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The Printer Working Group

IPP Finishings 2.1 (FIN)

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Abstract: This document defines new "finishings" and "finishings-col" Job Template attribute values to specify additional finishing intent, including the placement of finishings with respect to the corners and edges of portrait and landscape documents.

This document is a PWG Candidate Standard. For a definition of a "PWG Candidate Standard", see: <http://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf>

This document is available electronically at:

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57 technically competent, has multiple, independent and interoperable implementations with
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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

68 About the Internet Printing Protocol Workgroup

69 The Internet Printing Protocol (IPP) workgroup has developed a modern, full-featured
70 network printing protocol, which is now the industry standard. IPP allows a print client to
71 query a printer for its supported capabilities, features, and parameters to allow the selection
72 of an appropriate printer for each print job. IPP also provides Job information prior to, during,
73 and at the end of Job processing.

74 For additional information regarding IPP visit:

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76 Implementers of this specification are encouraged to join the IPP mailing list in order to
77 participate in any discussions of the specification. Suggested additions, changes, or
78 clarification to this specification, should be sent to the IPP mailing list for consideration.
79

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242 1. Introduction

243 The Internet Printing Protocol/1.1: Model and Semantics [RFC2911] and Internet Printing
244 Protocol (IPP): Production Printing Attributes - Set 1 [PWG5100.3] specifications define the
245 basic attributes and values needed to support advanced finishing processes on printed
246 output. This specification, which was originally titled 'IPP: "finishings" attribute values
247 extension', defines additional values and member attributes needed to support the full
248 breadth of finishing options available in modern Printers. It also revisits the original
249 definitions of the "finishings" and "finishings-col" attributes in order to provide a holistic view
250 of the various finishing processes that some Printers support.

251 The "finishings" Job Template attribute [RFC2911] allows Clients to specify simple intent -
252 staple, fold, trim, etc. This specification extends the original values to include positional
253 characteristics, e.g., staple top-left, as well as common variations, e.g., Z fold.

254 The "finishings-col" Job Template attribute [PWG5100.3] allows Clients to specify detailed
255 intent - staple at the following coordinates, fold at the following positions and directions, trim
256 at the following positions and cut types, etc. This specification extends the original "finishing-
257 template" member attribute to include standard names and adds member attributes for each
258 type of finishing.

259 The coordinate system scheme used in this specification agrees with the Finisher MIB
260 [RFC3806], which in turn follows the ISO DPA [ISO10175] approach of using a coordinate
261 system as if the document were portrait. The approach for coordinate system being relative
262 to the intended reading direction depends on the device being able to understand the
263 orientation embedded in the PDL, which is too problematic for many PDLs. The approach
264 for the coordinate system of being relative to the media feed direction is too dependent on
265 the way the device is configured, i.e., pulling short edge first vs. long edge first, and can vary
266 between different output bins in the same device.

267 **2. Terminology**

268 **2.1 Conformance Terminology**

269 Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD,
270 SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as
271 defined in Key words for use in RFCs to Indicate Requirement Levels [RFC2119]. The term
272 CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that
273 applies to a particular capability or feature.

274 **2.2 Protocol Role Terminology**

275 This document defines the following protocol roles in order to specify unambiguous
276 conformance requirements:

277 *Client*: Initiator of outgoing IPP session requests and sender of outgoing IPP operation
278 requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] User Agent).

279 *Printer*: Listener for incoming IPP session requests and receiver of incoming IPP operation
280 requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] Server) that represents one
281 or more Physical Devices or a Logical Device.

282 **2.3 Printing Terminology**

283 Normative definitions and semantics of printing terms are imported from the Printer MIB v2
284 [RFC3805], Printer Finishings MIB [RFC3806], Internet Printing Protocol/1.1: Model and
285 Semantics [RFC2911], and IPP: Job Progress Attributes [RFC3381].

286 *Document*: An object created and managed by a Printer that contains the description,
287 processing, and status information. A Document object can have attached data and is bound
288 to a single Job.

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

291 *Finishing Location*: The distance along the Finishing Reference Edge as measured from the
292 bottom or left of the media sheet.

