2 keyword   name(MAX))	imposition-template-supported (1setOf (type2 keyword   name(MAX)))
page-delivery (type2 keyword)	page-delivery-default (type2 keyword)	page-delivery-supported (1setOf type2 keyword)
presentation-direction-number-up (type2 keyword)	presentation-direction-number-up-default (type2 keyword)	presentation-direction-number-up-supported (1setOf type2 keyword)
x-image-position (type2 keyword)	x-image-position-default (type2 keyword)	x-image-position-supported (1setOf type2 keyword)
x-image-shift (integer(MIN:MAX))	x-image-shift-default (integer(MIN:MAX))	x-image-shift-supported (rangeOfInteger(MIN:MAX))
x-side1-image-shift (integer(MIN:MAX))	x-side1-image-shift-default (integer(MIN:MAX))	x-side1-image-shift-supported (rangeOfInteger(MIN:MAX))
x-side2-image-shift (integer(MIN:MAX))	x-side2-image-shift-default (integer(MIN:MAX))	x-side2-image-shift-supported (rangeOfInteger(MIN:MAX))
y-image-position (type2 keyword)	y-image-position-default (type2 keyword)	y-image-position-supported (1setOf type2 keyword)
y-image-shift (integer(MIN:MAX))	y-image-shift-default (integer(MIN:MAX))	y-image-shift-supported (rangeOfInteger(MIN:MAX))
y-side1-image-shift (integer(MIN:MAX))	y-side1-image-shift-default (integer(MIN:MAX))	y-side1-image-shift-supported (rangeOfInteger(MIN:MAX))
y-side2-image-shift (integer(MIN:MAX))	y-side2-image-shift-default (integer(MIN:MAX))	y-side2-image-shift-supported (rangeOfInteger(MIN:MAX))

### 402 **4.3 Cover Pages, Insert Sheets, and Separator Sheets**

403 The IPP Finishings 2.1 (FIN) [PWG5100.1] specification defines covers as one or two Media  
 404 Sheets that placed over the hardcopy output. These covers are not printed on and draw from  
 405 a separate media supply. They can also be combined with the Cover Pages, Insert Sheets,  
 406 and Separator Sheets defined in this specification.

407 Cover Pages can be printed using Input Pages in the Job's Document Data and draw from  
 408 the standard media supply. Blank Insert Sheets can be added to separate forms or reports  
 409 within a Set. Blank Separator Sheets can be added between Sets to separate each Set  
 410 visually. Table 2 lists the Cover Page, Insert Sheet, and Separator Sheet attributes.

411 For example, a Job can request 10 copies of a Document with the first and last Input Page  
 412 of the Document Data printed as covers on cardstock media, blank yellow pages between  
 413 each section within the Document Data, and blank pink pages between each Set (copy) of  
 414 the Document. When combined with IPP Finishings 2.1, the Covers and interior pages can  
 415 be bound with the Separator Sheets left loose between the bound Sets.

416

417

**Table 2 - Cover Page, Insert Sheet, and Separator Sheet Attributes**

<b>Template Attribute</b>	<b>Default Attribute</b>	<b>Supported Attribute(s)</b>
cover-back (collection)	cover-back-default (collection)	cover-back-supported (1setOf keyword) cover-type-supported (1setOf (type2 keyword   name(MAX)))
cover-front (collection)	cover-front-default (collection)	cover-front-supported (1setOf keyword) cover-type-supported (1setOf (type2 keyword   name(MAX)))
insert-sheet (1setOf collection)	insert-sheet-default (1setOf collection)	insert-sheet-supported (1setOf keyword) insert-count-supported (rangeOfInteger(0:MAX))
separator-sheets (collection)	separator-sheets-default (collection)	separator-sheets-supported (1setOf keyword) separator-sheets-type-supported (1setOf (type2 keyword   name(MAX)))

#### 418 4.4 Accounting and Error Sheets

419 Accounting and Error Sheets are important parts of large print Jobs. Accounting Sheets  
 420 provide a report of the Job owner, local accounting details, and Job metrics such as the  
 421 number and type of Media Sheets that were used to print a Job. Error Sheets provide a  
 422 detailed report of technical processing issues that can be used to troubleshoot a Job. Table  
 423 3 lists the Accounting and Error Sheet attributes.

424

**Table 3 - Accounting and Error Sheet Attributes**

<b>Job Template Attribute</b>	<b>Default Attribute</b>	<b>Supported Attribute(s)</b>
job-accounting-sheets (collection)	job-accounting-sheets-default (collection)	job-accounting-sheets-supported (1setOf keyword) job-accounting-sheets-type-supported (1setOf (type2 keyword   name(MAX)))
job-error-sheet (collection)	job-error-sheet-default (collection)	job-error-sheet-supported (1setOf keyword) job-error-sheet-type-supported (1setOf (type2 keyword   name(MAX))) job-error-sheet-when-supported (1setOf type2 keyword)
job-message-to-operator (text(MAX))	N/A	job-message-to-operator-supported (boolean)
job-sheet-message (text(MAX))	N/A	job-sheet-message-supported (boolean)

425

426

## 427 5. New Attributes

### 428 5.1 Job Template Attributes

#### 429 5.1.1 cover-back (collection)

430 This attribute specifies how back covers are to be applied to each Set. The Media Sheets in  
 431 the rendered output that represent the covers are treated like any other Media Sheet in the  
 432 Set. For example, if the "finishings" Job Template attribute [STD92] has a value of 'staple,'  
 433 then the staple would bind the cover along with all of the other Media Sheets in the Set.

434 Table 4 lists the member attributes. If the Client omits both the "media" and the "media-col"  
 435 member attributes, then the media currently being used by the Printer for the Job SHOULD  
 436 also be used for the cover. The Client MUST NOT supply both the "media" and the "media-  
 437 col" member attributes. If the Client supplies such a malformed request, the Printer MUST  
 438 either reject the request and return the 'client-error-bad-request' status code or choose either  
 439 the "media" or the "media-col" member attribute and return the 'successful-ok-ignored-or-  
 440 substituted-values' status code with the unused member attribute in the unsupported  
 441 attributes group.

442 **Table 4 - "cover-front" and "cover-back" Member Attributes**

Member Attribute	Conformance
media (type2 keyword   name(MAX))	MUST
media-col (collection)	SHOULD
cover-type (type2 keyword)	MUST

##### 443 5.1.1.1 media (type2 keyword | name(MAX))

444 This REQUIRED member attribute specifies the media to use for the cover. If specified, the  
 445 "media-col" member attribute (section 5.1.1.2) MUST NOT be specified.

##### 446 5.1.1.2 media-col (collection)

447 This RECOMMENDED member attribute specifies the media to use for the cover. If  
 448 specified, the "media" member attribute (section 5.1.1.1) MUST NOT be specified.

##### 449 5.1.1.3 cover-type (type2 keyword)

450 This REQUIRED member attribute specifies whether covers are intended and which sides  
 451 of the cover are printed. The Input Pages used for printing on a cover come from the  
 452 Document Data.

453 Standard keyword values for "cover-type" are:

454 'no-cover': No covers are to be produced.

455 'print-none': Add a cover but do not print on either side of the cover.

456 'print-front': Add a cover that is printed on the front side (side one). For a front cover  
457 ("cover-front") the first Input Page is printed on side one of the cover sheet (this is  
458 the outside of the front cover) and the second Input Page is printed on side one of  
459 the first Media Sheet of the output. For back cover ("cover-back") the last Input  
460 Page is printed on side one of the cover sheet (this is the inside of the back cover).

461 'print-back': Add a cover that is printed on the back side (side two). For a front cover  
462 ("cover-front") the first Input Page is printed on side two of the cover sheet (this is  
463 the inside of the front cover) and the second Input Page is printed on side one of the  
464 first Media Sheet of the output. For a back cover ("cover-back") the last Input Page  
465 is printed on side two of the cover sheet (this is the outside of the back cover).

466 'print-both': Add a cover that is printed on both sides of the cover. The front cover  
467 has the first and second Input Pages printed on the front and back sides of the  
468 cover sheet, respectively. The back cover has the second to last and last Input  
469 Pages printed on the front and back sides of the cover sheet, respectively.

470 When printing on the back side (side two) of a cover, the value of the "sides" Job Template  
471 attribute [STD92] SHOULD be used to determine which edge is the reference edge, i.e., the  
472 long or short edge. When the "sides" attribute is 'one-sided', the reference edge SHOULD  
473 be the long edge.

