



The Printer Working Group

May 14, 2019
Working Draft

IPP Production Printing Extensions v2.0 (PPX)

Deleted: 1.1

Status: Initial

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.

Deleted: the general-use "media-col" Job Template attribute as well as several other

Deleted: needed

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-ippv20-20190514.docx>

<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippv20-20190514.pdf>

Field Code Changed

Deleted: <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippv11-20190501.docx>

Field Code Changed

Deleted: <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippv11-20190501.pdf>

1 Copyright © 2001-2019 The Printer Working Group. All rights reserved.

2 This document may be copied and furnished to others, and derivative works that comment
3 on, or otherwise explain it or assist in its implementation may be prepared, copied, published
4 and distributed, in whole or in part, without restriction of any kind, provided that the above
5 copyright notice, this paragraph and the title of the Document as referenced below are
6 included on all such copies and derivative works. However, this document itself may not be
7 modified in any way, such as by removing the copyright notice or references to the IEEE-
8 ISTO and the Printer Working Group, a program of the IEEE-ISTO.

9 Title: *IPP Production Printing Extensions v2.0 (PPX)*

Deleted: 1.1

10 The IEEE-ISTO and the Printer Working Group DISCLAIM ANY AND ALL WARRANTIES,
11 WHETHER EXPRESS OR IMPLIED INCLUDING (WITHOUT LIMITATION) ANY IMPLIED
12 WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

13 The Printer Working Group, a program of the IEEE-ISTO, reserves the right to make
14 changes to the document without further notice. The document may be updated, replaced
15 or made obsolete by other documents at any time.

16 The IEEE-ISTO takes no position regarding the validity or scope of any intellectual property
17 or other rights that might be claimed to pertain to the implementation or use of the technology
18 described in this document or the extent to which any license under such rights might or
19 might not be available; neither does it represent that it has made any effort to identify any
20 such rights.

21 The IEEE-ISTO invites any interested party to bring to its attention any copyrights, patents,
22 or patent applications, or other proprietary rights which may cover technology that may be
23 required to implement the contents of this document. The IEEE-ISTO and its programs shall
24 not be responsible for identifying patents for which a license may be required by a document
25 and/or IEEE-ISTO Industry Group Standard or for conducting inquiries into the legal validity
26 or scope of those patents that are brought to its attention. Inquiries may be submitted to the
27 IEEE-ISTO by e-mail at: ieee-isto@ieee.org.

28 The Printer Working Group acknowledges that the IEEE-ISTO (acting itself or through its
29 designees) is, and shall at all times be the sole entity that may authorize the use of
30 certification marks, trademarks, or other special designations to indicate compliance with
31 these materials.

32 Use of this document is wholly voluntary. The existence of this document does not imply that
33 there are no other ways to produce, test, measure, purchase, market, or provide other goods
34 and services related to its scope.
35

37 **About the IEEE-ISTO**

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

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

44 <https://www.ieee-isto.org/>

45 **About the IEEE-ISTO PWG**

46 The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and
47 Technology Organization (ISTO) with member organizations including printer
48 manufacturers, print server developers, operating system providers, network operating
49 system providers, network connectivity vendors, and print management application
50 developers. The PWG is chartered to make printers and the applications and operating
51 systems supporting them work together better. All references to the PWG in this document
52 implicitly mean “The Printer Working Group, a Program of the IEEE ISTO.”

53 To meet this objective, the PWG documents the results of their work as open standards that
54 define print related protocols, interfaces, procedures, and conventions. A PWG standard is
55 a stable, well understood, and technically competent specification that is widely used with
56 multiple independent and interoperable implementations. Printer manufacturers and
57 vendors of printer related software benefit from the interoperability provided by voluntary
58 conformance to these standards.

59 For additional information regarding the Printer Working Group visit:

60 <https://www.pwg.org/>

61 Contact information:

62 The Printer Working Group
63 c/o The IEEE Industry Standards and Technology Organization
64 445 Hoes Lane
65 Piscataway, NJ 08854
66 USA
67

Table of Contents

68

69 1. Introduction 7

70 2. Terminology 7

71 2.1 Conformance Terminology 7

72 2.2 Printing Terminology 7

73 2.3 Protocol Role Terminology 8

74 2.4 Other Terminology 8

75 2.5 Acronyms and Organizations 9

76 3. Requirements 10

77 3.1 Rationale 10

78 3.2 Use Cases 10

79 3.2.1 Printing Bound Books with Printed Covers 10

80 3.2.2 Printing Folded Booklets 10

81 3.2.3 Separating Copies with Colored Paper 11

82 3.3 Exceptions 11

83 3.3.1 Printing a Report on Error 11

84 3.4 Out of Scope 11

85 3.5 Design Requirements 11

86 4. Model 12

87 4.1 Imaging Coordinate System and Units 12

88 4.2 Number Up, Imposition, and Shifting 13

89 4.3 Cover Pages, Insert Sheets, and Separator Sheets 14

90 4.4 Accounting and Error Sheets 15

91 5. New Attributes 16

92 5.1 Job Template Attributes 16

93 5.1.1 cover-back (collection) 16

94 5.1.2 cover-front (collection) 17

95 5.1.3 force-front-side (1setOf integer(1:MAX)) 18

96 5.1.4 imposition-template (type2 keyword | name(MAX)) 18

97 5.1.5 insert-sheet (1setOf collection) 18

98 5.1.6 job-accounting-sheets (collection) 19

99 5.1.7 job-error-sheet (collection) 20

100 5.1.8 job-message-to-operator (text(MAX)) 21

101 5.1.9 job-sheet-message (text(MAX)) 22

102 5.1.10 media-input-tray-check (type2 keyword | name(MAX)) 22

103 5.1.11 page-delivery (type2 keyword) 22

104 5.1.12 presentation-direction-number-up (type2 keyword) 23

105 5.1.13 separator-sheets (collection) 25

106 5.1.14 x-image-position (type2 keyword) 26

107 5.1.15 x-image-shift (integer(MIN:MAX)) 27

108 5.1.16 x-side1-image-shift (integer(MIN:MAX)) 27

109 5.1.17 x-side2-image-shift (integer(MIN:MAX)) 27

110 5.1.18 y-image-position (type2 keyword) 28

111 5.1.19 y-image-shift (integer(MIN:MAX)) 29

112 5.1.20 y-side1-image-shift (integer(MIN:MAX)) 29

113 5.1.21 y-side2-image-shift (integer(MIN:MAX)) 29

114 5.2 Printer Description Attributes 30

115 5.2.1 cover-back-default (collection | no-value) 30

116 5.2.2 cover-back-supported (1setOf keyword) 30

117 5.2.3 cover-front-default (collection | no-value) 30

118 5.2.4 cover-front-supported (1setOf keyword) 30

119 5.2.5 cover-type-supported (1setOf type2 keyword) 30

120 5.2.6 force-front-side-supported (rangeOfInteger(1:MAX)) 30

121 5.2.7 insert-count-supported (rangeOfInteger(0:MAX)) 30

122 5.2.8 insert-sheet-default (1setOf collection) 30

123 5.2.9 insert-sheet-supported (1setOf keyword) 31

124 5.2.10 job-accounting-output-bin-supported (1setOf (type2 keyword | name(MAX))) 31

125 5.2.11 job-accounting-sheets-default (collection) 31

126 5.2.12 job-accounting-sheets-supported (1setOf keyword) 31

127 5.2.13 job-accounting-sheets-type-supported (1setOf (type2 keyword | name(MAX)))

128 31

129 5.2.14 job-error-sheet-default (collection) 31

130 5.2.15 job-error-sheet-supported (1setOf keyword) 31

131 5.2.16 job-error-sheet-type-supported (1setOf (type2 keyword | name(MAX))) 31

132 5.2.17 job-error-sheet-when-supported (1setOf type2 keyword) 32

133 5.2.18 job-message-to-operator-supported (boolean) 32

134 5.2.19 job-sheet-message-supported (boolean) 32

135 5.2.20 presentation-direction-number-up-default (type2 keyword) 32

136 5.2.21 presentation-direction-number-up-supported (1setOf type2 keyword) 32

137 5.2.22 separator-sheets-default (collection) 32

138 5.2.23 separator-sheets-supported (1setOf type2 keyword) 32

139 5.2.24 separator-sheets-type-supported (1setOf (type2 keyword | name(MAX))) 32

140 5.2.25 x-image-position-default (type2 keyword) 33

141 5.2.26 x-image-position-supported (1setOf type2 keyword) 33

142 5.2.27 x-image-shift-default (integer(MIN:MAX)) 33

143 5.2.28 x-image-shift-supported (rangeOfInteger(MIN:MAX)) 33

144 5.2.29 x-side1-image-shift-default (integer(MIN:MAX)) 33

145 5.2.30 x-side1-image-shift-supported (rangeOfInteger(MIN:MAX)) 33

146 5.2.31 x-side2-image-shift-default (integer(MIN:MAX)) 33

147 5.2.32 x-side2-image-shift-supported (rangeOfInteger(MIN:MAX)) 33

148 5.2.33 y-image-position-default (type2 keyword) 34

149 5.2.34 y-image-position-supported (1setOf type2 keyword) 34

150 5.2.35 y-image-shift-default (integer(MIN:MAX)) 34

151 5.2.36 y-image-shift-supported (rangeOfInteger(MIN:MAX)) 34

152 5.2.37 y-side1-image-shift-default (integer(MIN:MAX)) 34

153 5.2.38 y-side1-image-shift-supported (rangeOfInteger(MIN:MAX)) 34

154 5.2.39 y-side2-image-shift-default (integer(MIN:MAX)) 34

155 5.2.40 y-side2-image-shift-supported (rangeOfInteger(MIN:MAX)) 34

156 6. New Values for Existing Attributes 35

157 6.1 job-state-reasons (1setOf type2 keyword) 35

158 7. Obsolete Attributes 35

159 7.1 Obsolete Job and Document Template Attributes 35

160 7.2 Obsolete Job Status Attributes 35

161 7.3 Obsolete Printer Description Attributes 35

162 8. Conformance Requirements 36

163 8.1 Printer Conformance Requirements 36

164 8.2 Client Conformance Requirements 37

165 9. Internationalization Considerations 37

166 10. Security Considerations 38

167 11. IANA Considerations 38

168 11.1 Attribute Registrations 38

169 11.2 Type2 keyword Registrations 41

170 12. Overview of Changes 42

171 12.1 IPP Production Printing Extensions v1.1 42

172 13. References 42

173 13.1 Normative References 42

174 13.2 Informative References 44

175 14. Author's Address 44

176 15. Change History 45

177 15.1 May 14, 2019 45

178 15.2 May 1, 2019 45

List of Figures

182 Figure 1 - IPP Media Sheet Coordinate System 12

183 Figure 2 - Relationship Between Number Up and Imposition 13

184 Figure 2 - "x-image-position" Values 27

185 Figure 3 - "y-image-position" Values 28

List of Tables

189 Table 1 - Number Up, Imposition, and Offset Attributes 14

190 Table 2 - Cover Page, Insert Sheet, and Separator Sheet Attributes 15

191 Table 3 - Accounting and Error Sheet Attributes 15

192 Table 5 - "cover-front" and "cover-back" Member Attributes 16

193 Table 6 - "insert-sheet" Member Attributes 18

194 Table 7 - "job-accounting-sheets" Member Attributes 20

195 Table 8 - "job-error-sheet" Member Attributes 21

196 Table 9 - Standard Values for the "presentation direction" Attribute 24

197 Table 10 - "separator-sheets" Member Attributes 25

198 Table 10 - OBSOLETE Printer Description Attributes 35

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

Deleted: make

Deleted: of

Deleted: needed

Deleted: , including the "media-col" Job
Template attribute which has been adopted for
general use in printing

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

241 **2.3 Protocol Role Terminology**

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

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

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

248 **2.4 Other Terminology**

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

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

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

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

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

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

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

269 *ith*: Referring to a specific IPP '1setOf' value - the first value, the second value, and so forth.