293 *Finishing Offset*: The distance from the Finishing Reference Edge.

294 *Finishing Reference Edge*: The edge or side of the media sheets that is used for finishing
295 processes. For example, when staples are placed along the left side of a set of sheets, the
296 Finishing Reference Edge is 'left'.

297 *Set*: A logical boundary between the delivered media sheets of a printed job. For example,
298 in the case of a ten-page single document with collated pages and a request for 50 copies,

299 each of the 50 printed copies of the document constitutes a "set". If the pages were
300 uncollated, then 50 copies of each of the individual pages within the document would
301 represent each "set". [RFC3381]

302 **2.4 Acronyms and Organizations**

303 *CIP4*: The International Cooperation for the Integration of Processes in Prepress, Press, and
304 Postpress Organization, <http://www.cip4.org/>

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

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

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

308 *PWG*: IEEE ISTO Printer Working Group, <http://www.pwg.org/>

309 **3. Requirements**

310 **3.1 Rationale for IPP Finishings**

311 Existing specifications define the following:

- 312 1. The Internet Printing Protocol/1.1: Model and Semantics [RFC2911] defines the
313 "finishings" Job Template attribute and basic values.
- 314 2. The Internet Printing Protocol (IPP): Production Printing Attributes - Set 1
315 [PWG5100.3] defines the "finishings-col" Job Template attribute for stapling.
- 316 3. IPP Finishings 2.0 [PWG5100.1-2014] defined additional Printer Description
317 attributes that allow a Client to determine the type and extent of finishing options
318 supported by the printer, allowing the User to select choices with higher fidelity
319 and allowing the Client to accurately present a preview to the User of the
320 selected finishing processes. It also defines Job Template attributes and values
321 that allow the Client to express finishing intent clearly.

322 In order to allow Clients to use and clearly specify finishing intent, this IPP Finishings 2.1
323 specification:

- 324 1. Defines Job Template attributes and values needed to clearly express finishing
325 intent; and
- 326 2. Defines Printer Description attributes and values needed to allow a Client to
327 determine the type and extent of finishing options supported by the Printer as well
328 as preview the results of finishing processes for the User.

329 **3.2 Use Cases**

330 The following use cases are derived in part from the list of finishing processes defined in
331 section 2.2 of [RFC3806].

332 **3.2.1 Band**

333 Jane needs to ship ten copies of a fifty-page report. Using software on her Client device,
334 she specifies a finishing intent that will band wrap each copy and submits the print request.

335 **3.2.2 Bind**

336 Jane is self-publishing a book on lawn ornaments. Using software on her Client device, she
337 specifies a finishing intent that will bind the long edge of each book and submits the print
338 request.

339 3.2.3 Booklet Maker

340 Jane is producing an orientation guide for new students. Using software on her Client device,
341 she specifies a finishing intent that will impose the pages from her Document onto folded
342 sheets and submits the print request.

343 3.2.4 Coat

344 Jane needs to protect a digital photographic print from sunlight. Using software on her Client
345 device, she specifies a finishing intent that coats the media sheet with an archival UV
346 protectant and submits the print request.

347 3.2.5 Cover

348 Jane needs to print an investor report for an upcoming meeting with the preprinted company
349 report cover. Using software on her Client device, she specifies a finishing intent that will
350 add the report cover to each Set and submits the print request.

351 3.2.6 Edge Stitch

352 Jane wants to print a multi-page checklist. Using software on her Client device, she specifies
353 a finishing intent that will stitch the tops of the pages in the output and submits the print
354 request.

355 3.2.7 Fold

356 Jane has a set of attendee cards she wants to print. Using software on her Client device,
357 she specifies a finishing intent that will fold the cardstock in half after printing and submits
358 the print request.

359 3.2.8 Jog Offset

360 Jane is printing several copies of a report and would like each copy separated. Using
361 software on her Client device, she specifies a finishing intent that will offset each Set in the
362 output bin and submits the print request.

363 3.2.9 Laminate

364 Jane is printing operating procedure checklists that will be used many times. Using software
365 on her Client device, she specifies a finishing intent that will laminate each checklist and
366 submits the print request.