474 In cases where the Document Data does not contain enough Input Pages to satisfy the  
475 "cover-type" request, the behavior is implementation dependent.

### 476 **5.1.2 cover-front (collection)**

477 This attribute specifies how front covers are to be applied to each Set. The Media Sheets in  
478 the rendered output that represent the covers are treated like any other Media Sheet in the  
479 Set. For example, if the "finishings" Job Template attribute [STD92] has a value of 'staple,'  
480 then the staple would bind the cover along with all of the other Media Sheets in the Set.

481 Table 4 lists the member attributes. If the Client omits both the "media" and the "media-col"  
482 member attributes, then the media currently being used by the Printer for the Job SHOULD  
483 also be used for the cover. The Client MUST NOT supply both the "media" and the "media-  
484 col" member attributes. If the Client supplies such a malformed request, the Printer MUST  
485 either reject the request and return the 'client-error-bad-request' status code or choose either  
486 the "media" or the "media-col" member attribute and return the 'successful-ok-ignored-or-  
487 substituted-values' status code with the unused member attribute in the unsupported  
488 attributes group.

### 489 **5.1.3 force-front-side (1setOf integer(1:MAX))**

490 This attribute forces the identified Input Pages (numbered 1 to N) to be imposed on the front  
491 side of a Media Sheet. This attribute is typically used to start a new chapter or section of a

492 document. For each identified Input Page, if that page would have been imposed on the  
 493 back side of a Media Sheet, that back side is left blank and the page is imposed on the front  
 494 side of the next Media Sheet.

495 If the “number-up” Job Template attribute [STD92] is also supplied and the specified page  
 496 would have been in the first position on the front side of a Media Sheet anyway, this attribute  
 497 has no effect. Otherwise, the Printer imposes the specified page in the first position of the  
 498 front side of the next Media Sheet and the intervening page positions are left blank.

#### 499 **5.1.4 imposition-template (type2 keyword | name(MAX))**

500 This attribute specifies how Impressions are imposed on one or more Media Sheets.  
 501 Standard keyword values are:

502 'none': No imposition template is applied.

503 'signature': A template is applied so that Impressions are positioned, scaled, and  
 504 ordered for a folded 2-up booklet.

#### 505 **5.1.5 insert-sheet (1setOf collection)**

506 This attribute specifies where Insert Sheets are included in the sequence of Media Sheets  
 507 that are produced for Set in the Job. The order of the values of the "insert-sheet" attribute is  
 508 significant - in the case where more than one value refers to the same "insert-after-page-  
 509 number" member attribute value, the values of "insert-sheet" are applied in the order  
 510 specified.

511 This attribute is affected by the "multiple-document-handling" attribute. For values of 'single-  
 512 document' and 'single-document-new-sheet', the sheet is inserted in the composite (single)  
 513 document created by the concatenation of all the Input Pages in all of the Documents. In the  
 514 case of 'separate-documents-collated-copies' and 'separate-documents-uncollated-copies',  
 515 the inserted sheets are applied to each Document separately. Table 5 lists the member  
 516 attributes.

517 **Table 5 - "insert-sheet" Member Attributes**

<b>Member Attribute</b>	<b>Conformance</b>
insert-after-page-number (integer(1:MAX))	MUST
insert-count (integer(0:MAX))	MUST
media (type2 keyword   name(MAX))	MUST
media-col (collection)	MAY

#### 518 **5.1.5.1 insert-after-page-number (integer(0:MAX))**

519 This REQUIRED member attribute specifies the Input Page number, starting at 1, after which  
 520 the Insert Sheets are to be placed. The inserted sheets do not affect the numbering of Input  
 521 Pages. For example, to insert a single sheet after both pages 2 and 3 of a given document,

522 the value of "input-after-page-number" would be '2' and '3' respectively, not '2' and '4' as it  
523 would be if the inserted sheet affected the Input Page count.

524 If the value is '0' then the sheet is inserted before the first page. If the value is MAX  
525 ('2147483647'), then the sheet is inserted after the last page.

526 If the value is not a valid Input Page number, e.g., if the page number is beyond the last  
527 page and is not MAX, or if the "page-ranges" Job Template attribute [STD92] does not  
528 include the specified page number, then the Printer SHOULD ignore the request.. There is  
529 no way to validate this member attribute with the Validate-Job operation since the validation  
530 cannot occur until the pages of the Documents have arrived at the Printer.

531 Since this member attribute refers to a specific Input Page, it is possible to specify a page  
532 that would not be the last page on a sheet, e.g., an insertion occurs after the page that is on  
533 the front side of a two-sided document. In this case, the Printer MUST force a new Media  
534 Sheet after the specified page, insert the specified sheet, and place the following pages  
535 starting on the first side of the next Media Sheet.

#### 536 **5.1.5.2 insert-count (integer(0:MAX))**

537 This REQUIRED member attribute specifies how many sheets to insert. If omitted, the  
538 Printer assumes a value of '1'. The value '0' indicates that no inserts sheets are to be  
539 inserted.

#### 540 **5.1.5.3 media (type2 keyword | name(MAX))**

541 This REQUIRED member attribute specifies the media to insert. If specified, the "media-col"  
542 member attribute (section 5.1.5.4) MUST NOT be specified.

#### 543 **5.1.5.4 media-col (collection)**

544 This RECOMMENDED member attribute specifies the media to insert. If specified, the  
545 "media" member attribute (section 5.1.5.3) MUST NOT be specified.

#### 546 **5.1.6 job-accounting-sheets (collection)**

547 This attribute specifies which Job accounting sheets to print with the Job. Job accounting  
548 sheets typically contain information such as the value of the "job-account-id" attribute  
549 (section **Error! Reference source not found.**) and the "job-accounting-user-id" attribute  
550 (section **Error! Reference source not found.**), and the number and type of media sheets  
551 used while printing the Job. The exact information contained on a Job accounting sheet is  
552 implementation-dependent, but should always be a reflection of the account information  
553 associated with the Job. Typically, Job accounting sheets are printed after the Job and are  
554 not finished, i.e., not stapled, with the Sets. Table 6 lists the member attributes.

555 **Table 6 - "job-accounting-sheets" Member Attributes**

<b>Member Attribute</b>	<b>Conformance</b>
job-accounting-sheets-type (type2 keyword   name(MAX))	MUST
media (type2 keyword   name(MAX))	MUST
media-col (collection)	SHOULD
job-accounting-output-bin (type2 keyword   name(MAX))	SHOULD

556 **5.1.6.1 job-accounting-sheets-type (type2 keyword | name(MAX))**

557 This REQUIRED member attribute specifies the Job accounting sheets format to use.  
558 Standard keyword values are:

559 'none': Suppress printing of accounting sheets.

560 'standard': Use the standard site accounting sheets.

561 **5.1.6.2 media (type2 keyword | name(MAX))**

562 This REQUIRED member attribute specifies the media to use for the Job accounting sheets.  
563 If specified, the "media-col" member attribute (section 5.1.6.3) MUST NOT be specified.

564 **5.1.6.3 media-col (collection)**

565 This RECOMMENDED member attribute specifies the media to use for the Job accounting  
566 sheets. If specified, the "media" member attribute (section 5.1.6.2) MUST NOT be specified.

567 **5.1.6.4 job-accounting-output-bin (type2 keyword | name(MAX))**

568 This RECOMMENDED member attribute specifies the output bin [PWG5100.2] in which the  
569 accounting sheets are to be placed. If this member attribute is not supplied by the Client or  
570 is not supported by the Printer, then the Printer places the accounting sheets in the same  
571 output bin as the rest of the Job.

572 **5.1.7 job-error-sheet (collection)**

573 This attribute specifies which Job Error Sheet to print with the Job. The Job Error Sheet lists  
574 any known errors or warnings that occurred during processing. For example, a Printer could  
575 put the text "warning: image off page 2," on the error sheet to indicate a possible image  
576 processing defect.

577 If the Printer is producing a Job Sheet for this Job, the Printer can print any error and warning  
578 information on the same Job Sheet, i.e., merge the Job Error Sheet with the Job Sheet. This  
579 use of the Job Sheet for errors only applies if the "job-error-sheet" attribute is supplied  
580 without either a "media" or "media-col" member attribute. If the "media" or "media-col"  
581 member attribute is supplied, a separate error sheet MUST be used to print errors and  
582 warnings. Table 7 lists the member attributes.