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

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

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

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

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

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

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

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

291 **2.5 Acronyms and Organizations**

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

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

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

295 *PDL*: [Page Description Language](#)

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

297

298 **3. Requirements**

299 **3.1 Rationale**

300 Given the following existing specifications:

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

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

Deleted: need

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

Deleted: <#>Define attributes and values for specifying detailed media requirements;¶

317 **3.2 Use Cases**

318 **3.2.1 Printing Bound Books with Printed Covers**

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

325 **3.2.2 Printing Folded Booklets**

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

333 **3.2.3 Separating Copies with Colored Paper**

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

337 **3.3 Exceptions**

338 **3.3.1 Printing a Report on Error**

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

341 **3.4 Out of Scope**

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

- 343 1. Definition of new file formats; and
- 344 2. Definition of new protocol bindings.

345 **3.5 Design Requirements**

346 The design requirements for this specification are:

- 347 1. Define attributes and values for specifying printed covers;
- 348 2. Define attributes and values for specifying how Input Pages are mapped to the
- 349 front side of a Media Sheet;
- 350 3. Define attributes and values for specifying how Input Pages are imposed on
- 351 Impressions;
- 352 4. Define attributes and values for specifying Insert Sheets;
- 353 5. Define attributes and values for specifying Job accounting, error reporting,
- 354 operator, and summary information;
- 355 6. Define attributes and values for specifying the ordering and layout of Input
- 356 Pages;
- 357 7. Define attributes and values for specifying how Input Pages are offset when
- 358 imposed on Impressions; and
- 359 8. Define sections to register all attributes, values, and operations with IANA.
- 360

Deleted: <#>Printing on Specific Media
 <#>Judy needs to print her company's financial statement on company letterhead. She initiates the print action from her software and specifies the company letterhead as the output media.
Deleted: <#>Printing with Banner Pages of a Different Size
 <#>Joe wants to configure his school's printer to print banner pages on half sheets of paper to save money. He uses his printer management software to configure the default job sheet setting for the printer to use "half letter" sized media instead of the media used for the rest of the print job.

Deleted: <#>Tracking Print Usage by Account
 <#>Mary manages the use of a high-volume printer and tracks usage by department numbers and staff names. Users that submit print jobs to the printer supply this information so that Mary can provide a monthly printing summary to each department's manager.

Deleted: <#>Define attributes and values for specifying detailed media requirements;
Deleted: <#> and

386 **4. Model**

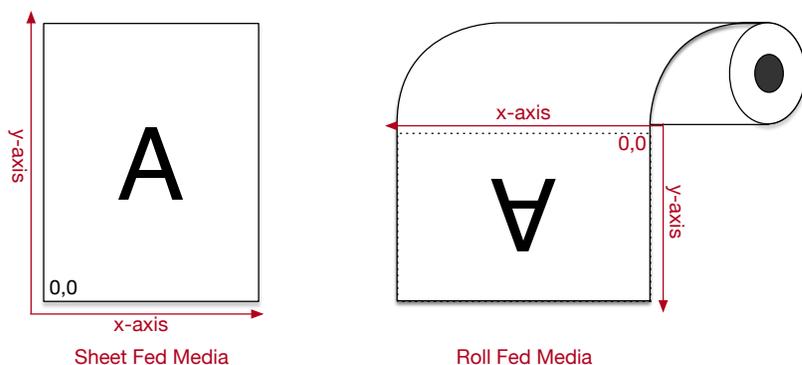
387 This specification extends the Internet Printing Protocol/1.1 [STD92] model to include Job
388 Template attributes [for production printing that](#) specify:

Deleted: to

- 389 1. Front and back covers;
- 390 2. Which Input Pages are placed on the front side of a Media Sheet;
- 391 3. How Input Pages are imposed on each Impression;
- 392 4. How Input Pages are ordered prior to imposition;
- 393 5. How Input Pages are offset during imposition;
- 394 6. Where and what Insert Sheets are placed in the output;
- 395 7. Job accounting information;
- 396 8. Job error reporting requirements; [and](#)
- 397 9. A message to the operator.

Deleted: ;
How banner pages are printed for the Job;
and
Detailed media requirements such as size,
type, and color...

398 **4.1 [Imaging](#) Coordinate System and Units**



399

400 Figure 1 shows the coordinate system used by IPP when addressing locations on a Media
 401 Sheet or within an Impression. Coordinates are provided without respect to the orientation
 402 of the Input Page. For sheet fed media the X dimension is the short side and the Y dimension
 403 is the long side ("portrait" orientation). For roll fed media the X dimension is in the cross-feed
 404 direction and the Y dimension is in the feed direction, with the "top" of the page being the
 405 leading edge of the roll.
 406

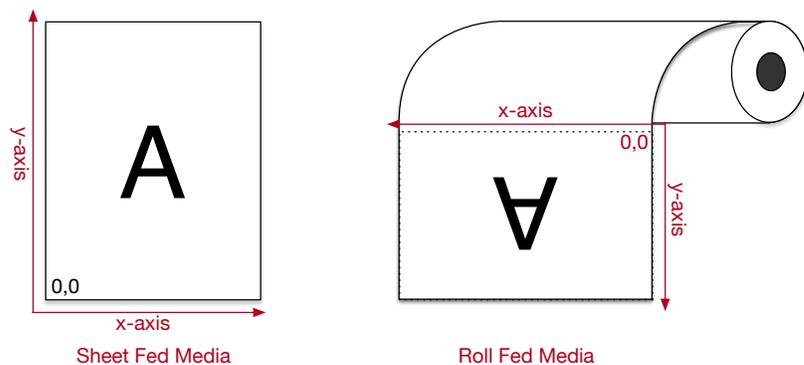
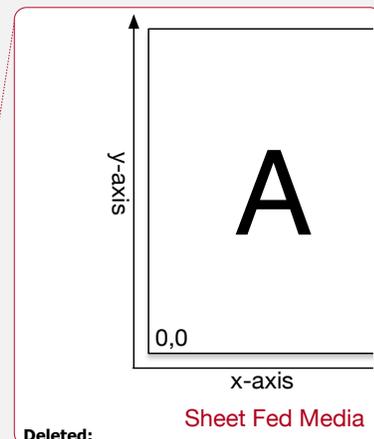


Figure 1 - IPP Media Sheet Coordinate System



Deleted: and

413
414

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

417 **4.2 Number Up, Imposition, and Shifting**

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

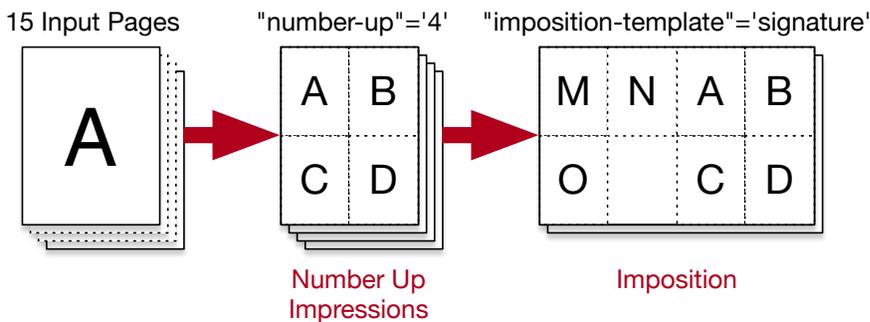


Figure 2 - Relationship Between Number Up and Imposition

420
421

422 Aside from the "imposition-template" Job Template attribute (section 5.1.4), this specification
423 defines additional Job Template attributes to offset and position the imposed Impressions
424 on the Media Sheet, typically to compensate for an application or scanning in some
425 consistent direction, or to shift the Impressions toward or away from a binding edge.
426 The Printer MUST apply "number-up", "[page-delivery](#)", "[presentation-direction-number-up](#)",
427 image shifting, and "imposition-template" attributes [listed in](#)

430 [Table 1](#) in the following order:

- 431 [1. Order the Input Pages according to the "page-delivery" attribute \(section 5.1.11\).](#)
432 [If "page-delivery" is unsupported or not applied, Input Pages are processed in the](#)
433 [order they occur within the Document Data.](#)
- 434 2. Create an Impression by laying out the number of Input Pages specified by the
435 "number-up" attribute [STD92] [in the direction specified by the "presentation-](#)
436 [direction-number-up" attribute \(section 5.1.12\).](#) If "number-up" ~~and "presentation-~~
437 [direction-number-up" are](#) unsupported or not applied, the Impression consists of
438 a single Input Page.
- 439 3. Shift the Impression as specified by the ["x-image-xxx" and "y-image-xxx"](#) image
440 shifting attributes. If the image ~~shifting~~ attributes are unsupported or not applied,
441 the Impression is not shifted.
- 442 4. Layout the Impressions onto the surfaces (i.e. sides) of a number of (larger) Media
443 Sheets according to the "force-front-side" (section 5.1.3), "imposition-template",
444 and "sides" [STD92] attributes.
445

Deleted: is

Deleted: -

448

Table 1 - Number Up, Imposition, and Offset Attributes

Template Attribute	Default Attribute	Supported Attribute
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))

449 **4.3 Cover Pages, Insert Sheets, and Separator Sheets**

450 [The IPP Finishings 2.1 \(FIN\) \[PWG5100.1\] specification defines covers as one or two Media](#)
 451 [Sheets that placed over the hardcopy output. These covers are not printed on and draw from](#)
 452 [a separate media supply. They can also be combined with the Cover Pages, Insert Sheets,](#)
 453 [and Separator Sheets defined in this specification.](#)
 454 [Cover Pages can be printed on using Input Pages in the Job's Document Data and draw](#)
 455 [from the standard media supply. Blank Insert Sheets can be added to separate forms or](#)
 456 [reports within a Set. Blank Separator Sheets can be added between Sets to separate each](#)
 457 [Set visually.](#)

458 [Table 2 lists the attributes.](#)

459 [For example, a Job can request 10 copies of a Document with the first and last Input Page](#)
460 [of the Document Data printed as covers on cardstock media, blank yellow pages between](#)
461 [each section within the Document Data, and blank pink pages between each Set \(copy\) of](#)
462 [the Document. When combined with IPP Finishings 2.1, the Covers and interior pages can](#)
463 [be bound with the Separator Sheets left loose between the bound Sets.](#)
464

465

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

Template Attribute	Default Attribute	Supported Attribute(s)
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)))

466

4.4 Accounting and Error Sheets

467

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

468

469

470

471

472

Table 3 - Accounting and Error Sheet Attributes

Job Template Attribute	Default Attribute	Supported Attribute(s)
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)

473

474

Deleted: DISCUSS: This document defines a "page-order-received" attribute to change the logical numbering of pages in a document as used for all page-based attributes. STD92 says the following about "page-ranges": "The attribute is associated with Input Pages and not application-numbered pages such as the page numbers found in the headers and/or footers for certain word processing applications" which I read as "the order pages are sent to the Printer" which is NOT compatible with what this attribute does. This document spends a great deal of time explaining all of the side-effects and how to correctly implement support for "page-order-received" - similar wording is NOT present in the page overrides spec (5100.6) or in the document object spec (5100.5) which would be affected. The '1-to-n-order' value is also not a valid keyword string!
What is also not clear is why this complexity is necessary or useful - the only use case I can make is to support proper Printer-side rendering of "number-up" when the pages are in reverse order and the number of pages is not an even multiple of the number-up value. Otherwise, the "page-delivery" attribute is sufficient to produce output in any order.
My recommendation is to make "page-order-received" OBSOLETE.