367 3.2.10 Punch

368 Jane is printing invoices that will be placed in a 3-ring binder. Using software on her Client
369 device, she specifies a finishing intent that will punch three holes along the left side of each
370 sheet and submits the print request.

371 3.2.11 Saddle Stitch

372 Jane is printing a short informational booklet. Using software on her Client device, she
373 specifies a finishing intent that will place two staples along the midline of each Set and
374 submits the print request.

375 3.2.12 Staple

376 Jane is printing an accounts-receivable report. Using software on her Client device, she
377 specifies a finishing intent that will place a single staple at the top left corner of each Set and
378 submits the print request.

379 3.2.13 Trim

380 Jane is printing a large photograph on her roll-fed printer. Using software on her Client
381 device, she specifies a finishing intent that will cut the roll at the end of the printed
382 photograph and submits the print request.

383 3.2.14 Wrap

384 Jane is printing documentation for a software product. Using software on her Client device,
385 she specifies a finishing intent that will shrink-wrap each Set and submits the print request.

386 3.2.15 Multiple Finishing Options

387 Jane is printing an eight-page brochure booklet. Using software on her Client device, she
388 specifies finishing intent to first impose the pages from her Document onto sheets, then
389 staple the sheets along the midline, fold the sheets along the midline, and finally shrink-wrap
390 each booklet. She then submits the print request.

391 3.2.16 Finishing of Multiple Copies

392 Jane is printing a seven-page report to a Printer that only supports a raster format. Using
393 software on her Client device, she specifies a copy count of 10 and finishing intent to staple
394 each Set. She then submits the print request. Her Client device generates and submits 70
395 pages of raster data to the Printer.

396 3.2.17 Finishing Supplies

397 Jane is printing an accounts-receivable report. Using software on her Client device, she
398 specifies a finishing intent that will place a single staple at the top left corner of each Set.
399 She is notified that the number of staples in the Printer is low.

400 **3.3 Exceptions**

401 **3.3.1 Unsupported Media**

402 After submitting the orientation guide for printing (section 3.2.3), the Printer returns an error
403 indicating that the requested media cannot be used with the booklet maker.

404 **3.3.2 Unsupported Combinations of Finishing Options**

405 After submitting an eight page brochure booklet for printing (section 3.2.15), the Printer
406 returns an error indicating that the requested finishing intent cannot be combined as
407 requested.

408 **3.3.3 Finishing with Finisher Fidelity Restrictions**

409 Jane is printing an eight-page brochure booklet. Using software on her Client device, she
410 specifies finishing intent to impose the pages from her Document onto sheets, fold and staple
411 the sheets along the midline, and shrink-wrap each produced copy of the booklet. The Client
412 looks up finisher restrictions for the Printer's media and orientation, and presents an accurate
413 print preview. Jane submits the print request, and the output accurately matches the preview
414 and her expectations.

415 **3.4 Out of Scope**

416 The following are out of scope for this specification:

- 417 1. Explicitly specifying the order of finishing processes, i.e., processing instructions
418 instead of intent;
- 419 2. Support for folds not parallel to a Finishing Reference Edge;
- 420 3. Support for cuts not parallel to a Finishing Reference Edge; and
- 421 4. Support for cuts that do not extend the full width or length of the media

422 **3.5 Design Requirements**

423 The design requirements for this specification are:

- 424 1. Follow the naming conventions defined in the IPP/1.1 Model and Semantics
425 [RFC2911], including keyword value (lowercase) and hyphenation requirements;
- 426 2. Optimize compatibility with existing IETF and PWG IPP operations when making
427 design decisions in defining new operations and attributes;
- 428 3. Define values for the "finishings" Job Template attribute to support the full range
429 of finishing options supported by modern Printers;
- 430 4. Define Printer Description and member attributes for the "finishings-col" Job
431 Template attribute to support the full range of finishing options supported by
432 modern Printers;

- 433 5. Update the definition of the "finishing-template" member attribute for all of the
434 standard finishing options supported by modern Printers; and
435 6. Register all attributes and values with IANA and the PWG.
436

437 **4. Overview of Finishing**

438 The finishing processes supported by Printers are identified in the Printer Finishing MIB
439 [RFC3806]. Loosely stated, IPP finishing is any post-processing of the hardcopy output
440 performed by any of the Subunits of the Printer. Common finishing processes include baling,
441 binding, booklet making, coating, covering, folding, jogging, laminating, punching, stapling,
442 stitching, trimming, and wrapping. As in [RFC3806], all IPP finishing processes are specified
443 with respect to portrait media orientation. The "multiple-document-handling" Job Template
444 attribute [RFC2911] defines how multiple copies and Documents are combined into sets for
445 finishing.