583

**Table 7 - "job-error-sheet" Member Attributes**

<b>Member Attribute</b>	<b>Conformance</b>
job-error-sheet-type (type2 keyword   name(MAX))	MUST
job-error-sheet-when (type2 keyword)	SHOULD
media (type2 keyword   name(MAX))	MUST
media-col (collection)	SHOULD

584 **5.1.7.1 job-error-sheet-type (type2 keyword | name(MAX))**

585 This REQUIRED member attribute specifies the type of Job Error Sheets to print. Standard  
586 keyword values are:

587 'none': Do not print error sheet information.

588 'standard': Use the standard site or vendor defined error sheet.

589 **5.1.7.2 job-error-sheet-when (type2 keyword)**

590 This RECOMMENDED member attribute specifies the conditions under which the error  
591 sheet information is to be produced. The standard keyword values are:

592 'on-error': Print the error sheet information if and only if errors or warnings occurred  
593 during the life of the Job.

594 'always': Always print the error sheet information.

595 **5.1.7.3 media (type2 keyword | name(MAX))**

596 This REQUIRED member attribute specifies the media to use for the Job Error Sheets. If  
597 specified, the "media-col" member attribute (section 5.1.7.4) MUST NOT be specified.

598 **5.1.7.4 media-col (collection)**

599 This RECOMMENDED member attribute specifies the media to use for the Job Error Sheets.  
600 If specified, the "media" member attribute (section 5.1.7.3) MUST NOT be specified.

601 **5.1.8 job-message-to-operator (text(MAX))**

602 This attribute specifies a message from the End User to the Operator to indicate something  
603 about the processing of the print Job. A zero-length value indicates no message.

604 **5.1.9 job-sheet-message (text(MAX))**

605 This attribute specifies a message that is delivered with the Job and is printed on the  
606 specified Job Sheet.

**607 5.1.10 media-input-tray-check (type2 keyword | name(MAX))**

608 This DEPRECATED attribute specifies that the Printer MUST verify that the characteristics  
609 of the media in the identified input tray are the same as characteristics of the media identified  
610 by the Job's "media" or "media-col" Job Template attributes. The keyword values are the  
611 same input tray keyword values as defined in the PWG Media Standardized Names v2.0  
612 (MSN2) [PWG5101.1].

613 Note: Clients SHOULD use the "media-source" member attribute of the "media-col" attribute  
614 [PWG5100.7] instead of this attribute.

615 Independent of the "ipp-attributes-fidelity" operation attribute supplied by the Client, if the  
616 characteristics differ, the Printer adds the 'resources-are-not-ready' value (see section 6.1)  
617 to the Job's "job-state-reasons" attribute and MAY either put the Job into the 'pending-held'  
618 state or start to process the Job normally but immediately stop the Job ("job-state" =  
619 'processing-stopped') and the Printer ("printer-state" = 'stopped', "printer-state-reasons"  
620 includes 'media-needed'). In either implementation, the Operator can change the media in  
621 the input tray to agree with the Job or can modify the Job's "media" or "media-col" attributes  
622 to agree with the input tray, depending on policy.

**623 5.1.11 page-delivery (type2 keyword)**

624 This attribute specifies whether Input Pages of the Job are to be delivered to the output bin  
625 or finisher in the same page order as the original document and whether the Input Pages  
626 are delivered face up or face down. Standard keyword values for page delivery are:

627 'same-order-face-up': The Media Sheets that represent the printed output MUST be  
628 delivered to the output bin or finishing device in the same order as defined by the  
629 "page-order-received" attribute. Furthermore, side one of each Media Sheet MUST  
630 be delivered face up to the output bin or finishing device.

631 'same-order-face-down': The Media Sheets that represent the printed output MUST  
632 be delivered to the output bin or finishing device in the same order as defined by the  
633 "page-order-received" attribute. Furthermore, side one of each Media Sheet MUST  
634 be delivered face down to the output bin or finishing device.

635 'reverse-order-face-up': The Media Sheets that represent the printed output MUST  
636 be delivered to the output bin or finishing device in the reverse order of the "page-  
637 order-received" attribute. Furthermore, side one of each Media Sheet MUST be  
638 delivered face up to the output bin or finishing device.

639 'reverse-order-face-down': The Media Sheets that represent the printed document  
640 MUST be delivered to the output bin or finishing device in the reverse order of the  
641 "page-order-received" attribute. Furthermore, side one of each Media Sheet MUST  
642 be delivered face down to the output bin or finishing device.

643 'system-specified': The Printer selects the most efficient delivery order based on  
644 other Job Template attributes supplied by the Client, such as "finishings",  
645 "finishings-col", "page-order-received", and "sides".

646 This attribute is often used in conjunction with online and offline finishing devices. The intent  
647 is to be able to deliver the Media Sheets in either the order of the Input Pages or in the  
648 reverse of that order.

#### 649 **5.1.12 presentation-direction-number-up (type2 keyword)**

650 This attribute specifies the order that the Printer places Input Pages with the "number-up"  
651 attribute. This attribute is especially useful to control the presentation direction in languages  
652 or multi-lingual documents that have more than one presentation direction but may be used  
653 with any language. For example, Japanese text on pages can have a presentation direction  
654 that is either top-to-bottom-right-to-left or left-to-right-top-to-bottom. Similarly, a mixed  
655 English and Hebrew document can have a presentation direction that is either left-to-right-  
656 top-to-bottom or right-to-left-top-to-bottom. This attribute allows the Client to specify the  
657 placement of Input Pages on Impressions to mirror the direction of the text on pages.

658 Table 8 below shows the standard keyword values. The name of each attribute value  
659 suggests the order of laying out Input Pages on a Impression when a human reader is  
660 holding the sheet in the proper orientation, i.e., oriented so text is oriented for normal  
661 reading. For each 'toxxx-toyyy' value, the images are placed according to the 'toxxx'  
662 direction, and then according to the 'toyyy' direction, and the first image is placed in the  
663 corner diagonally opposite the 'xxx-yyy' corner. For example, 'tright-tobottom' starts in the  
664 upper-left corner which is diagonally opposite the 'right-bottom' corner. The images are  
665 placed from left to right in a line, and the line progression is from top to bottom.

666 Unlike other Job Template attributes, the coordinate system for this attribute is relative to  
667 the orientation of the Input Pages. The reason that this attribute has a relative coordinate  
668 system is that the Client may not know what the orientation of the document actually is,  
669 especially if the Client did not generate the document.

670 The Printer determines the Document orientation in the following way:

- 671 1. If the Client supplies the "orientation-requested" Job Template attribute [STD92],  
672 that attribute specifies the orientation.
- 673 2. If the Client doesn't supply the "orientation-requested" attribute and the Printer is  
674 able to determine the orientation by inspecting the Document, that is the  
675 orientation.
- 676 3. If the Client doesn't supply the "orientation-requested" attribute and the Printer is  
677 unable to determine the orientation by inspecting the Document, the orientation  
678 is the value specified by the "orientation-requested-default" Printer Description  
679 attribute [STD92].

680 The orientation is used by the "presentation-direction-number-up" attribute for laying out  
681 pages on the Impression as follows:

- 682 1. If the value of the “number-up” attribute is a power of 4, e.g., 1, 4, or 16, the  
 683 orientation is used as-is.  
 684 2. If the value of the “number-up” attribute is 2 times the power of 4, e.g., 2 and 8,  
 685 the orientation used for layout is:  
 686 a. ‘landscape’ if the Document orientation is ‘portrait’;  
 687 b. ‘portrait’ if the Document orientation is ‘landscape’;  
 688 c. ‘reverse-landscape’ if the Document orientation is ‘reverse-portrait’; and  
 689 d. ‘reverse-portrait’ if the Document orientation is ‘reverse-landscape’  
 690 3. If the value of “number-up” is any other value, e.g., 3, 6, or 12, the orientation  
 691 used for layout is implementation-defined.

692 **Table 8 - 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'				
'totop-toleft'				

693 **5.1.13 separator-sheets (collection)**

694 This attribute specifies when separator sheets are printed between Sets in the Job.  
 695 Separator sheets can contain Printer-generated content or be blank Media Sheets. Table 9  
 696 lists the member attributes.