An Input Page is a page according to the definition of pages in the language used to express the Document Data (see section of 13.2.4 of the IPP Model and Semantics Document). The Document Data included in an IPP request is typically a PDL representation of a document composed by a user. For the remainder of this description we will use the term Document Data to mean the typical PDL representation sent with an IPP request (e.g., a PostScript File), and the term *original document* to mean the document composed by the user (e.g., a Word97 document). The Input Page numbering is with respect to the Input-Document, not the Output-Document (see [ipp-override]). Furthermore, the page numbers are ordinal numbers starting at 1 and are independent of the page numbers that may be printed on the pages.
The order of the Input Pages in the Document Data is either the same as the order of the original document, known as 1-N (read "one to N"), or the reverse of that order, known as N-1. There are no assumptions on the order of the original document, other than it is ordered.
The enumeration of Input Pages begins with 1 and increments by 1 for each additional Input Page. The enumeration is based on the order of the original document, not the Document Data supplied with the IPP request. In other words, if the Document Data is supplied in N-1 order (reverse of the original document order), then Input Page number '1' in the enumeration is actually the N th Input Page defined in the Document Data (see the "page-order-received" attribute in section 5.1.16). Similarly, Input Page number '2' is defined by the (N-1) th Input Page defined in the Document Data. Suppose the Document Data is supplied in the 1-N order.. [1]

630 **5. New Attributes**

631 **5.1 Job Template Attributes**

633 **5.1.1 cover-back (collection)**

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

638 Table 4 lists the member attributes. If the Client omits both the "media" and the "media-col"
 639 member attributes, then the media currently being used by the Printer for the Job SHOULD
 640 also be used for the cover. The Client MUST NOT supply both the "media" and the "media-
 641 col" member attributes. If the Client supplies such a malformed request, the Printer MUST
 642 either reject the request and return the 'client-error-bad-request' status code or choose either
 643 the "media" or the "media-col" member attribute and return the 'successful-ok-ignored-or-
 644 substituted-values' status code with the unused member attribute in the unsupported
 645 attributes group.

646 **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

647 **5.1.1.1 media (type2 keyword | name(MAX))**

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

650 **5.1.1.2 media-col (collection)**

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

653 **5.1.1.3 cover-type (type2 keyword)**

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

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

Deleted: Table 1 summarizes the Job Template attributes defined in this specification.
Table 1 - Summary of Job Template Attributes
 Job Attribute ... [2]

- 663 'no-cover': No covers are to be produced.
- 664 'print-none': Add a cover but do not print on either side of the cover.
- 665 'print-front': Add a cover that is printed on the front side (side one). For a front cover
666 ("cover-front") the first Input Page is printed on side one of the cover sheet (this is
667 the outside of the front cover) and the second Input Page is printed on side one of
668 the first Media Sheet of the output. For back cover ("cover-back") the last Input
669 Page is printed on side one of the cover sheet (this is the inside of the back cover).
- 670 'print-back': Add a cover that is printed on the back side (side two). For a front cover
671 ("cover-front") the first Input Page is printed on side two of the cover sheet (this is
672 the inside of the front cover) and the second Input Page is printed on side one of the
673 first Media Sheet of the output. For a back cover ("cover-back") the last Input Page
674 is printed on side two of the cover sheet (this is the outside of the back cover).
- 675 'print-both': Add a cover that is printed on both sides of the cover. The front cover
676 has the first and second Input Pages printed on the front and back sides of the
677 cover sheet, respectively. The back cover has the second to last and last Input
678 Pages printed on the front and back sides of the cover sheet, respectively.
- 679 When printing on the back side (side two) of a cover, the value of the "sides" Job Template
680 attribute [STD92] SHOULD be used to determine which edge is the reference edge, i.e., the
681 long or short edge. When the "sides" attribute is 'one-sided', the reference edge SHOULD
682 be the long edge.
- 683 In cases where the Document Data does not contain enough Input Pages to satisfy the
684 "cover-type" request, the behavior is implementation dependent.
- 685 **5.1.2 cover-front (collection)**
- 686 This attribute specifies how front covers are to be applied to each Set. The Media Sheets in
687 the rendered output that represent the covers are treated like any other Media Sheet in the
688 Set. For example, if the "finishings" Job Template attribute [STD92] has a value of 'staple,'
689 then the staple would bind the cover along with all of the other Media Sheets in the Set.
- 690 Table 4 lists the member attributes. If the Client omits both the "media" and the "media-col"
691 member attributes, then the media currently being used by the Printer for the Job SHOULD
692 also be used for the cover. The Client MUST NOT supply both the "media" and the "media-
693 col" member attributes. If the Client supplies such a malformed request, the Printer MUST
694 either reject the request and return the 'client-error-bad-request' status code or choose either
695 the "media" or the "media-col" member attribute and return the 'successful-ok-ignored-or-
696 substituted-values' status code with the unused member attribute in the unsupported
697 attributes group.

698 **5.1.3 force-front-side (1setOf integer(1:MAX))**

699 This attribute forces the identified Input Pages (numbered 1 to N) to be imposed on the front
 700 side of a Media Sheet. This attribute is typically used to start a new chapter or section of a
 701 document. For each identified Input Page, if that page would have been imposed on the
 702 back side of a Media Sheet, that back side is left blank and the page is imposed on the front
 703 side of the next Media Sheet.

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

708 **5.1.4 imposition-template (type2 keyword | name(MAX))**

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

711 'none': No imposition template is applied.

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

714 **5.1.5 insert-sheet (1setOf collection)**

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

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

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

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

727 5.1.5.1 insert-after-page-number (integer(0:MAX))

728 This REQUIRED member attribute specifies the Input Page number, starting at 1, after which
 729 the Insert Sheets are to be placed. The inserted sheets do not affect the numbering of Input
 730 Pages. For example, to insert a single sheet after both pages 2 and 3 of a given document,
 731 the value of "input-after-page-number" would be '2' and '3' respectively, not '2' and '4' as it
 732 would be if the inserted sheet affected the Input Page count.

733 If the value is '0' then the sheet is inserted before the first page. If the value is MAX
 734 ('2147483647'), then the sheet is inserted after the last page.

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

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

745 5.1.5.2 insert-count (integer(0:MAX))

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

749 5.1.5.3 media (type2 keyword | name(MAX))

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

752 5.1.5.4 media-col (collection)

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

755 5.1.6 job-accounting-sheets (collection)

756 This attribute specifies which Job accounting sheets to print with the Job. Job accounting
 757 sheets typically contain information such as the value of the "job-account-id" attribute
 758 (section 1.1.1) and the "job-accounting-user-id" attribute (section 1.1.1), and the number and
 759 type of media sheets used while printing the Job. The exact information contained on a Job
 760 accounting sheet is implementation-dependent, but should always be a reflection of the
 761 account information associated with the Job. Typically, Job accounting sheets are printed

Deleted: <#>job-account-id (name(MAX)) ¶
 <#>This attribute specifies the account associated with the Job, such as a customer name, a sequence of digits referencing an internal billing number, or even a credit card number. How the Printer uses this attribute is implementation dependent. ¶
 <#>A zero-length value indicates that there is no account name. ¶
<#>job-accounting-user-id (name(MAX)) ¶
 <#>This attribute specifies the user ID associated with the account specified by the "job-account-id" attribute (see section 5.1.65.1.6) used for this Job. These two attributes can be used for account tracking. ¶
 <#>A zero-length value indicates that there is no user accounting ID. ¶

779 after the Job and are not finished, i.e., not stapled, with the Sets. Table 6 lists the member
780 attributes.

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

Member Attribute	Conformance
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

782 **5.1.6.1 job-accounting-sheets-type (type2 keyword | name(MAX))**

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

785 'none': Suppress printing of accounting sheets.

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

787 **5.1.6.2 media (type2 keyword | name(MAX))**

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

790 **5.1.6.3 media-col (collection)**

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

793 **5.1.6.4 job-accounting-output-bin (type2 keyword | name(MAX))**

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

798 **5.1.7 job-error-sheet (collection)**

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

803 If the Printer is producing a Job Sheet for this Job, the Printer can print any error and warning
804 information on the same Job Sheet, i.e., merge the Job Error Sheet with the Job Sheet. This
805 use of the Job Sheet for errors only applies if the "job-error-sheet" attribute is supplied
806 without either a "media" or "media-col" member attribute. If the "media" or "media-col"

807 member attribute is supplied, a separate error sheet MUST be used to print errors and
808 warnings. Table 7 lists the member attributes.

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

Member Attribute	Conformance
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

810 **5.1.7.1 job-error-sheet-type (type2 keyword | name(MAX))**

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

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

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

815 **5.1.7.2 job-error-sheet-when (type2 keyword)**

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

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

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

821 **5.1.7.3 media (type2 keyword | name(MAX))**

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

824 **5.1.7.4 media-col (collection)**

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

827 **5.1.8 job-message-to-operator (text(MAX))**

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

830 **5.1.9 job-sheet-message (text(MAX))**

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

836 **5.1.10 media-input-tray-check (type2 keyword | name(MAX))**

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

842 [Note: Clients SHOULD use the "media-source" member attribute of the "media-col" attribute](#)
843 [\[PWG5100.7\] instead of this attribute.](#)

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

852 **5.1.11 page-delivery (type2 keyword)**

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

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

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

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

Deleted: <#>job-sheets-col (collection)
<#>This attribute augments the "job-sheets" Job Template attribute [STD92] and allows a Client to specify media for Job Sheets that is different than the current media being used for the Job. Table 6 lists the member attributes.
<#>Table 6 - "job-sheets-col" Member Attributes
<#>Member Attribute ... [3]

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

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

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

887 5.1.12 presentation-direction-number-up (type2 keyword)

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

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

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

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

- 909 1. If the Client supplies the "orientation-requested" Job Template attribute [STD92],
 910 that attribute specifies the orientation.
- 911 2. If the Client doesn't supply the "orientation-requested" attribute and the Printer is
 912 able to determine the orientation by inspecting the Document, that is the
 913 orientation.
- 914 3. If the Client doesn't supply the "orientation-requested" attribute and the Printer is
 915 unable to determine the orientation by inspecting the Document, the orientation

Moved down [1]: <#>page-order-received (type2 keyword)
 <#>See discussion in section 4.
 <#>This attribute specifies the order of the Input 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 5.1.5). See section 4.2 for a complete discussion of Input Page order.
 <#>Standard keyword values for "page-order-received" are:
 <#>"1-to-n-order": The Input Pages defined in the Document Data are in the same order as the original document.
 <#>"n-to-1-order": The Input Pages defined in the Document Data are in the reverse order of the original document.
 <#>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."