446 A key concept with IPP finishing processes is that the "finishings" and "finishings-col" Job
447 Template attributes define the Client's intent and not the processing order of finishing
448 processes. That is, a Client can specify the intent that a Document be covered and bound
449 or bound and covered and get the intended output – the Printer is responsible for determining
450 the correct processing order for a sequence of finishing values.

451 The original finishing support in IPP/1.1: Model and Semantics [RFC2911] only allows a
452 Printer to list and a Client to specify simple finishing intent using the "finishings" attribute -
453 staple, fold, punch, and so forth. The IPP Production Printing Extensions, Set 1
454 [PWG5100.3] provided the first definition of the "finishings-col" Job Template attribute to
455 provide explicit intent for the number and location of staples. This specification expands the
456 "finishings-col" attribute so that it is possible to specify explicit intent for all finishing
457 processes. In addition, the "finishings-col-database" and "finishings-col-ready" Printer
458 Description attributes allow the Client to discover which "finishings-col" values are supported
459 and to provide an accurate preview of those values.

460 The following subsections describe each of the finishing processes supported by this
461 specification.

462 **4.1 Bale (or Band) and Wrap**

463 Bale finishers bundle hardcopy output with string or straps. Wrap finishings completely
464 enclose the output, such as with a shrink-wrap material.

465 **4.2 Bind**

466 Bind finishers join hardcopy output along one edge. Binding can be performed by gluing the
467 edge, joining using plastic or wire loops, padded, or taped.

468 **4.3 Booklet Making**

469 Booklet making combines a half fold with signature imposition, placing and ordering input
470 pages so that the resulting output can be read as a booklet. Booklet making is often
471 combined with a saddle stitch to hold the hardcopy output together.

472 **4.4 Coat and Laminate**

473 Coating finishers apply a liquid or powdered material to the surface of the hardcopy output,
474 e.g., a clear UV light and weather resistant paint over a sign, while laminator finishers
475 combine a solid material with the hardcopy output using heat and/or adhesives.

476 **4.5 Cover**

477 Cover finishers place cover media over the hardcopy output, either as two separate sheets
478 or a single sheet that covers the binding edge.

479 **4.6 Fold**

480 A fold finisher places folds in hardcopy output at certain positions and directions. Figure 1
481 shows common fold styles that are supported by this specification.

482 **4.7 Jog**

483 A jog finisher offsets the stack of sheets for each Set by a fixed distance so that each Set
484 can be retrieved separately.