697 **Table 9 - "separator-sheets" Member Attributes**

Member Attribute	Conformance
separator-sheets-type (type2 keyword   name(MAX))	MUST
media (type2 keyword   name(MAX))	MUST
media-col (collection)	SHOULD

698 **5.1.13.1 separator-sheets-type (type2 keyword | name(MAX))**

699 This REQUIRED member attribute specifies the type of separator sheets to use. Standard  
 700 keyword values are:

701 'none': No separator sheets are delivered with the printed output.

702 'slip-sheets': A separator sheet is printed between each Set of the Job.

703 'start-sheet': A separator sheet is printed to indicate the start of each Set of the Job.

704 'end-sheet': A separator sheet is printed to indicate the end of each Set of the Job.

705 'both-sheets': Separator sheets are printed to indicate both the start and end of  
 706 each Set of the Job.

707 For example, a Job is created consisting of a single document, with the value of the "copies"  
 708 attribute set to '3', the value of "job-sheets" attribute set to 'job-both-sheets', and the value  
 709 of the "separator-sheets-type" attribute set to 'slip-sheets'. If each of the three Sets is  
 710 denoted by (J1), (J2), (J3), a Job Sheet is denoted by X, and a separator sheet is denoted  
 711 by S, then the delivered output would be:

712 X (J1) S (J2) S (J3) X.

713 If the value of the "separator-sheets-type" is 'start-sheet' instead, then the delivered output  
 714 would be:

715 X S (J1) S (J2) S (J3) X

716 **5.1.13.2 media (type2 keyword | name(MAX))**

717 This REQUIRED member attribute specifies the media to use for the separator sheets. If  
 718 specified, the "media-col" member attribute (section 5.1.13.3) MUST NOT be specified.

719 **5.1.13.3 media-col (collection)**

720 This RECOMMENDED member attribute specifies the media to use for the separator sheets.  
721 If specified, the "media" member attribute (section 5.1.13.2) MUST NOT be specified.

722 **5.1.14 x-image-position (type2 keyword)**

723 This attribute causes the specified point of the Impression to be offset to a specified location.  
724 One standard value causes the Impression to be centered along the x-axis on the media to  
725 which it is applied. Two other standard values specify that the location is co-incident with the  
726 specified edge of the printable area by moving the image parallel to the x-axis on the media  
727 to which it is applied.

728 Standard keyword values are:

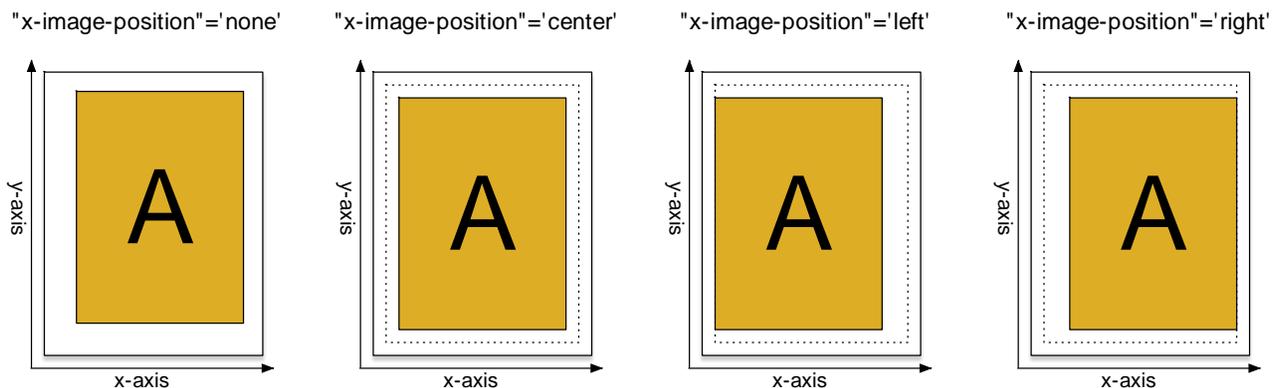
729 'none': Place the Impression wherever the print data specifies on the medium.

730 'center': Center the Impression between the physical edges of the medium by  
731 moving the Impression in a direction parallel to the x-axis

732 'left': Position the left edge of the Impression so that it is co-incident with the left  
733 edge of the printable area of the medium.

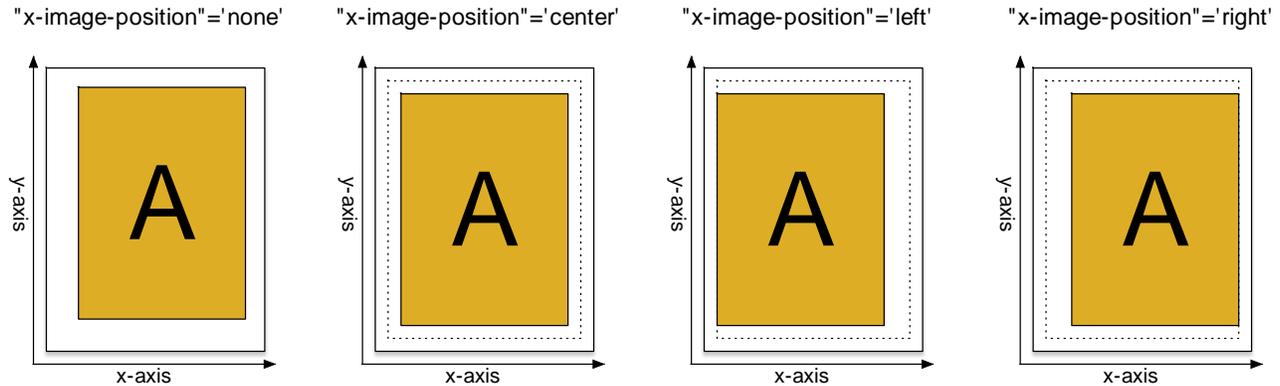
734 'right': Position the right edge of the Impression so that it is co-incident with the right  
735 edge of the printable area of the medium.

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



741

742 Figure 3 shows the effect of different values on the location of the printed Impression.



743

744

Figure 3 - "x-image-position" Values

745 **5.1.15 x-image-shift (integer(MIN:MAX))**

746 This attribute causes the Impression (whether it will be on the front side or back side of a  
 747 sheet of the Finished Document) to be offset in position with respect to the media on which  
 748 the Impression is to be rendered. The direction of shift **MUST** be along the x-axis of the  
 749 Coordinate System (see section **Error! Reference source not found.**) with respect to the  
 750 medium. The sign of the value indicates the direction of the shift.

751 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to  
 752 1/2540<sup>th</sup> of an inch resolution.

753 **5.1.16 x-side1-image-shift (integer(MIN:MAX))**

754 This attribute causes each Impression that would be placed on the front side of a Media  
 755 Sheet to be offset in position with respect to the media on which the Impression is to be  
 756 rendered. The direction **MUST** be along the x-axis of the Coordinate System (see section  
 757 **Error! Reference source not found.**) with respect to the medium. The sign of the value  
 758 indicates the direction of the shift.

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

763 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to  
 764 1/2540<sup>th</sup> of an inch resolution.

765 **5.1.17 x-side2-image-shift (integer(MIN:MAX))**

766 This attribute causes a Impression that would be placed on the back side of a Media Sheet  
 767 to be offset in position with respect to the media on which the Impression is to be rendered.  
 768 The direction of shift **MUST** be along the x-axis of the Coordinate System (see section **Error!**

769 **Reference source not found.**) with respect to the medium. The sign of the value indicates  
770 the direction of the shift.

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

775 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to  
776  $1/2540^{\text{th}}$  of an inch resolution.

### 777 5.1.18 y-image-position (type2 keyword)

778 This attribute causes the specified point of the Impression to be offset to a specified location.  
779 One standard value causes the Impression to be centered along the y-axis on the media to  
780 which it is applied. Two other standard values specify that the location is co-incident with the  
781 specified edge of the printable area by moving the image parallel to the y-axis on the media  
782 to which it is applied.