952 is the value specified by the “orientation-requested-default” Printer Description
 953 attribute [STD92].

954 The orientation is used by the “presentation-direction-number-up” attribute for laying out
 955 pages on the Impression as follows:

- 956 1. If the value of the “number-up” attribute is a power of 4, e.g., 1, 4, or 16, the
 957 orientation is used as-is.
- 958 2. If the value of the “number-up” attribute is 2 times the power of 4, e.g., 2 and 8,
 959 the orientation used for layout is:
 - 960 a. ‘landscape’ if the Document orientation is ‘portrait’;
 - 961 b. ‘portrait’ if the Document orientation is ‘landscape’;
 - 962 c. ‘reverse-landscape’ if the Document orientation is ‘reverse-portrait’; and
 - 963 d. ‘reverse-portrait’ if the Document orientation is ‘reverse-landscape’
- 964 3. If the value of “number-up” is any other value, e.g., 3, 6, or 12, the orientation
 965 used for layout is implementation-defined.

966 **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'				

Value	Portrait	Landscape	Reverse-Landscape	Reverse-Portrait
'totopt-toleft'				

967 **5.1.13 separator-sheets (collection)**

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

971 **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

972 **5.1.13.1 separator-sheets-type (type2 keyword | name(MAX))**

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

- 975 'none': No separator sheets are delivered with the printed output.
- 976 'slip-sheets': A separator sheet is printed between each Set of the Job.
- 977 'start-sheet': A separator sheet is printed to indicate the start of each Set of the Job.
- 978 'end-sheet': A separator sheet is printed to indicate the end of each Set of the Job.
- 979 'both-sheets': Separator sheets are printed to indicate both the start and end of
 980 each Set of the Job.

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

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

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

989 X S (J1) S (J2) S (J3) X

990 **5.1.13.2 media (type2 keyword | name(MAX))**

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

993 **5.1.13.3 media-col (collection)**

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

996 **5.1.14 x-image-position (type2 keyword)**

997 This attribute causes the specified point of the Impression to be offset to a specified location.
 998 One standard value causes the Impression to be centered along the x-axis on the media to
 999 which it is applied. Two other standard values specify that the location is co-incident with the
 1000 specified edge of the printable area by moving the image parallel to the x-axis on the media
 1001 to which it is applied.

1002 Standard keyword values are:

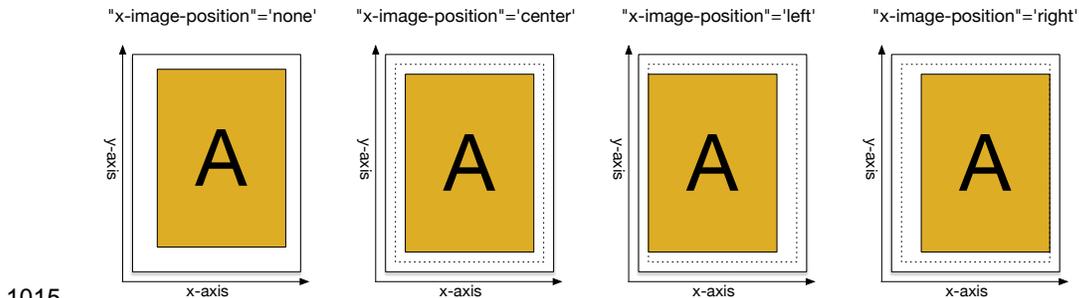
1003 'none': Place the Impression wherever the print data specifies on the medium.

1004 'center': Center the Impression between the physical edges of the medium by
 1005 moving the Impression in a direction parallel to the x-axis

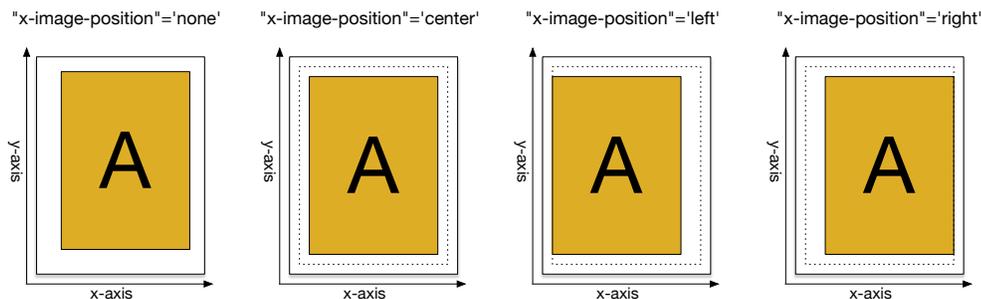
1006 'left': Position the left edge of the Impression so that it is co-incident with the left
 1007 edge of the printable area of the medium.

1008 'right': Position the right edge of the Impression so that it is co-incident with the right
 1009 edge of the printable area of the medium.

1010 Note: the 'center' value is centered with respect to the physical edges of the medium rather
 1011 than the printable area of it because the printable area may have different left and right
 1012 margins. If this specification defined two separate attributes, one for values that are medium-
 1013 relative and one for values that are relative to printable area, the rules for defaulting would
 1014 be too complicated.



1016 Figure 3 shows the effect of different values on the location of the printed Impression.



1017

1018

Figure 3 - "x-image-position" Values

1019 5.1.15 x-image-shift (integer(MIN:MAX))

1020 This attribute causes the Impression (whether it will be on the front side or back side of a
 1021 sheet of the Finished Document) to be offset in position with respect to the media on which
 1022 the Impression is to be rendered. The direction of shift MUST be along the x-axis of the
 1023 Coordinate System (see section **Error! Reference source not found.**) with respect to the
 1024 medium. The sign of the value indicates the direction of the shift.

1025 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to
 1026 1/2540th of an inch resolution.

1027 5.1.16 x-side1-image-shift (integer(MIN:MAX))

1028 This attribute causes each Impression that would be placed on the front side of a Media
 1029 Sheet to be offset in position with respect to the media on which the Impression is to be
 1030 rendered. The direction MUST be along the x-axis of the Coordinate System (see section
 1031 **Error! Reference source not found.**) with respect to the medium. The sign of the value
 1032 indicates the direction of the shift.

1033 If the bind edge is along the y-axis, then a bind edge image shift can be accomplished by
 1034 applying shifts of equal magnitude, and opposite sign, to the "x-side1-image-shift" and "x-
 1035 side2-image-shift" attributes, respectively (assuming that the "sides" attribute is 'two-sided-
 1036 long-edge' or imposition has equivalent behavior).

1037 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to
 1038 1/2540th of an inch resolution.

1039 5.1.17 x-side2-image-shift (integer(MIN:MAX))

1040 This attribute causes a Impression that would be placed on the back side of a Media Sheet
 1041 to be offset in position with respect to the media on which the Impression is to be rendered.
 1042 The direction of shift MUST be along the x-axis of the Coordinate System (see section **Error!**

1043 **Reference source not found.**) with respect to the medium. The sign of the value indicates
1044 the direction of the shift.

1045 If the bind edge is along the y-axis, then a bind edge image shift can be accomplished by
1046 applying shifts of equal magnitude, and opposite sign, to the "x-side1-image-shift" and "x-
1047 side2-image-shift" attributes, respectively (assuming that the "sides" attribute is 'two-sided-
1048 long-edge' or imposition has equivalent behavior).

1049 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to
1050 1/2540th of an inch resolution.

1051 5.1.18 y-image-position (type2 keyword)

1052 This attribute causes the specified point of the Impression to be offset to a specified location.
1053 One standard value causes the Impression to be centered along the y-axis on the media to
1054 which it is applied. Two other standard values specify that the location is co-incident with the
1055 specified edge of the printable area by moving the image parallel to the y-axis on the media
1056 to which it is applied.

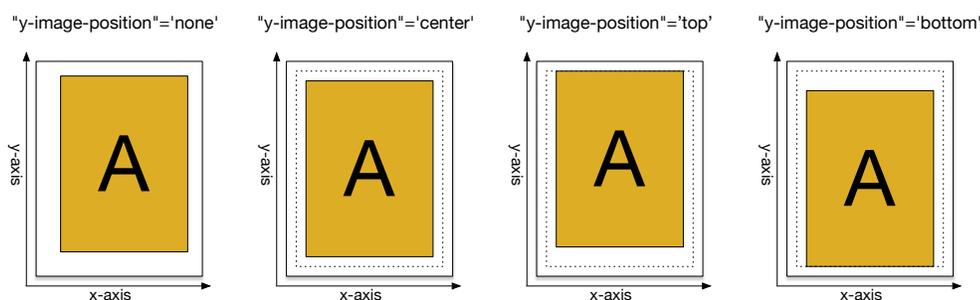
1057 Standard keyword values are:

1058 'none': Place the Impression wherever the print data specifies on the medium.

1059 'center': Center the Impression between the physical edges of the medium by
1060 moving the Impression in the direction parallel to the y-axis

1061 'top': Position the top edge of the Impression so that it is co-incident with the top
1062 edge of the printable area of the medium.

1063 'bottom': Position the bottom edge of the Impression so that it is co-incident with the
1064 bottom edge of the printable area of the medium.



1065

1066 Figure 4 shows the effect of different values on the location of the printed Impression.

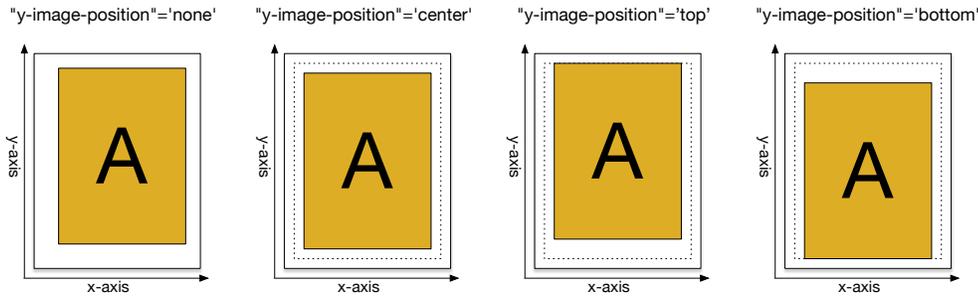


Figure 4 - "y-image-position" Values

1067

1068

1069 5.1.19 y-image-shift (integer(MIN:MAX))

1070 This attribute causes the Impression (whether it will be on the front side or back side of a
 1071 sheet of the Finished Document) to be offset in position with respect to the media on which
 1072 the Impression is to be rendered. The direction of shift MUST be along the y-axis of the
 1073 Coordinate System (see section **Error! Reference source not found.**) with respect to the
 1074 medium. The sign of the value indicates the direction of the shift.