485 **4.8 Punch**

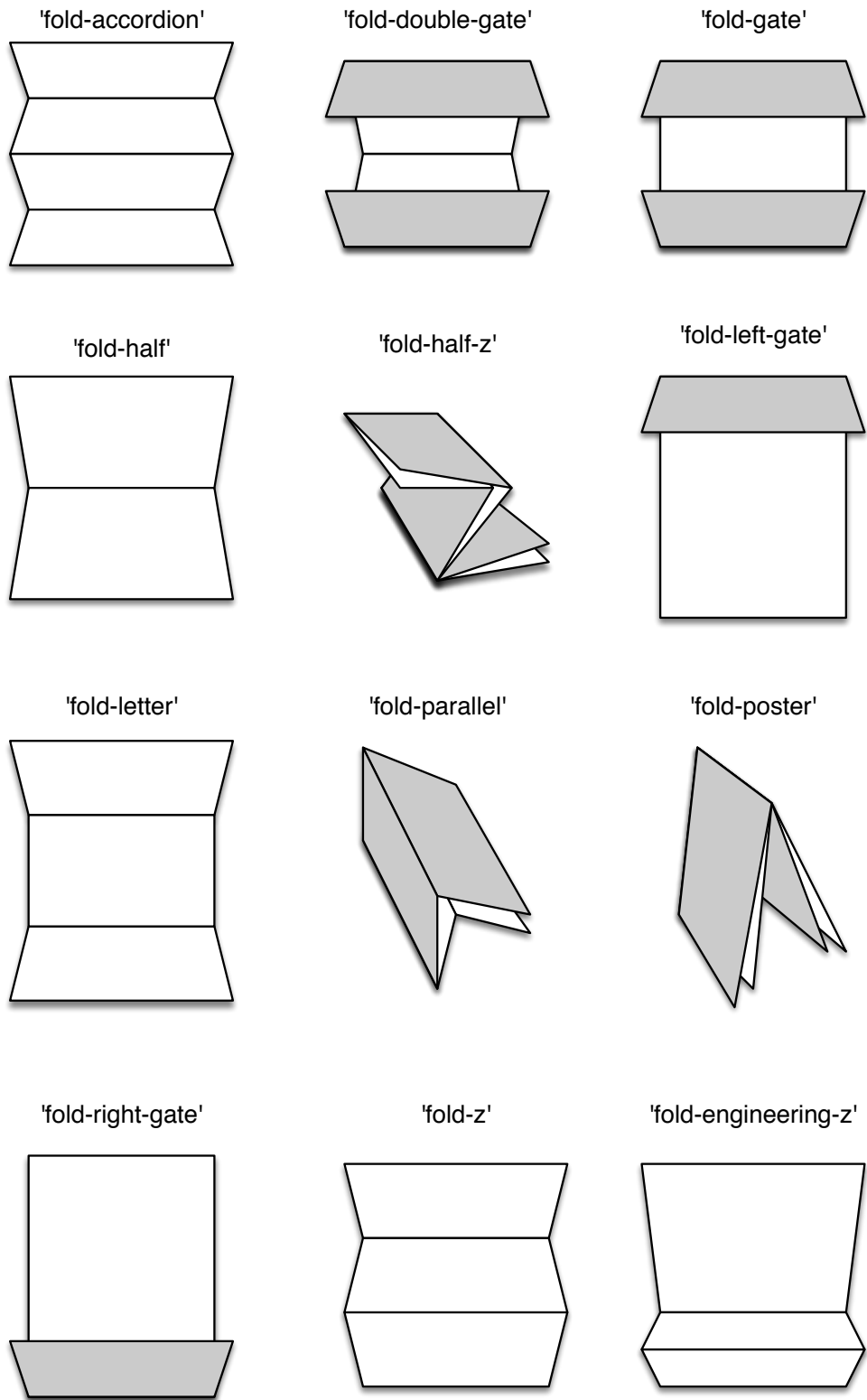
486 A punch finisher creates holes in the hardcopy Set by drilling or punching with a die. The
487 number and location of holes varies and is not well standardized [PUNCH].

488 **4.9 Staple, Edge Stitch, and Saddle Stitch**

489 Staple and stitch finishers bind Sets of hardcopy output using 'U' shaped pieces of metal
490 wire ("staples"). Staples are placed in a corner, along an edge, or along the middle fold (for
491 saddle stitching). IPP uses the keyword 'edge-stitch' when multiple staples are used along
492 an edge and 'saddle-stitch' when multiple staples are placed along the middle fold.

493 **4.10 Trim (Cut, Perforate, or Score)**

494 Trim finishers cut, perforate, or score hardcopy output along a straight line - most only
495 support trimming along lines parallel or perpendicular to the feed direction.



496

497

Figure 1 - Standard Folds

498 **5. Job Template Attributes**

499 **5.1 finishings (1setOf type2 enum)**

500 The "finishings" Job Template attribute [RFC2911] identifies the finishing processes that the
501 Printer uses for each copy of each printed Document in the Job. Printers that support any of
502 the finishing processes listed in section 4 of this specification MUST support this attribute.

503 The order of values supplied in the "finishings" attribute is not significant. Printers MUST
504 NOT require Clients to supply values in a particular order. If the Client supplies a value of
505 'none' along with any other combination of values, it is the same as if only that other
506 combination of values had been supplied, i.e., the 'none' value has no effect.