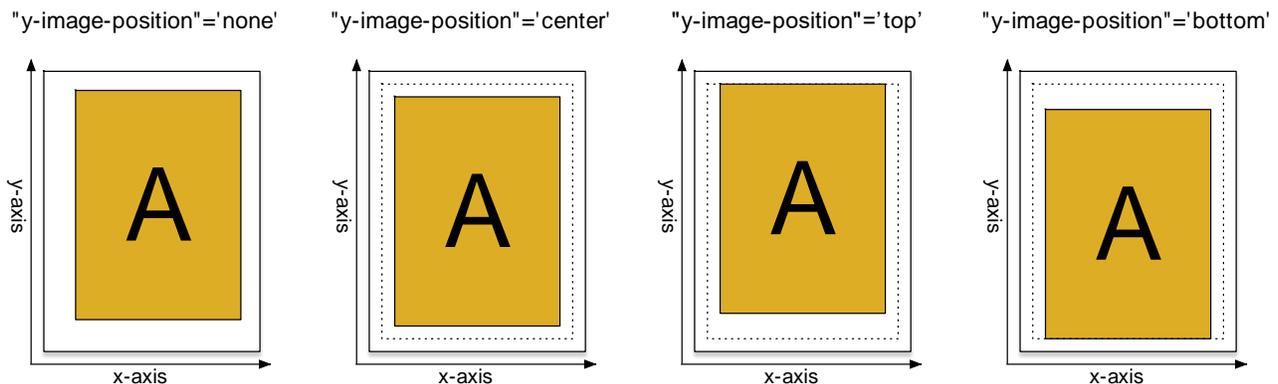
783 Standard keyword values are:

784 'none': Place the Impression wherever the print data specifies on the medium.

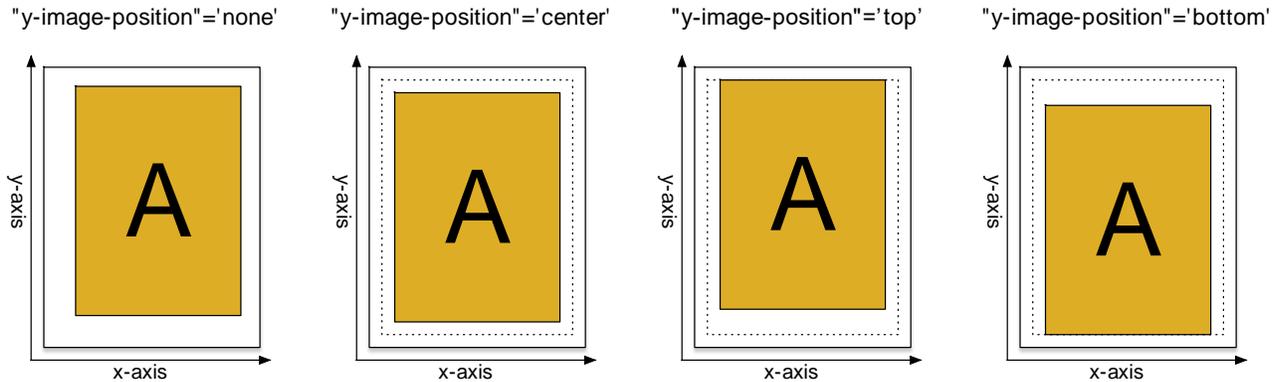
785 'center': Center the Impression between the physical edges of the medium by  
786 moving the Impression in the direction parallel to the y-axis

787 'top': Position the top edge of the Impression so that it is co-incident with the top  
788 edge of the printable area of the medium.

789 'bottom': Position the bottom edge of the Impression so that it is co-incident with the  
790 bottom edge of the printable area of the medium.



791  
792 Figure 4 shows the effect of different values on the location of the printed Impression.



793

794

Figure 4 - "y-image-position" Values

795 **5.1.19 y-image-shift (integer(MIN:MAX))**

796 This attribute causes the Impression (whether it will be on the front side or back side of a  
 797 sheet of the Finished Document) to be offset in position with respect to the media on which  
 798 the Impression is to be rendered. The direction of shift **MUST** be along the y-axis of the  
 799 Coordinate System (see section **Error! Reference source not found.**) with respect to the  
 800 medium. The sign of the value indicates the direction of the shift.

801 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to  
 802 1/2540<sup>th</sup> of an inch resolution.

803 **5.1.20 y-side1-image-shift (integer(MIN:MAX))**

804 This attribute causes each Impression that would be placed on the front side of a Media  
 805 Sheet to be offset in position with respect to the media on which the Impression is to be  
 806 rendered. The direction of shift **MUST** be along the y-axis of the Coordinate System (see  
 807 section **Error! Reference source not found.**) with respect to the medium. The sign of the  
 808 value indicates the direction of the shift.

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

813 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to  
 814 1/2540<sup>th</sup> of an inch resolution.

815 **5.1.21 y-side2-image-shift (integer(MIN:MAX))**

816 This attribute causes each Impression that would be placed on the back side of a Media  
 817 Sheet to be offset in position with respect to the media on which the Impression is to be  
 818 rendered. The direction of shift **MUST** be along the y-axis of the Coordinate System (see  
 819 section **Error! Reference source not found.**) with respect to the medium. The sign of the  
 820 value indicates the direction of the shift.

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

825 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to  
826 1/2540<sup>th</sup> of an inch resolution.

## 827 **5.2 Printer Description Attributes**

### 828 **5.2.1 cover-back-default (collection | no-value)**

829 This attribute specifies the default value of the "cover-back" Job Template attribute (section  
830 5.1.1). This attribute MUST be supported if the "cover-back" attribute is supported.

### 831 **5.2.2 cover-back-supported (1setOf keyword)**

832 This attribute lists the supported "cover-back" Job Template attribute (section 5.1.1) member  
833 attributes. This attribute MUST be supported if the "cover-back" attribute is supported.

### 834 **5.2.3 cover-front-default (collection | no-value)**

835 This attribute specifies the default value of the "cover-front" Job Template attribute (section  
836 5.1.2). This attribute MUST be supported if the "cover-front" attribute is supported.

### 837 **5.2.4 cover-front-supported (1setOf keyword)**

838 This attribute lists the supported "cover-front" Job Template attribute (section 5.1.2) member  
839 attributes. This attribute MUST be supported if the "cover-front" attribute is supported.

### 840 **5.2.5 cover-type-supported (1setOf type2 keyword)**

841 This attribute lists the supported values of the "cover-type" member attribute (section  
842 5.1.1.3). Printers that support the "cover-type" member attribute MUST support this attribute.

### 843 **5.2.6 force-front-side-supported (rangeOfInteger(1:MAX))**

844 This attribute specifies the range of supported "force-front-side" Job Template attribute  
845 (section 5.1.3) values. Printers MUST support this attribute if the "force-front-side" attribute  
846 is supported.

### 847 **5.2.7 insert-count-supported (rangeOfInteger(0:MAX))**

848 This attribute specifies the supported range of values of the "insert-count" member attribute  
849 (section 5.1.5.2). Printers MUST support this attribute if the "insert-sheet" Job Template  
850 attribute (section 5.1.5) is supported.

**851 5.2.8 insert-sheet-default (1setOf collection)**

852 This attribute specifies the default value of the "insert-sheet" Job Template attribute (section  
853 5.1.5). Printers MUST support this attribute if the "insert-sheet" attribute is supported.

**854 5.2.9 insert-sheet-supported (1setOf keyword)**

855 This attribute lists the supported member attributes of the "insert-sheet" Job Template  
856 attribute (section 5.1.5 ). Printers MUST support this attribute if the "insert-sheet" attribute is  
857 supported.

**858 5.2.10 job-accounting-output-bin-supported (1setOf (type2 keyword | name(MAX)))**

859 This attribute lists the supported output bins for Job accounting sheets. Printers that support  
860 the "job-accounting-output-bin" attribute (section 5.1.6.4) MUST support this attribute.

**861 5.2.11 job-accounting-sheets-default (collection)**

862 This attribute specifies the default value of the "job-accounting-sheets" Job Template  
863 attribute (section 5.1.6). Printers MUST support this attribute if the "job-accounting-sheets"  
864 attribute is supported.

**865 5.2.12 job-accounting-sheets-supported (1setOf keyword)**

866 This attribute lists the supported member attributes of the "job-accounting-sheets" Job  
867 Template attribute (section 5.1.6). Printers MUST support this attribute if the "job-  
868 accounting-sheets" attribute is supported.

**869 5.2.13 job-accounting-sheets-type-supported (1setOf (type2 keyword | name(MAX)))**

870 This attribute lists the supported values of the "job-accounting-sheets-type" member  
871 attribute (section 5.1.6.1). Printers that support the "job-accounting-sheets" attribute (section  
872 5.1.6) MUST support this attribute.