1075 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to
 1076 1/2540th of an inch resolution.

1077 5.1.20 y-side1-image-shift (integer(MIN:MAX))

1078 This attribute causes each Impression that would be placed on the front side of a Media
 1079 Sheet to be offset in position with respect to the media on which the Impression is to be
 1080 rendered. The direction of shift MUST be along the y-axis of the Coordinate System (see
 1081 section **Error! Reference source not found.**) with respect to the medium. The sign of the
 1082 value indicates the direction of the shift.

1083 If the bind edge is along the x-axis, then a bind edge image shift can be accomplished by
 1084 applying shifts of equal magnitude, and opposite sign, to the "y-side1-image-shift" and "y-
 1085 side2-image-shift" attributes, respectively (assuming that the "sides" attribute is 'two-sided-
 1086 short-edge' or imposition has equivalent behavior).

1087 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to
 1088 1/2540th of an inch resolution.

1089 5.1.21 y-side2-image-shift (integer(MIN:MAX))

1090 This attribute causes each Impression that would be placed on the back side of a Media
 1091 Sheet to be offset in position with respect to the media on which the Impression is to be
 1092 rendered. The direction of shift MUST be along the y-axis of the Coordinate System (see
 1093 section **Error! Reference source not found.**) with respect to the medium. The sign of the
 1094 value indicates the direction of the shift.

1095 If the bind edge is along the x-axis, then bind edge image shift can be accomplished by
1096 applying shifts of equal magnitude, and opposite sign, to the "y-side1-image-shift" and "y-
1097 side2-image-shift" attributes, respectively (assuming that the "sides" attribute is 'two-sided-
1098 short-edge' or imposition has equivalent behavior).

1099 The unit of measure for this attribute is hundredths of a millimeter. This is equivalent to
1100 1/2540th of an inch resolution.

1101 **5.2 Printer Description Attributes**

1102 **5.2.1 cover-back-default (collection | no-value)**

1103 This attribute specifies the default value of the "cover-back" Job Template attribute (section
1104 5.1.1). This attribute MUST be supported if the "cover-back" attribute is supported.

1105 **5.2.2 cover-back-supported (1setOf keyword)**

1106 This attribute lists the supported "cover-back" Job Template attribute (section 5.1.1) member
1107 attributes. This attribute MUST be supported if the "cover-back" attribute is supported.

1108 **5.2.3 cover-front-default (collection | no-value)**

1109 This attribute specifies the default value of the "cover-front" Job Template attribute (section
1110 5.1.2). This attribute MUST be supported if the "cover-front" attribute is supported.

1111 **5.2.4 cover-front-supported (1setOf keyword)**

1112 This attribute lists the supported "cover-front" Job Template attribute (section 5.1.2) member
1113 attributes. This attribute MUST be supported if the "cover-front" attribute is supported.

1114 **5.2.5 cover-type-supported (1setOf type2 keyword)**

1115 This attribute lists the supported values of the "cover-type" member attribute (section
1116 5.1.1.3). Printers that support the "cover-type" member attribute MUST support this attribute.

1117 **5.2.6 force-front-side-supported (rangeOfInteger(1:MAX))**

1118 This attribute specifies the range of supported "force-front-side" Job Template attribute
1119 (section 5.1.3) values. Printers MUST support this attribute if the "force-front-side" attribute
1120 is supported.

1121 **5.2.7 insert-count-supported (rangeOfInteger(0:MAX))**

1122 This attribute specifies the supported range of values of the "insert-count" member attribute
1123 (section 5.1.5.2). Printers MUST support this attribute if the "insert-sheet" Job Template
1124 attribute (section 5.1.5) is supported.

1125 **5.2.8 insert-sheet-default (1setOf collection)**

1126 This attribute specifies the default value of the "insert-sheet" Job Template attribute (section
1127 5.1.5). Printers MUST support this attribute if the "insert-sheet" attribute is supported.

1128 **5.2.9 insert-sheet-supported (1setOf keyword)**

1129 This attribute lists the supported member attributes of the "insert-sheet" Job Template
1130 attribute (section 5.1.5). Printers MUST support this attribute if the "insert-sheet" attribute is
1131 supported.

1132 **5.2.10 job-accounting-output-bin-supported (1setOf (type2 keyword | name(MAX)))**

1133 This attribute lists the supported output bins for Job accounting sheets. Printers that support
1134 the "job-accounting-output-bin" attribute (section 5.1.6.4) MUST support this attribute.

1135 **5.2.11 job-accounting-sheets-default (collection)**

1136 This attribute specifies the default value of the "job-accounting-sheets" Job Template
1137 attribute (section 5.1.6). Printers MUST support this attribute if the "job-accounting-sheets"
1138 attribute is supported.

1139 **5.2.12 job-accounting-sheets-supported (1setOf keyword)**

1140 This attribute lists the supported member attributes of the "job-accounting-sheets" Job
1141 Template attribute (section 5.1.6). Printers MUST support this attribute if the "job-
1142 accounting-sheets" attribute is supported.

1143 **5.2.13 job-accounting-sheets-type-supported (1setOf (type2 keyword | name(MAX)))**

1144 This attribute lists the supported values of the "job-accounting-sheets-type" member
1145 attribute (section 5.1.6.1). Printers that support the "job-accounting-sheets" attribute (section
1146 5.1.6) MUST support this attribute.

1147 **5.2.14 job-error-sheet-default (collection)**

1148 This attribute specifies the default value of the "job-error-sheet" Job Template attribute
1149 (section 5.1.7). Printers that support the "job-error-sheet" attribute MUST support this
1150 attribute.

1151 **5.2.15 job-error-sheet-supported (1setOf keyword)**

1152 This attribute lists the supported member attributes of the "job-error-sheet" Job Template
1153 attribute (section 5.1.7). Printers that support the "job-error-sheet" attribute MUST support
1154 this attribute.

Deleted: <#>job-account-id-default (name(MAX) | no-value)
 <#>This attribute specifies the default value of the "job-account-id" Job Template attribute (section 5.1.6). Printers MUST support this attribute if the "job-account-id" attribute is supported.
 <#>job-account-id-supported (boolean)
 <#>This attribute specifies whether the "job-account-id" Job Template attribute (section 5.1.6) is supported. Printers MUST support this attribute if the "job-account-id" attribute is supported.

Deleted: <#>job-accounting-user-id-default (name(MAX) | no-value)
 <#>This attribute specifies the default value of the "job-accounting-user-id" Job Template attribute (section 5.1.7). Printers MUST support this attribute if the "job-accounting-user-id" attribute is supported.
 <#>job-accounting-user-id-supported (boolean)
 <#>This attribute specifies whether the "job-accounting-user-id" Job Template attribute (section 5.1.7) is supported. Printers MUST support this attribute if the "job-accounting-user-id" attribute is supported.

1182 **5.2.16 job-error-sheet-type-supported (1setOf (type2 keyword | name(MAX)))**

1183 This attribute lists the supported values of the "job-error-sheet-type" member attribute
 1184 (section 5.1.7.1). Printers that support the "job-error-sheet" Job Template attribute (section
 1185 5.1.7) MUST support this attribute.

1186 **5.2.17 job-error-sheet-when-supported (1setOf type2 keyword)**

1187 This attribute lists the supported values of the "job-error-sheet-when" member attribute
 1188 (section 5.1.7.2). Printers that support the "job-error-sheet-when" member attribute MUST
 1189 support this attribute.

1190 **5.2.18 job-message-to-operator-supported (boolean)**

1191 This attribute specifies whether the "job-message-to-operator" Job Template attribute
 1192 (section 5.1.8) is supported. Printers that support the "job-message-to-operator" attribute
 1193 MUST support this attribute.

1194 **5.2.19 job-sheet-message-supported (boolean)**

1195 This attribute specifies whether the "job-sheet-message" Job Template attribute (section
 1196 **Error! Reference source not found.**) is supported. Printers that support the "job-sheet-
 1197 message" attribute MUST support this attribute.

1198 **5.2.20 presentation-direction-number-up-default (type2 keyword)**

1199 This attribute specifies the default value of the "presentation-direction-number-up" Job
 1200 Template attribute (section 5.1.12). Printers that support the "presentation-direction-number-
 1201 up" attribute MUST support this attribute.

1202 **5.2.21 presentation-direction-number-up-supported (1setOf type2 keyword)**

1203 This attribute lists the supported values of the "presentation-direction-number-up" Job
 1204 Template attribute (section 5.1.12). Printers that support the "presentation-direction-number-
 1205 up" attribute MUST support this attribute.

1206 **5.2.22 separator-sheets-default (collection)**

1207 This attribute specifies the default value of the "separator-sheets" Job Template attribute
 1208 (section 5.1.13). Printers that support the "separator-sheets" attribute MUST support this
 1209 attribute and MUST support the same member attributes for this default collection attribute
 1210 as it supports for the corresponding "separator-sheets" attribute.

1211 **5.2.23 separator-sheets-supported (1setOf type2 keyword)**

1212 This attribute lists the supported member attributes of the "separator-sheets" Job Template
 1213 attribute (section 5.1.13). Printers that support the "separator-sheets" attribute MUST
 1214 support this attribute.

Deleted: <#>job-sheets-col-default (collection)
 <#>This attributes specifies the default value of the "job-sheets-col" Job Template attribute (section 5.1.11). Printers that support the "job-sheets-col" attribute MUST support this attribute.
 <#>job-sheets-col-supported (1setOf keyword)
 <#>This attributes lists the supported member attributes of the "job-sheets-col" Job Template attribute (section 5.1.11). Printers that support the "job-sheets-col" attribute MUST support this attribute.
 <#>media-back-coating-supported (1setOf (type2 keyword | name(MAX)))
 <#>This attribute lists the supported values of the "media-back-coating" member attribute (section 5.1.13.10). Printers that support the "media-back-coating" member attribute MUST support this attribute.
 <#>media-col-default (collection)
 <#>This attribute specifies the default value of the "media-col" Job Template attribute (section 5.1.12.3). Printers that support the "media-col" attribute MUST support this attribute and MUST support the same member attributes for this default collection attribute as it supports for the corresponding "media-col" attribute.
 <#>The "media-default" [STD92] and "media-col-default" Printer attributes MUST both be configured to specify the same media instance. If the Administrator sets one of them to a value (either locally or with the Set-Printer-Attributes [RFC3380] operation), the Printer MUST set the other attribute's value to the same media instance or to the 'unknown' out-of-band value, if there isn't a corresponding value to be set for the other attribute. If a Client attempts to set both attributes, but their values specify different media instances, the Printer MUST reject the Set-Printer-Attributes operation and return the 'client-error-conflicting-attributes' status code.
 <#>media-col-ready (1setOf collection)
 <#>This attribute lists the media that are available for use without human intervention, i.e., the media that are ready to be printed on without interaction. Printers that support the "media-col" Job Template attribute (section 5.1.12.3) SHOULD support this attribute. If the Printer supports this attribute, it MUST support the same member attributes for these collection values as it supports for the corresponding "media-col" attribute and MUST support the "media-ready" Printer Status attribute [STD92]. The ith value of the "media-col-ready" attribute corresponds to the ith value of the "media-ready" attribute so that the Client can correlate the media names or keywords with the collection values and determine the characteristics of each ready media instance.
 <#>media-col-supported (1setOf keyword)
 <#>This attribute lists the supported member attributes of the "media-col" Job Template attribute (section 5.1.12.3). Printers that support the "media-col" attribute MUST support this attribute. ... [4]

1368 5.2.24 separator-sheets-type-supported (1setOf (type2 keyword | name(MAX)))

1369 This attribute lists the supported values of the "separator-sheets-type" member attribute
1370 (section 5.1.13.1). Printers that support the "separator-sheets-type" attribute MUST support
1371 this attribute.