507 The positional values are specified with respect to the Document as if the Document were a
508 portrait Document. If the Document is actually a landscape or a reverse-landscape
509 Document, the Client supplies the appropriate transformed value. For example, to position
510 a staple in the upper left hand corner of a landscape Document when held for reading, the
511 Client supplies the 'staple-bottom-left' value since landscape is defined as an anti-clockwise
512 rotation from portrait. On the other hand, to position a staple in the upper left hand corner of
513 a reverse-landscape Document when held for reading, the Client supplies the 'staple-top-
514 right' value since reverse-landscape is defined as a clockwise rotation from portrait. Figure
515 2 shows how content is placed on sheets for each "orientation-requested" value where "feed-
516 orientation" is 'short-edge-first'. Figure 3 shows how content is placed on sheets for each
517 "orientation-requested" value where "feed-orientation" is 'long-edge-first'. If the Printer
518 supports "media-col-ready" and / or "media-col-database", the Client could discover the
519 media feed orientation and direction by checking the values of the "media-source-feed-
520 orientation" and "media-source-feed-direction" sub-member attributes of "media-col".

521 Note: The effect of this attribute on Jobs with multiple copies and Documents is controlled
522 by the "multiple-document-handling" Job Template attribute (section 4.2.4 [RFC2911]) and
523 the relationship of this attribute and the other attributes that control Document processing is
524 described in section 15.3 [RFC2911].

Lorem ipsum
dolor sit amet,
consectetur
adipiscing elit.
Pellentesque vitae
orci ut quam
sagittis porttitor.
Sed vel dapibus
sem, ac ultricies

portrait

Lorem ipsum dolor sit
amet, consectetur
adipiscing elit.
Pellentesque vitae orci
ut quam sagittis
porttitor. Sed vel
dapibus sem, ac

landscape

>Lorem ipsum
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adipiscing elit.
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sagittis porttitor.
Sed vel dapibus
sem, ac ultricies

reverse-portrait

>Lorem ipsum dolor sit
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adipiscing elit.
Pellentesque vitae orci
ut quam sagittis
porttitor. Sed vel
dapibus sem, ac

reverse-landscape

Leading Edge of Sheet

525

526

Figure 2 - Effect of "orientation-requested" on Output with Short Edge First Feed

Lorem ipsum
dolor sit amet,
consectetur
adipiscing elit.
Pellentesque vitae
orci ut quam
sagittis porttitor.
Sed vel dapibus
sem, ac ultricies

portrait

Lorem ipsum dolor sit
amet, consectetur
adipiscing elit.
Pellentesque vitae orci
ut quam sagittis
porttitor. Sed vel
dapibus sem. ac

landscape

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Sed vel dapibus
sagittis porttitor.
orci ut quam
Pellentesque vitae
adipiscing elit.
consectetur
dolor sit amet,
Lorem ipsum

reverse-portrait

>Lorem ipsum dolor sit
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adipiscing elit.
Pellentesque vitae orci
ut quam sagittis
porttitor. Sed vel
dapibus sem. ac

reverse-landscape

Leading Edge of Sheet

527

528

Figure 3 - Effect of "orientation-requested" on Output with Long Edge First Feed

529 5.1.1 RFC 2911 “finishings” Values

530 The Internet Printing Protocol/1.1: Model and Semantics [RFC2911] defines the following
531 standard enum values:

532 ‘none’ (3): Perform no finishing

533 ‘staple’ (4): Bind the Set(s) with one or more staples. The exact number,
534 placement, and orientation of the staples are implementation and/or site-defined.

535 ‘punch’ (5): This value indicates that holes are required in the finished hardcopy
536 output. The exact number and placement of the holes are implementation and/or
537 site-defined. The punch specification MAY be satisfied (in a site- and
538 implementation-specific manner) either by drilling/punching, or by substituting pre-
539 drilled media.

540 ‘cover’ (6): This value is specified when it is desired to select a non-printed (or pre-
541 printed) cover for each Set. This does not supplant the specification of a printed
542 cover (on cover stock medium) by the Document itself.