**873 5.2.14 job-error-sheet-default (collection)**

874 This attribute specifies the default value of the "job-error-sheet" Job Template attribute  
875 (section 5.1.7). Printers that support the "job-error-sheet" attribute MUST support this  
876 attribute.

**877 5.2.15 job-error-sheet-supported (1setOf keyword)**

878 This attribute lists the supported member attributes of the "job-error-sheet" Job Template  
879 attribute (section 5.1.7). Printers that support the "job-error-sheet" attribute MUST support  
880 this attribute.

**881 5.2.16 job-error-sheet-type-supported (1setOf (type2 keyword | name(MAX)))**

882 This attribute lists the supported values of the "job-error-sheet-type" member attribute  
883 (section 5.1.7.1). Printers that support the "job-error-sheet" Job Template attribute (section  
884 5.1.7) MUST support this attribute.

**885 5.2.17 job-error-sheet-when-supported (1setOf type2 keyword)**

886 This attribute lists the supported values of the "job-error-sheet-when" member attribute  
887 (section 5.1.7.2). Printers that support the "job-error-sheet-when" member attribute MUST  
888 support this attribute.

**889 5.2.18 job-message-to-operator-supported (boolean)**

890 This attribute specifies whether the "job-message-to-operator" Job Template attribute  
891 (section 5.1.8) is supported. Printers that support the "job-message-to-operator" attribute  
892 MUST support this attribute.

**893 5.2.19 job-sheet-message-supported (boolean)**

894 This attribute specifies whether the "job-sheet-message" Job Template attribute (section  
895 **Error! Reference source not found.**) is supported. Printers that support the "job-sheet-  
896 message" attribute MUST support this attribute.

**897 5.2.20 presentation-direction-number-up-default (type2 keyword)**

898 This attribute specifies the default value of the "presentation-direction-number-up" Job  
899 Template attribute (section 5.1.12). Printers that support the "presentation-direction-number-  
900 up" attribute MUST support this attribute.

**901 5.2.21 presentation-direction-number-up-supported (1setOf type2 keyword)**

902 This attribute lists the supported values of the "presentation-direction-number-up" Job  
903 Template attribute (section 5.1.12). Printers that support the "presentation-direction-number-  
904 up" attribute MUST support this attribute.

**905 5.2.22 separator-sheets-default (collection)**

906 This attribute specifies the default value of the "separator-sheets" Job Template attribute  
907 (section 5.1.13). Printers that support the "separator-sheets" attribute MUST support this  
908 attribute and MUST support the same member attributes for this default collection attribute  
909 as it supports for the corresponding "separator-sheets" attribute.

**910 5.2.23 separator-sheets-supported (1setOf type2 keyword)**

911 This attribute lists the supported member attributes of the "separator-sheets" Job Template  
912 attribute (section 5.1.13). Printers that support the "separator-sheets" attribute MUST  
913 support this attribute.

**914 5.2.24 separator-sheets-type-supported (1setOf (type2 keyword | name(MAX)))**

915 This attribute lists the supported values of the "separator-sheets-type" member attribute  
916 (section 5.1.13.1). Printers that support the "separator-sheets-type" attribute MUST support  
917 this attribute.

**918 5.2.25 x-image-position-default (type2 keyword)**

919 This attribute specifies the default value of the "x-image-position" Job Template attribute  
920 (section 5.1.14). Printers that support the "x-image-position" attribute MUST support this  
921 attribute.

**922 5.2.26 x-image-position-supported (1setOf type2 keyword)**

923 This attribute lists the supported values of the "x-image-position" Job Template attribute  
924 (section 5.1.14). Printers that support the "x-image-position" attribute MUST support this  
925 attribute.

**926 5.2.27 x-image-shift-default (integer(MIN:MAX))**

927 This attribute specifies the default value of the "x-image-shift" Job Template attribute  
928 (section 5.1.15). Printers that support the "x-image-shift" attribute MUST support this  
929 attribute.

**930 5.2.28 x-image-shift-supported (rangeOfInteger(MIN:MAX))**

931 This attribute specifies the range of supported values of the "x-image-shift" Job Template  
932 attribute (section 5.1.15). Printers that support the "x-image-shift" attribute MUST support  
933 this attribute.

**934 5.2.29 x-side1-image-shift-default (integer(MIN:MAX))**

935 This attribute specifies the default value of the "x-side1-image-shift" Job Template attribute  
936 (section 5.1.16). Printers that support the "x-side1-image-shift" attribute MUST support this  
937 attribute.

**938 5.2.30 x-side1-image-shift-supported (rangeOfInteger(MIN:MAX))**

939 This attribute specifies the range of supported values of the "x-side1-image-shift" Job  
940 Template attribute (section 5.1.16). Printers that support the "x-side1-image-shift" attribute  
941 MUST support this attribute.

**942 5.2.31 x-side2-image-shift-default (integer(MIN:MAX))**

943 This attribute specifies the default value of the "x-side2-image-shift" Job Template attribute  
944 (section 5.1.17). Printers that support the "x-side2-image-shift" attribute MUST support this  
945 attribute.

**946 5.2.32 x-side2-image-shift-supported (rangeOfInteger(MIN:MAX))**

947 This attribute specifies the range of supported values of the "x-side2-image-shift" Job  
948 Template attribute (section 5.1.17). Printers that support the "x-side2-image-shift" attribute  
949 MUST support this attribute.

**950 5.2.33 y-image-position-default (type2 keyword)**

951 This attribute specifies the default value of the "y-image-position" Job Template attribute  
952 (section 5.1.18). Printers that support the "y-image-position" attribute MUST support this  
953 attribute.

**954 5.2.34 y-image-position-supported (1setOf type2 keyword)**

955 This attribute lists the supported values of the "y-image-position" Job Template attribute  
956 (section 5.1.18). Printers that support the "y-image-position" attribute MUST support this  
957 attribute.

**958 5.2.35 y-image-shift-default (integer(MIN:MAX))**

959 This attribute specifies the default value of the "y-image-shift" Job Template attribute  
960 (section 5.1.19). Printers that support the "y-image-shift" attribute MUST support this  
961 attribute.

**962 5.2.36 y-image-shift-supported (rangeOfInteger(MIN:MAX))**

963 This attribute specifies the range of supported values of the "y-image-shift" Job Template  
964 attribute (section 5.1.19). Printers that support the "y-image-shift" attribute MUST support  
965 this attribute.

**966 5.2.37 y-side1-image-shift-default (integer(MIN:MAX))**

967 This attribute specifies the default value of the "y-side1-image-shift" Job Template attribute  
968 (section 5.1.20). Printers that support the "y-side1-image-shift" attribute MUST support this  
969 attribute.

**970 5.2.38 y-side1-image-shift-supported (rangeOfInteger(MIN:MAX))**

971 This attribute specifies the range of supported values of the "y-side1-image-shift" Job  
972 Template attribute (section 5.1.20). Printers that support the "y-side1-image-shift" attribute  
973 MUST support this attribute.

**974 5.2.39 y-side2-image-shift-default (integer(MIN:MAX))**

975 This attribute specifies the default value of the "y-side2-image-shift" Job Template attribute  
976 (section 5.1.21). Printers that support the "y-side2-image-shift" attribute MUST support this  
977 attribute.

#### 978 **5.2.40 y-side2-image-shift-supported (rangeOfInteger(MIN:MAX))**

979 This attribute specifies the range of supported values of the "y-side2-image-shift" Job  
980 Template attribute (section 5.1.21). Printers that support the "y-side2-image-shift" attribute  
981 MUST support this attribute.

## 982 **6. New Values for Existing Attributes**

### 983 **6.1 job-state-reasons (1setOf type2 keyword)**

984 This specification defines the 'resources-are-not-supported' value for the "job-state-reasons"  
985 Job Status attribute [STD92]. When present, at least one of the resources needed by the  
986 Job, such as media, fonts, resource objects, etc., is not supported on any of the physical  
987 Printer's for which the Job is a candidate. This condition MAY be detected when the Job is  
988 accepted, or subsequently while the Job is pending or processing, depending on  
989 implementation. The Job can:

- 990 1. remain in its current state,
- 991 2. be moved to the 'pending-held' state, depending on implementation and/or Job  
992 scheduling policy, or
- 993 3. scheduled normally, but the Printer is put into the 'stopped' state when the Job is  
994 attempted to be processed on the Printer.