1372 5.2.25 x-image-position-default (type2 keyword)

1373 This attribute specifies the default value of the "x-image-position" Job Template attribute
1374 (section 5.1.14). Printers that support the "x-image-position" attribute MUST support this
1375 attribute.

1376 5.2.26 x-image-position-supported (1setOf type2 keyword)

1377 This attribute lists the supported values of the "x-image-position" Job Template attribute
1378 (section 5.1.14). Printers that support the "x-image-position" attribute MUST support this
1379 attribute.

1380 5.2.27 x-image-shift-default (integer(MIN:MAX))

1381 This attribute specifies the default value of the "x-image-shift" Job Template attribute
1382 (section 5.1.15). Printers that support the "x-image-shift" attribute MUST support this
1383 attribute.

1384 5.2.28 x-image-shift-supported (rangeOfInteger(MIN:MAX))

1385 This attribute specifies the range of supported values of the "x-image-shift" Job Template
1386 attribute (section 5.1.15). Printers that support the "x-image-shift" attribute MUST support
1387 this attribute.

1388 5.2.29 x-side1-image-shift-default (integer(MIN:MAX))

1389 This attribute specifies the default value of the "x-side1-image-shift" Job Template attribute
1390 (section 5.1.16). Printers that support the "x-side1-image-shift" attribute MUST support this
1391 attribute.

1392 5.2.30 x-side1-image-shift-supported (rangeOfInteger(MIN:MAX))

1393 This attribute specifies the range of supported values of the "x-side1-image-shift" Job
1394 Template attribute (section 5.1.16). Printers that support the "x-side1-image-shift" attribute
1395 MUST support this attribute.

1396 5.2.31 x-side2-image-shift-default (integer(MIN:MAX))

1397 This attribute specifies the default value of the "x-side2-image-shift" Job Template attribute
1398 (section 5.1.17). Printers that support the "x-side2-image-shift" attribute MUST support this
1399 attribute.

1400 5.2.32 x-side2-image-shift-supported (rangeOfInteger(MIN:MAX))

1401 This attribute specifies the range of supported values of the "x-side2-image-shift" Job
1402 Template attribute (section 5.1.17). Printers that support the "x-side2-image-shift" attribute
1403 MUST support this attribute.

1404 5.2.33 y-image-position-default (type2 keyword)

1405 This attribute specifies the default value of the "y-image-position" Job Template attribute
1406 (section 5.1.18). Printers that support the "y-image-position" attribute MUST support this
1407 attribute.

1408 5.2.34 y-image-position-supported (1setOf type2 keyword)

1409 This attribute lists the supported values of the "y-image-position" Job Template attribute
1410 (section 5.1.18). Printers that support the "y-image-position" attribute MUST support this
1411 attribute.

1412 5.2.35 y-image-shift-default (integer(MIN:MAX))

1413 This attribute specifies the default value of the "y-image-shift" Job Template attribute
1414 (section 5.1.19). Printers that support the "y-image-shift" attribute MUST support this
1415 attribute.

1416 5.2.36 y-image-shift-supported (rangeOfInteger(MIN:MAX))

1417 This attribute specifies the range of supported values of the "y-image-shift" Job Template
1418 attribute (section 5.1.19). Printers that support the "y-image-shift" attribute MUST support
1419 this attribute.

1420 5.2.37 y-side1-image-shift-default (integer(MIN:MAX))

1421 This attribute specifies the default value of the "y-side1-image-shift" Job Template attribute
1422 (section 5.1.20). Printers that support the "y-side1-image-shift" attribute MUST support this
1423 attribute.

1424 5.2.38 y-side1-image-shift-supported (rangeOfInteger(MIN:MAX))

1425 This attribute specifies the range of supported values of the "y-side1-image-shift" Job
1426 Template attribute (section 5.1.20). Printers that support the "y-side1-image-shift" attribute
1427 MUST support this attribute.

1428 5.2.39 y-side2-image-shift-default (integer(MIN:MAX))

1429 This attribute specifies the default value of the "y-side2-image-shift" Job Template attribute
1430 (section 5.1.21). Printers that support the "y-side2-image-shift" attribute MUST support this
1431 attribute.

1432 **5.2.40 y-side2-image-shift-supported (rangeOfInteger(MIN:MAX))**

1433 This attribute specifies the range of supported values of the "y-side2-image-shift" Job
 1434 Template attribute (section 5.1.21). Printers that support the "y-side2-image-shift" attribute
 1435 MUST support this attribute.

1436 **6. New Values for Existing Attributes**1437 **6.1 job-state-reasons (1setOf type2 keyword)**

1438 This specification defines the 'resources-are-not-supported' value for the "job-state-reasons"
 1439 Job Status attribute [STD92]. When present, at least one of the resources needed by the
 1440 Job, such as media, fonts, resource objects, etc., is not supported on any of the physical
 1441 Printer's for which the Job is a candidate. This condition MAY be detected when the Job is
 1442 accepted, or subsequently while the Job is pending or processing, depending on
 1443 implementation. The Job can:

- 1444 1. remain in its current state,
- 1445 2. be moved to the 'pending-held' state, depending on implementation and/or Job
 1446 scheduling policy, or
- 1447 3. scheduled normally, but the Printer is put into the 'stopped' state when the Job is
 1448 attempted to be processed on the Printer.

1449 **7. Obsolete Attributes**1450 **7.1 Obsolete Job and Document Template Attributes**

1451 [This specification makes the "page-order-received \(type2 keyword\)" Job and Document](#)
 1452 [Template attribute \[PWG5100.3-2001\] OBSOLETE because it causes interoperability issues](#)
 1453 [with any IPP attribute that specifies page numbers or ranges.](#)

1454 **7.2 Obsolete Job Status Attributes**

1455 [This specification makes the "current-page-order \(type2 keyword\)" Job Status attribute](#)
 1456 [\[PWG5100.3-2001\] OBSOLETE because IPP does not expose the implementation details](#)
 1457 [of Document processing and because many implementations do not change Document Data](#)
 1458 [in-place.](#)

1459 **7.3 Obsolete Printer Description Attributes**

1460 [?? lists the Printer Description attributes from the previous version of this specification](#)
 1461 [\[PWG5100.3-2001\] which are now OBSOLETE.](#)

1462 **Table 10 - OBSOLETE Printer Description Attributes**

Deleted: <#>job-sheets (type2 keyword | name(MAX))
 <#>The following additional values are defined for the "job-sheets" Job Template attribute [STD92]:
 <#>"job-start-sheet": A Job Sheet is printed to indicate the start of the Job.
 <#>"job-end-sheet": A Job Sheet is printed to indicate the end of the Job.
 <#>"job-both-sheets": Job Sheets is printed to indicate the start and end of all the output associated with the Job.
 <#>"first-print-stream-page": The first Input Page in the Document Data is printed as the Job Sheet and the Printer's standard Job Sheet is suppressed.

Deleted: <#> and Values

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

1480 **8. Conformance Requirements**

1481 **8.1 Printer Conformance Requirements**

1482 In general each of the attributes defined in this document are OPTIONAL for a Printer to
 1483 support, so that Printer implementers MAY implement any combination of attributes. Only
 1484 the following conditional conformance requirements are defined:

1485

If the Printer supports:	then the Printer MUST also support (but vice-versa is OPTIONAL):
"cover-back"	"cover-front"
"finishings-col"	"finishings" (see [STD92] section 4.2.6)
"finishings-col-ready"	"finishings-ready (see section Error! Reference source not found.)
"job-sheets-col"	"job-sheets" (see [STD92] section 4.2.3)
"media-col"	"media" (see [STD92] section 4.2.11)
"media-col-ready"	"media-ready (see [STD92] section 4.2.11)
"media-input-tray-check"	"media" (see [STD92] section 4.2.11) 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"

1486 Each of the collection attribute definitions indicate which member attributes are REQUIRED
 1487 and which are OPTIONAL for a Printer to support and is not repeated here.

1488 If a Printer supports the 'collection' attribute syntax of a Job Template attribute , then it MUST
 1489 support the distinguished none value defined for that collection. See section 0.

1490 Support of the 'name' attribute syntax for Job Template attributes and collection member
 1491 attributes is OPTIONAL, as in IPP/1.1 [STD92].

1492 **In order for a Printer to claim conformance to this specification, a Printer MUST support:**

Deleted: <#>current-page-order (type2 keyword) ¶
 <#>This OBSOLETE Job Status attribute reported the current "page-order-received" value of the Document Data supplied with the Job, updating it as the Document Data was processed. Since IPP does not expose the implementation details of Document processing, and since many implementations do not change Document data in-place, this attribute cannot be implemented in an interoperable way. ¶
<#>insert-after-page-number-supported (rangeOfInteger(0:MAX)) ¶
 <#>This OBSOLETE Printer Description attribute indicated the range of page numbers supported by the "insert-after-page-number" member attribute (section 5.1.5.1). Since the attribute syntax defines the allowable range of values, the actual range of page numbers depends on the Document Data, and the "insert-sheet-supported" Printer Description attribute (section 5.2.8) specifies whether this attribute is supported, the "insert-after-page-number-supported" attribute is unnecessary. ¶
<#>job-accounting-output-bin-default (type2 keyword | name(MAX)) ¶
 <#>This OBSOLETE Printer Description attribute contained the default output bin for Job accounting sheets. Since this information is part of the "job-accounting-sheets-default" attribute (section 5.2.15), this attribute is unnecessary. ¶
<#>media-info-supported (boolean) ¶
 <#>This OBSOLETE Printer Description attribute reported whether the Printer supported the "media-info" member attribute (section 5.1.13.3). Since the "media-col-supported" Printer Description attribute (section 5.2.30) provides this information, this attribute is unnecessary. ¶
<#>page-order-received (type2 keyword) ¶
 <#>See discussion in section 4. ¶
 <#>This attribute specifies the order of the Input 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 5.1.5). See section 4.2 for a complete discussion of Input Page order. ¶
 <#>Standard keyword values for "page-order-received" are: ¶
 <#>"1-to-n-order": The Input Pages defined in the Document Data are in the same order as the original document. ¶
 <#>"n-to-1-order": The Input Pages defined in the Document Data are in the reverse order of the original document. ¶
 <#>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.. [5]

Moved (insertion) [1]

- 1643 1. The required attributes and values defined in section ??;
1644 2. The required operations defined in section ??;
1645 3. The additional values defined in section ??;
1646 4. The internationalization considerations defined in section 9; and
1647 5. The security considerations defined in section 10.

1648 8.2 Client Conformance Requirements

1649 Clients that support two Job Template attributes that control the same aspect, such as
1650 "media" and "media-col", MUST NOT supply both in a Job Creation request as indicated in
1651 the definitions of these attributes.

1652 Clients that support a "xxx" collection Job Template attribute SHOULD use the Get-Printer-
1653 Attributes request to obtain the "xxx-default" collection and display that to the user, so that
1654 the user can make any changes before submitting the Job. Then the Client submits values
1655 for all member attributes, rather than depending on the Printer's defaulting for omitted
1656 member attributes, since such defaulting is implementation dependent and will vary from
1657 Printer to Printer.

1658 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1659 1. The required attributes and values defined in section ??;
1660 2. The required operations defined in section ??;
1661 3. The additional values defined in section ??;
1662 4. The internationalization considerations defined in section 9; and
1663 5. The security considerations defined in section 10.

1664 9. Internationalization Considerations

1665 For interoperability and basic support for multiple languages, conforming implementations
1666 MUST support:

- 1667 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
1668 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
1669 1. The Unicode Format for Network Interchange [RFC5198] which requires
1670 transmission of well-formed UTF-8 strings and recommends transmission of
1671 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1672 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1673 characters and combining marks) followed by Canonical Composition (into canonical
1674 composed characters wherever Unicode has assigned them).

1675 WARNING – Performing normalization on UTF-8 strings received from Clients and
1676 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client
1677 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now
1678 'hidden').

1679 Implementations of this specification SHOULD conform to the following standards on
1680 processing of human-readable Unicode text strings, see:

1681 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1682 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1683 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1684 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1685 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1686 Unicode Collation Algorithm [UTS10] – sorting

1687 Unicode Locale Data Markup Language [UTS35] – locale databases

1688 Implementations of this specification are advised to also review the following informational
1689 documents on processing of human-readable Unicode text strings:

1690 Unicode Character Encoding Model [UTR17] – multi-layer character model

1691 Unicode Character Property Model [UTR23] – character properties

1692 Unicode Conformance Model [UTR33] – Unicode conformance basis

1693 **10. Security Considerations**

1694 The IPP extensions defined in this document require the same security considerations as
1695 defined in the Internet Printing Protocol/1.1 [STD92].

1696 Implementations of this specification SHOULD conform to the following standard on
1697 processing of human-readable Unicode text strings, see:

1698 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1699 Implementations of this specification are advised to also review the following informational
1700 document on processing of human-readable Unicode text strings:

1701 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

1702 **11. IANA Considerations**1703 **11.1 Attribute Registrations**

1704 The attributes defined in this specification will be published by IANA according to the
1705 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1706 <https://www.iana.org/assignments/ipp-registrations>

1707 The registry entries will contain the following information:

Job Status attributes: -----	Reference -----
1708	
1709	
1710	
1711	
1712	
1713	
1714	
1715	
1716	
1717	
1718	
1719	
1720	
1721	
1722	
1723	
1724	
1725	
1726	
1727	
1728	
1729	
1730	
1731	
1732	
1733	
1734	
1735	
1736	
1737	
1738	
1739	
1740	
1741	
1742	
1743	
1744	
1745	
1746	
1747	
1748	
1749	

Deleted: job-account-id
(name (MAX)) →[PWG5100.3] §
job-accounting-user-id
(name (MAX)) →[PWG5100.3] §

Deleted: job-sheets-col
(collection) →[PWG5100.3] §
job-sheets (type2 keyword |
name (MAX)) →[PWG5100.3] §
media (type2 keyword |
name (MAX)) →[PWG5100.3] §
media-col
(collection) →[PWG5100.3] §
media-col
(collection) →[PWG5100.3] §
media-back-coating (type2
keyword | name (MAX)) →[PWG5100.3] §
media-color (type2 keyword |
name (MAX)) →[PWG5100.3] §
media-front-coating (type2
keyword | name (MAX)) →[PWG5100.3] §
media-hole-count
(integer (0:MAX)) →[PWG5100.3] §
media-info
(text (255)) →[PWG5100.3] §
media-key (type2 keyword |
name (MAX)) →[PWG5100.3] §
media-order-count
(integer (1:MAX)) →[PWG5100.3] §
media-pre-printed (type2
keyword | name (MAX)) →[PWG5100.3] §
media-recycled (type2 keyword |
name (MAX)) →[PWG5100.3] §
media-size
(collection) →[PWG5100.3] §
x-dimension
(integer (0:MAX)) →[PWG5100.3] §
y-dimension
(integer (0:MAX)) →[PWG5100.3] §
media-type (type2 keyword |
name (MAX)) →[PWG5100.3] §
media-weight-metric
(integer (0:MAX)) →[PWG5100.3] §

Formatted: Not Highlight

Formatted: Not Highlight

1792	x-side1-image-shift (integer(MIN:MAX))	[PWG5100.3]
1793	x-side2-image-shift (integer(MIN:MAX))	[PWG5100.3]
1794	y-image-position (type2 keyword)	[PWG5100.3]
1795	y-image-shift (integer(MIN:MAX))	[PWG5100.3]
1796	y-side1-image-shift (integer(MIN:MAX))	[PWG5100.3]
1797	y-side2-image-shift (integer(MIN:MAX))	[PWG5100.3]
1798		
1799	Printer Description attributes:	Reference
1800	-----	-----
1801	cover-back-default (collection no-value)	[PWG5100.3]
1802	cover-back-supported (1setOf keyword)	[PWG5100.3]
1803	cover-front-default (collection no-value)	[PWG5100.3]
1804	cover-front-supported (1setOf keyword)	[PWG5100.3]
1805	cover-type-supported (1setOf type2 keyword)	[PWG5100.3]
1806	force-front-side-supported (rangeOfInteger(1:MAX))	[PWG5100.3]
1807	insert-after-page-number-supported (obsolete) (rangeOfInteger(0:MAX))	[PWG5100.3]
1808		
1809	insert-count-supported (rangeOfInteger(0:MAX))	[PWG5100.3]
1810	insert-sheet-default (1setOf collection)	[PWG5100.3]
1811	insert-sheet-supported (1setOf keyword)	[PWG5100.3]
1812	job-account-id-default (name(MAX) no-value)	[PWG5100.3]
1813	job-account-id-supported (boolean)	[PWG5100.3]
1814	job-accounting-output-bin-default (obsolete) (type2 keyword name(MAX))	[PWG5100.3]
1815		
1816	job-accounting-output-bin-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.3]
1817		
1818	job-accounting-sheets-default (collection)	[PWG5100.3]
1819	job-accounting-sheets-supported (1setOf keyword)	[PWG5100.3]
1820	job-accounting-sheets-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.3]
1821		
1822	job-accounting-user-id-default (name(MAX))	[PWG5100.3]
1823	job-accounting-user-id-supported (boolean)	[PWG5100.3]
1824	job-error-sheet-default (collection)	[PWG5100.3]
1825	job-error-sheet-supported (1setOf keyword)	[PWG5100.3]
1826	job-error-sheet-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.3]
1827		
1828	job-error-sheet-when-supported (1setOf type2 keyword)	[PWG5100.3]
1829	job-message-to-operator-supported (boolean)	[PWG5100.3]
1830	job-sheet-message-supported (boolean)	[PWG5100.3]
1831	job-sheets-col-default (collection)	[PWG5100.3]
1832	job-sheets-col-supported (1setOf keyword)	[PWG5100.3]
1833	page-delivery-default (type2 keyword)	[PWG5100.3]
1834	page-delivery-supported (1setOf type2 keyword)	[PWG5100.3]
1835	page-order-received-default (obsolete) (type2 keyword)	[PWG5100.3]
1836	page-order-received-supported (obsolete) (1setOf type2 keyword)	[PWG5100.3]
1837		
1838	presentation-direction-number-up-default (type2 keyword)	[PWG5100.3]
1839	presentation-direction-number-up-supported (1setOf type2 keyword)	[PWG5100.3]
1840		
1841	separator-sheets-default (collection)	[PWG5100.3]
1842	separator-sheets-supported (1setOf keyword)	[PWG5100.3]
1843	user-defined-values-supported (obsolete) (1setOf keyword)	[PWG5100.3]
1844	x-image-position-default (type2 keyword)	[PWG5100.3]
1845	x-image-position-supported (1setOf type2 keyword)	[PWG5100.3]
1846	x-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1847	x-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]

Deleted: media-back-coating-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]

Deleted: media-col-default (collection) →[PWG5100.3]

Deleted: media-col-ready (1setOf collection) →[PWG5100.3]
 media-col-supported (1setOf keyword) →[PWG5100.3]
 media-color-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]
 media-front-coating-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]
 media-hole-count-supported (1setOf rangeOfInteger(0:MAX)) →[PWG5100.3]
 media-key-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]
 media-order-count-supported (1setOf rangeOfInteger(1:MAX)) →[PWG5100.3]
 media-pre-printed-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]
 media-recycled-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]
 media-size-supported (1setOf collection) →[PWG5100.3]
 x-dimension (integer(1:MAX) | rangeOfInteger(1:MAX)) →[PWG5100.3]
 y-dimension (integer(1:MAX) | rangeOfInteger(1:MAX)) →[PWG5100.3]
 media-type-supported (1setOf (type2 keyword | name(MAX))) →[PWG5100.3]
 media-weight-metric-supported (1setOf rangeOfInteger(1:MAX)) →[PWG5100.3]

1895	x-side1-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1896	x-side1-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1897	x-side2-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1898	x-side2-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1899	y-image-position-default (type2 keyword)	[PWG5100.3]
1900	y-image-position-supported (lsetOf type2 keyword)	[PWG5100.3]
1901	y-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1902	y-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1903	y-side1-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1904	y-side1-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]
1905	y-side2-image-shift-default (integer(MIN:MAX))	[PWG5100.3]
1906	y-side2-image-shift-supported (rangeOfInteger(MIN:MAX))	[PWG5100.3]

1907 11.2 Type2 keyword Registrations

1908 The keyword values defined in this specification will be published by IANA according to the
1909 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1910 <https://www.iana.org/assignments/ipp-registrations>

1911 The registry entries will contain the following information:

1912	Attributes (attribute syntax)	
1913	Keyword Attribute Value	Reference
1914	-----	-----
1915	cover-type (type2 keyword)	[PWG5100.3]
1916	no-cover	[PWG5100.3]
1917	print-back	[PWG5100.3]
1918	print-both	[PWG5100.3]
1919	print-front	[PWG5100.3]
1920	print-none	[PWG5100.3]
1921		
1922	imposition-template (type2 keyword name(MAX))	[PWG5100.3]
1923	none	[PWG5100.3]
1924	signature	[PWG5100.3]
1925		
1926	job-accounting-output-bin (type2 keyword name(MAX))	[PWG5100.3]
1927	< any "output-bin" value >	[PWG5100.3]
1928		
1929	job-accounting-sheets-type (type2 keyword name(MAX))	[PWG5100.3]
1930	none	[PWG5100.3]
1931	standard	[PWG5100.3]
1932		
1933	job-error-sheet-type (type2 keyword name(MAX))	[PWG5100.3]
1934	none	[PWG5100.3]
1935	standard	[PWG5100.3]
1936		
1937	job-error-sheet-when (type2 keyword)	[PWG5100.3]
1938	always	[PWG5100.3]
1939	on-error	[PWG5100.3]
1940		
1941	job-state-reasons (lsetOf type2 keyword)	[STD92]
1942	resources-are-not-supported	[PWG5100.3]
1943		