## 995 **7. Obsolete Attributes**

### 996 **7.1 Obsolete Job and Document Template Attributes**

997 This specification makes the "page-order-received (type2 keyword)" Job and Document  
998 Template attribute [PWG5100.3-2001] OBSOLETE because it causes interoperability issues  
999 with any IPP attribute that specifies page numbers or ranges.

### 1000 **7.2 Obsolete Job Status Attributes**

1001 This specification makes the "current-page-order (type2 keyword)" Job Status attribute  
1002 [PWG5100.3-2001] OBSOLETE because IPP does not expose the implementation details  
1003 of Document processing and because many implementations do not change Document Data  
1004 in-place.

### 1005 **7.3 Obsolete Printer Description Attributes**

1006 Table 10 lists the Printer Description attributes from the previous version of this specification  
1007 [PWG5100.3-2001] which are now OBSOLETE.

1008 **Table 10 - OBSOLETE Printer Description Attributes**

Attribute	Notes
insert-after-page-number-supported (rangeOfInteger(0:MAX))	Unnecessary
job-accounting-output-bin-default (type2 keyword   name(MAX))	Unnecessary
page-order-received-default (type2 keyword)	See section 7.1
page-order-received-supported (1setOf type2 keyword)	See section 7.1
user-defined-values-supported (1setOf keyword)	Unnecessary

## 1009 8. Conformance Requirements

### 1010 8.1 Printer Conformance Requirements

1012 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1013 1. The required attributes and values defined in section 5;
- 1014 2. The additional values defined in section 6;
- 1015 3. The internationalization considerations defined in section 9; and
- 1016 4. The security considerations defined in section 10.

1017 Printer MUST NOT support the OBSOLETE attributes listed in section 7.

### 1018 8.2 Client Conformance Requirements

1019 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1020 1. The required attributes and values defined in section 5;
- 1021 2. The additional values defined in section 6;
- 1022 3. The internationalization considerations defined in section 9; and
- 1023 4. The security considerations defined in section 10.

## 1024 9. Internationalization Considerations

1025 For interoperability and basic support for multiple languages, conforming implementations  
1026 MUST support:

- 1027 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)  
1028 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1029 1. The Unicode Format for Network Interchange [RFC5198] which requires  
1030 transmission of well-formed UTF-8 strings and recommends transmission of  
1031 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1032 Unicode NFC is defined as the result of performing Canonical Decomposition (into base  
1033 characters and combining marks) followed by Canonical Composition (into canonical  
1034 composed characters wherever Unicode has assigned them).

1035 WARNING – Performing normalization on UTF-8 strings received from Clients and  
1036 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client  
1037 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now  
1038 'hidden').

1039 Implementations of this specification SHOULD conform to the following standards on  
1040 processing of human-readable Unicode text strings, see:

1041 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1042 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1043 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1044 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1045 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1046 Unicode Collation Algorithm [UTS10] – sorting

1047 Unicode Locale Data Markup Language [UTS35] – locale databases

1048 Implementations of this specification are advised to also review the following informational  
1049 documents on processing of human-readable Unicode text strings:

1050 Unicode Character Encoding Model [UTR17] – multi-layer character model

1051 Unicode Character Property Model [UTR23] – character properties

1052 Unicode Conformance Model [UTR33] – Unicode conformance basis

## 1053 **10. Security Considerations**

1054 The IPP extensions defined in this document require the same security considerations as  
1055 defined in the Internet Printing Protocol/1.1 [STD92].

1056 Implementations of this specification SHOULD conform to the following standard on  
1057 processing of human-readable Unicode text strings, see:

1058 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1059 Implementations of this specification are advised to also review the following informational  
1060 document on processing of human-readable Unicode text strings:

1061 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

## 1062 11. IANA Considerations

### 1063 11.1 Attribute Registrations

1064 The attributes defined in this specification will be published by IANA according to the  
1065 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1066 <https://www.iana.org/assignments/ipp-registrations>

1067 The registry entries will contain the following information:

1068 Job Status attributes:	Reference
1069 -----	-----
1070 current-page-order(obsolete) (type2 keyword)	[PWG5100.3]
1071	
1072 Job Template attributes:	Reference
1073 -----	-----
1074 cover-back (collection)	[PWG5100.3]
1075 cover-type (type2 keyword   name(MAX))	[PWG5100.3]
1076 media (type2 keyword   name(MAX))	[PWG5100.3]
1077 media-col (collection)	[PWG5100.3]
1078 cover-front (collection)	[PWG5100.3]
1079 < member attributes are the same as "cover-back" >	[PWG5100.3]
1080 force-front-side (1setOf integer(1:MAX))	[PWG5100.3]
1081 imposition-template (type2 keyword   name(MAX))	[PWG5100.3]
1082 insert-sheet (1setOf collection)	[PWG5100.3]
1083 insert-after-page-number (integer(0:MAX))	[PWG5100.3]
1084 insert-count (integer(0:MAX))	[PWG5100.3]
1085 media (type2 keyword   name(MAX))	[PWG5100.3]
1086 media-col (collection)	[PWG5100.3]
1087 job-accounting-sheets (collection)	[PWG5100.3]
1088 job-accounting-output-bin (type2 keyword   name(MAX))	[PWG5100.3]
1089 job-accounting-sheets-type (type2 keyword   name(MAX))	[PWG5100.3]
1090 media (type2 keyword   name(MAX))	[PWG5100.3]
1091 media-col (collection)	[PWG5100.3]
1092 job-error-sheet (collection)	[PWG5100.3]
1093 job-error-sheet-type (type2 keyword   name(MAX))	[PWG5100.3]
1094 job-error-sheet-when (type2 keyword)	[PWG5100.3]
1095 media (type2 keyword   name(MAX))	[PWG5100.3]
1096 media-col (collection)	[PWG5100.3]
1097 job-message-to-operator (text(MAX))	[PWG5100.3]
1098 job-sheet-message (text(MAX))	[PWG5100.3]
1099 media-input-tray-check(deprecated) (type2 keyword   name(MAX))	[PWG5100.3]
1100	
1101 page-delivery (type2 keyword)	[PWG5100.3]
1102 page-order-received(obsolete) (type2 keyword)	[PWG5100.3]
1103 presentation-direction-number-up (type2 keyword)	[PWG5100.3]
1104 separator-sheets (collection)	[PWG5100.3]
1105 media (type2 keyword   name(MAX))	[PWG5100.3]
1106 media-col (collection)	[PWG5100.3]
1107 separator-sheets-type (type2 keyword   name(MAX))	[PWG5100.3]