Deleted: job-sheets (type2 keyword) → [STD92] §
first-print-stream-page → [PWG5100.3] §
job-both-sheets → [PWG5100.3] §
job-end-sheet → [PWG5100.3] §
job-start-sheet → [PWG5100.3] §

1952	page-delivery (type2 keyword)	[PWG5100.3]
1953	reverse-order-face-down	[PWG5100.3]
1954	reverse-order-face-up	[PWG5100.3]
1955	same-order-face-down	[PWG5100.3]
1956	same-order-face-up	[PWG5100.3]
1957	system-specified	[PWG5100.3]
1958		
1959	separator-sheets-type (type2 keyword name (MAX))	[PWG5100.3]
1960	both-sheets	[PWG5100.3]
1961	end-sheet	[PWG5100.3]
1962	none	[PWG5100.3]
1963	slip-sheets	[PWG5100.3]
1964	start-sheet	[PWG5100.3]
1965		
1966	x-image-position (type2 keyword)	[PWG5100.3]
1967	center	[PWG5100.3]
1968	left	[PWG5100.3]
1969	none	[PWG5100.3]
1970	right	[PWG5100.3]
1971		
1972	y-image-position (type2 keyword)	[PWG5100.3]
1973	bottom	[PWG5100.3]
1974	center	[PWG5100.3]
1975	none	[PWG5100.3]
1976	top	[PWG5100.3]

Deleted: media-back-coating (type2 keyword | name (MAX)) →[PWG5100.3] §
 glossy→[PWG5100.3] §
 high-gloss→[PWG5100.3] §
 matte→[PWG5100.3] §
 none→[PWG5100.3] §
 satin→[PWG5100.3] §
 semi-gloss→[PWG5100.3] §
 §
 media-front-coating (type2 keyword | name (MAX)) →[PWG5100.3] §
 < any "media-back-coating"
 value >→[PWG5100.3] §
 §
 media-pre-printed (type2 keyword | name (MAX)) →[PWG5100.3] §
 blank→[PWG5100.3] §
 letter-head→[PWG5100.3] §
 pre-printed→[PWG5100.3] §
 §
 media-recycled (type2 keyword | name (MAX)) →[PWG5100.3] §
 none→[PWG5100.3] §
 standard→[PWG5100.3] §
 §

Deleted: page-order-received (type2 keyword) →[PWG5100.3] §
 1-to-n-order →[PWG5100.3] §
 n-to-1-order →[PWG5100.3] §

1977 12. Overview of Changes

1978 12.1 IPP Production Printing Extensions v1.1

1979 The following changes were made to the previous version of this specification [PWG5100.3-
 1980 2001]:

- 1981 • Finishing attributes have been moved to the IPP Finishings v2.1 specification
 1982 [PWG5100.1];
- 1983 • [The "job-account-id", "job-accounting-user-id", "job-sheets-col", and "media-col"](#)
 1984 [attributes have been moved to the IPP Job Extensions v2.0 specification](#)
 1985 [\[PWG5100.7\]; and](#)
- 1986 • References to the original page overrides draft and attributes have been removed
 1987 since that specification was withdrawn.

2017 13. References

2018 13.1 Normative References

- 2019 [BCP14] S. Bradner, "Key words for use in RFCs to Indicate Requirement
2020 Levels", RFC 2119/BCP 14, March 1997,
2021 <https://tools.ietf.org/html/bcp14>
- 2022 [ISO10646] "Information technology -- Universal Coded Character Set (UCS)",
2023 ISO/IEC 10646:2011
- 2024 [PWG5100.1] S. Kennedy, M. Sweet, "IPP Finishings v2.1 (FIN)", PWG 5100.1-
2025 2017, February 2017, [https://ftp.pwg.org/pub/pwg/candidates/cs-
2026 ippfinishings21-20170217-5100.1.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippfinishings21-20170217-5100.1.pdf)
- 2027 [[PWG5100.7](#)] [M. Sweet, "IPP Job Extensions v2.0 \(JOBEXT\)", PWG 5100-7-YYYY,
2028 Month YYYY, https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobext20-
2029 yyyyymmdd-5100.7.pdf](#)
- 2030 [PWG5101.1] M. Sweet, R. Bergman, T. Hastings, "PWG Media Standardized
2031 Names v2.0 (MSN2)", PWG 5101.1-2013, March 2013,
2032 [https://ftp.pwg.org/pub/pwg/candidates/cs-pwgmsn20-20130328-
2033 5101.1.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-pwgmsn20-20130328-5101.1.pdf)
- 2034 [RFC3380] T. Hastings, R. Herriot, C. Kugler, H. Lewis, "Internet Printing Protocol
2035 (IPP): Job and Printer Set Operations", RFC 3380, September 2002,
2036 <https://tools.ietf.org/html/rfc3380>
- 2037 [RFC5198] J. Klensin, M. Padlipsky, "Unicode Format for Network Interchange",
2038 RFC 5198, March 2008, <https://tools.ietf.org/html/rfc5198>
- 2039 [RFC7230] R. Fielding, J. Reschke, "Hypertext Transfer Protocol (HTTP/1.1):
2040 Message Syntax and Routing", RFC 7230, June 2014,
2041 <https://tools.ietf.org/html/rfc7230>
- 2042 [STD63] F. Yergeau, "UTF-8, a transformation format of ISO 10646", RFC
2043 3629/STD 63, November 2003, <https://tools.ietf.org/html/std63>
- 2044 [STD66] T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifier
2045 (URI): Generic Syntax", RFC 3986/STD 66, January 2005,
2046 <https://tools.ietf.org/html/std66>
- 2047 [STD92] M. Sweet, I. McDonald, "Internet Printing Protocol/1.1", STD 92, June
2048 2018, <https://tools.ietf.org/html/std92>
- 2049 [UAX9] Unicode Consortium, "Unicode Bidirectional Algorithm", UAX#9, May
2050 2018, <https://www.unicode.org/reports/tr9>

- 2051 [UAX14] Unicode Consortium, "Unicode Line Breaking Algorithm", UAX#14,
2052 May 2018, <https://www.unicode.org/reports/tr14>
- 2053 [UAX15] M. Davis, M. Duerst, "Unicode Normalization Forms", Unicode
2054 Standard Annex 15, May 2018, <https://www.unicode.org/reports/tr15>
- 2055 [UAX29] Unicode Consortium, "Unicode Text Segmentation", UAX#29, May
2056 2018, <https://www.unicode.org/reports/tr29>
- 2057 [UAX31] Unicode Consortium, "Unicode Identifier and Pattern Syntax",
2058 UAX#31, June 2018, <https://www.unicode.org/reports/tr31>
- 2059 [UNICODE] Unicode Consortium, "Unicode Standard", Version 11.0.0, June 2018,
2060 <https://www.unicode.org/versions/Unicode11.0.0/>
- 2061 [UTS10] Unicode Consortium, "Unicode Collation Algorithm", UTS#10, May
2062 2018, <https://www.unicode.org/reports/tr10>
- 2063 [UTS35] Unicode Consortium, "Unicode Locale Data Markup Language",
2064 UTS#35, March 2018, <https://www.unicode.org/reports/tr35>
- 2065 [UTS39] Unicode Consortium, "Unicode Security Mechanisms", UTS#39, May
2066 2018, <https://www.unicode.org/reports/tr39>

2067 13.2 Informative References

- 2068 [redbook] "PostScript(R) LANGUAGE REFERENCE, third edition", Adobe
2069 Systems Incorporated, February 1999.
- 2070 [PWG5100.3-2001] K. Ocke, T. Hastings, "Internet Printing Protocol (IPP): Production
2071 Printing Attributes - Set 1", PWG 5100.3-2001, February 2001,
2072 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippprodprint10-20010212-
2073 5100.3.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippprodprint10-20010212-5100.3.pdf)
- 2074 [UTR17] Unicode Consortium "Unicode Character Encoding Model", UTR#17,
2075 November 2008, <https://www.unicode.org/reports/tr17>
- 2076 [UTR23] Unicode Consortium "Unicode Character Property Model", UTR#23,
2077 May 2015, <https://www.unicode.org/reports/tr23>
- 2078 [UTR33] Unicode Consortium "Unicode Conformance Model", UTR#33,
2079 November 2008, <https://www.unicode.org/reports/tr33>
- 2080 [UNISECFAQ] Unicode Consortium "Unicode Security FAQ", November 2013,
2081 <https://www.unicode.org/faq/security.html>

2082 **14. Author's Address**

2083 Primary author:

2084 Michael Sweet
2085 Apple Inc.
2086 One Apple Park Way
2087 Cupertino, CA 95014
2088 msweet@apple.com

2089 The author would also like to thank the following individuals for their contributions to this
2090 specification:

2091 Kirk Ocke (Co-author of previous version)
2092 Tom Hastings (Co-author of previous version)

2093 15. Change History

2094 15.1 May 14, 2019

- 2095 • [Updated abstract and introduction](#)
- 2096 • [Version 2.0](#)
- 2097 • [Moved all of the job-account-id, job-accounting-user-id, and job-sheets-col definitions](#)
2098 [to the Job Extensions v2.0 specification](#)
- 2099 • [Moved all of the media-col definitions to the Job Extensions v2.0 specification](#)
- 2100 • [Made page-order-received and friends obsolete](#)
- 2101 • [Expanded discussion of features in section 4](#)
- 2102 • [Updated figure showing roll media as a roll.](#)

2103 15.2 May 1, 2019

- 2104 • Initial changes to the published 5100.3-2001
- 2105 • Dropped all references to the old page overrides spec (which was eventually
2106 abandoned in favor of document overrides)
- 2107 • Dropped all new media values, which are now covered by PWG 5101.1 (MSN2)
- 2108 • Dropped all finishings attributes, which are now covered by PWG 5100.1 (FIN)
- 2109 • Updated (and shortened!) abstract
- 2110 • Section 1: Rewritten and shortened.
- 2111 • Global: Client, Document, Document Data, Input Pages (instead of print-stream
2112 pages), Job, Job Error Sheet, Job Sheet, Printer, End User, and other terminology
2113 properly capitalized
- 2114 • Global: type3 keyword changed to type2 keyword
- 2115 • Section 2: Updated with modern terminology
- 2116 • Section 3: Added rationale, use cases, etc.
- 2117 • Section 4: Expanded to include all of the background information that was inline with
2118 the attribute definitions.

- 2119 • Section 5: Split Job Template and Printer Description attributes
- 2120 • Removed references to "job-warnings-detected" since a) that is defined in PWG
- 2121 5100.7 and b) the final standardized names were different.

Page 17: [1] Deleted	Michael Sweet	5/14/19 1:38:00 PM
Page 18: [2] Deleted	Michael Sweet	5/14/19 4:38:00 PM
Page 24: [3] Deleted	Michael Sweet	5/10/19 10:07:00 AM
Page 34: [4] Deleted	Michael Sweet	5/10/19 10:10:00 AM
Page 38: [5] Deleted	Michael Sweet	5/14/19 5:03:00 PM