1108	x-image-position (type2 keyword)	[PWG5100.3]
1109	x-image-shift (integer(MIN:MAX))	[PWG5100.3]
1110	x-side1-image-shift (integer(MIN:MAX))	[PWG5100.3]
1111	x-side2-image-shift (integer(MIN:MAX))	[PWG5100.3]
1112	y-image-position (type2 keyword)	[PWG5100.3]
1113	y-image-shift (integer(MIN:MAX))	[PWG5100.3]
1114	y-side1-image-shift (integer(MIN:MAX))	[PWG5100.3]
1115	y-side2-image-shift (integer(MIN:MAX))	[PWG5100.3]
1116		
1117	Printer Description attributes:	Reference
1118	-----	-----
1119	cover-back-default (collection   no-value)	[PWG5100.3]
1120	cover-back-supported (1setOf keyword)	[PWG5100.3]
1121	cover-front-default (collection   no-value)	[PWG5100.3]
1122	cover-front-supported (1setOf keyword)	[PWG5100.3]
1123	cover-type-supported (1setOf type2 keyword)	[PWG5100.3]
1124	force-front-side-supported (rangeOfInteger(1:MAX))	[PWG5100.3]
1125	insert-after-page-number-supported(obsolete) (rangeOfInteger(0:MAX))	[PWG5100.3]
1126		
1127	insert-count-supported (rangeOfInteger(0:MAX))	[PWG5100.3]
1128	insert-sheet-default (1setOf collection)	[PWG5100.3]
1129	insert-sheet-supported (1setOf keyword)	[PWG5100.3]
1130	job-account-id-default (name(MAX)   no-value)	[PWG5100.3]
1131	job-account-id-supported (boolean)	[PWG5100.3]
1132	job-accounting-output-bin-default(obsolete) (type2 keyword   name(MAX))	[PWG5100.3]
1133		
1134	job-accounting-output-bin-supported (1setOf (type2 keyword   name(MAX)))	[PWG5100.3]
1135		
1136	job-accounting-sheets-default (collection)	[PWG5100.3]
1137	job-accounting-sheets-supported (1setOf keyword)	[PWG5100.3]
1138	job-accounting-sheets-type-supported (1setOf (type2 keyword   name(MAX)))	[PWG5100.3]
1139		
1140	job-accounting-user-id-default (name(MAX))	[PWG5100.3]
1141	job-accounting-user-id-supported (boolean)	[PWG5100.3]
1142	job-error-sheet-default (collection)	[PWG5100.3]
1143	job-error-sheet-supported (1setOf keyword)	[PWG5100.3]
1144	job-error-sheet-type-supported (1setOf (type2 keyword   name(MAX)))	[PWG5100.3]
1145		
1146	job-error-sheet-when-supported (1setOf type2 keyword)	[PWG5100.3]
1147	job-message-to-operator-supported (boolean)	[PWG5100.3]
1148	job-sheet-message-supported (boolean)	[PWG5100.3]
1149	job-sheets-col-default (collection)	[PWG5100.3]
1150	job-sheets-col-supported (1setOf keyword)	[PWG5100.3]
1151	page-delivery-default (type2 keyword)	[PWG5100.3]
1152	page-delivery-supported (1setOf type2 keyword)	[PWG5100.3]
1153	page-order-received-default(obsolete) (type2 keyword)	[PWG5100.3]
1154	page-order-received-supported(obsolete) (1setOf type2 keyword)	[PWG5100.3]
1155		
1156	presentation-direction-number-up-default (type2 keyword)	[PWG5100.3]
1157	presentation-direction-number-up-supported (1setOf type2 keyword)	[PWG5100.3]
1158		
1159	separator-sheets-default (collection)	[PWG5100.3]
1160	separator-sheets-supported (1setOf keyword)	[PWG5100.3]
1161	user-defined-values-supported(obsolete) (1setOf keyword)	[PWG5100.3]
1162	x-image-position-default (type2 keyword)	[PWG5100.3]
1163	x-image-position-supported (1setOf type2 keyword)	[PWG5100.3]

1164	x-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1165	x-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1166	x-side1-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1167	x-side1-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1168	x-side2-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1169	x-side2-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1170	y-image-position-default (type2 keyword)	[PWG5100.3]
1171	y-image-position-supported (1setOf type2 keyword)	[PWG5100.3]
1172	y-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1173	y-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1174	y-side1-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1175	y-side1-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1176	y-side2-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1177	y-side2-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]

## 1178 11.2 Type2 keyword Registrations

1179 The keyword values defined in this specification will be published by IANA according to the  
1180 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1181 <https://www.iana.org/assignments/ipp-registrations>

1182 The registry entries will contain the following information:

1183	Attributes (attribute syntax)	
1184	Keyword Attribute Value	Reference
1185	-----	-----
1186	cover-type (type2 keyword)	[PWG5100.3]
1187	no-cover	[PWG5100.3]
1188	print-back	[PWG5100.3]
1189	print-both	[PWG5100.3]
1190	print-front	[PWG5100.3]
1191	print-none	[PWG5100.3]
1192		
1193	imposition-template (type2 keyword   name(MAX))	[PWG5100.3]
1194	none	[PWG5100.3]
1195	signature	[PWG5100.3]
1196		
1197	job-accounting-output-bin (type2 keyword   name(MAX))	[PWG5100.3]
1198	< any "output-bin" value >	[PWG5100.3]
1199		
1200	job-accounting-sheets-type (type2 keyword   name(MAX))	[PWG5100.3]
1201	none	[PWG5100.3]
1202	standard	[PWG5100.3]
1203		
1204	job-error-sheet-type (type2 keyword   name(MAX))	[PWG5100.3]
1205	none	[PWG5100.3]
1206	standard	[PWG5100.3]
1207		
1208	job-error-sheet-when (type2 keyword)	[PWG5100.3]
1209	always	[PWG5100.3]
1210	on-error	[PWG5100.3]
1211		
1212	job-state-reasons (1setOf type2 keyword)	[STD92]

1213	resources-are-not-supported	[PWG5100.3]
1214		
1215	page-delivery (type2 keyword)	[PWG5100.3]
1216	reverse-order-face-down	[PWG5100.3]
1217	reverse-order-face-up	[PWG5100.3]
1218	same-order-face-down	[PWG5100.3]
1219	same-order-face-up	[PWG5100.3]
1220	system-specified	[PWG5100.3]
1221		
1222	separator-sheets-type (type2 keyword   name(MAX))	[PWG5100.3]
1223	both-sheets	[PWG5100.3]
1224	end-sheet	[PWG5100.3]
1225	none	[PWG5100.3]
1226	slip-sheets	[PWG5100.3]
1227	start-sheet	[PWG5100.3]
1228		
1229	x-image-position (type2 keyword)	[PWG5100.3]
1230	center	[PWG5100.3]
1231	left	[PWG5100.3]
1232	none	[PWG5100.3]
1233	right	[PWG5100.3]
1234		
1235	y-image-position (type2 keyword)	[PWG5100.3]
1236	bottom	[PWG5100.3]
1237	center	[PWG5100.3]
1238	none	[PWG5100.3]
1239	top	[PWG5100.3]

## 1240 12. Overview of Changes

### 1241 12.1 IPP Production Printing Extensions v1.1

1242 The following changes were made to the previous version of this specification [PWG5100.3-  
1243 2001]:

- 1244 • Finishing attributes have been moved to the IPP Finishings v2.1 specification  
1245 [PWG5100.1];
- 1246 • The "job-account-id", "job-accounting-user-id", "job-sheets-col", and "media-col"  
1247 attributes have been moved to the IPP Job Extensions v2.0 specification  
1248 [PWG5100.7]; and
- 1249 • References to the original page overrides draft and attributes have been removed  
1250 since that specification was withdrawn.

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1325 Kirk Ocke (Co-author of previous version)  
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## 1327 **15. Change History**

### 1328 **15.1 June 26, 2019**

- 1329 • Status: Prototype
- 1330 • Section 4.1: Figure 1 was duplicated (figure was part of the caption)
- 1331 • Section 4.2: Fixed table 1 reference
- 1332 • Section 4.3: Typos and clarifications, fixed table 2 reference
- 1333 • Section 4.4: Fixed table 3 reference
- 1334 • Updated conformance requirements in section 8.

### 1335 **15.2 May 14, 2019**

- 1336 • Updated abstract and introduction
- 1337 • Version 2.0
- 1338 • Moved all of the job-account-id, job-accounting-user-id, and job-sheets-col definitions  
1339 to the Job Extensions v2.0 specification
- 1340 • Moved all of the media-col definitions to the Job Extensions v2.0 specification
- 1341 • Made page-order-received and friends obsolete
- 1342 • Expanded discussion of features in section 4
- 1343 • Updated figure showing roll media as a roll.

### 1344 **15.3 May 1, 2019**

- 1345 • Initial changes to the published 5100.3-2001
- 1346 • Dropped all references to the old page overrides spec (which was eventually  
1347 abandoned in favor of document overrides)
- 1348 • Dropped all new media values, which are now covered by PWG 5101.1 (MSN2)
- 1349 • Dropped all finishings attributes, which are now covered by PWG 5100.1 (FIN)
- 1350 • Updated (and shortened!) abstract

- 1351 • Section 1: Rewritten and shortened.
- 1352 • Global: Client, Document, Document Data, Input Pages (instead of print-stream  
1353 pages), Job, Job Error Sheet, Job Sheet, Printer, End User, and other terminology  
1354 properly capitalized
- 1355 • Global: type3 keyword changed to type2 keyword
- 1356 • Section 2: Updated with modern terminology
- 1357 • Section 3: Added rationale, use cases, etc.
- 1358 • Section 4: Expanded to include all of the background information that was inline with  
1359 the attribute definitions.
- 1360 • Section 5: Split Job Template and Printer Description attributes
- 1361 • Removed references to "job-warnings-detected" since a) that is defined in PWG  
1362 5100.7 and b) the final standardized names were different.