543 ‘bind’ (7): This value indicates that a binding is to be applied to the Set; the type
544 and placement of the binding are implementation and/or site-defined.

545 ‘saddle-stitch’ (8): Bind the Set(s) with two or more staples (wire stitches) along the
546 middle fold. The exact number and placement of the staples and the middle fold are
547 implementation and/or site-defined.

548 ‘edge-stitch’ (9): Bind the Set(s) with two or more staples (wire stitches) along one
549 edge. The exact number and placement of the staples are implementation and/or
550 site-defined.

551 ‘staple-top-left’ (20): Bind the Set(s) with one or more staples in the top left corner.

552 ‘staple-bottom-left’ (21): Bind the Set(s) with one or more staples in the bottom left
553 corner.

554 ‘staple-top-right’ (22): Bind the Set(s) with one or more staples in the top right
555 corner.

556 ‘staple-bottom-right’ (23): Bind the Set(s) with one or more staples in the bottom
557 right corner.

558 ‘edge-stitch-left’ (24): Bind the Set(s) with two or more staples (wire stitches) along
559 the left edge. The exact number and placement of the staples are implementation
560 and/or site-defined.

- 561 'edge-stitch-top' (25): Bind the Set(s) with two or more staples (wire stitches) along
562 the top edge. The exact number and placement of the staples are implementation
563 and/or site-defined.
- 564 'edge-stitch-right' (26): Bind the Set(s) with two or more staples (wire stitches)
565 along the right edge. The exact number and placement of the staples are
566 implementation and/or site-defined.
- 567 'edge-stitch-bottom' (27): Bind the Set(s) with two or more staples (wire stitches)
568 along the bottom edge. The exact number and placement of the staples are
569 implementation and/or site-defined.
- 570 'staple-dual-left' (28): Bind the Set(s) with two staples (wire stitches) along the left
571 edge assuming a portrait document (see section 6).
- 572 'staple-dual-top' (29): Bind the Set(s) with two staples (wire stitches) along the top
573 edge assuming a portrait document (see section 6).
- 574 'staple-dual-right' (30): Bind the Set(s) with two staples (wire stitches) along the
575 right edge assuming a portrait document (see section 6).
- 576 'staple-dual-bottom' (31): Bind the Set(s) with two staples (wire stitches) along the
577 bottom edge assuming a portrait document (see section 6).

578 **5.1.2 PWG 5100.1-2001 “finishings” Values**

579 The IPP “finishings” attribute values extension [PWG5100.1-2001] defines the following
580 “finishings” enum values:

- 581 'fold' (10): Fold the hardcopy output. The exact number and orientations of the
582 folds is implementation and/or site-defined.
- 583 'trim' (11): Trim the hardcopy output on one or more edges. The exact number of
584 edges and the amount to be trimmed is implementation and/or site-defined.
- 585 'bale' (12): Bale the Set(s). The type of baling is implementation and/or site-
586 defined.
- 587 'booklet-maker' (13): Deliver the Set(s) to the signature booklet maker. This value
588 is a short cut for specifying a Job that is to be folded, trimmed and then saddle-
589 stitched.
- 590 'jog-offset' (14): Shift each Set from the previous one by a small amount which is
591 device dependent. This value has no effect on the “job-sheet”. This value
592 SHOULD NOT have an effect if each Set of the Job consists of one sheet.
- 593 'bind-left' (50): Bind the Set(s) along the left edge; the type of the binding is
594 implementation and/or site-defined.

595 'bind-top' (51): Bind the Set(s) along the top edge; the type of the binding is
596 implementation and/or site-defined.

597 'bind-right' (52): Bind the Set(s) along the right edge; the type of the binding
598 implementation and/or is site-defined.

599 'bind-bottom' (53): Bind the Set(s) along the bottom edge; the type of the binding is
600 implementation and/or site-defined.

601 **5.1.3 PWG 5100.1-2014 “finishings” Values**

602 The IPP Finishings 2.0 specification [PWG5100.1-2014] defines the following “finishings”
603 enum values:

604 'coat' (15): Apply a protective liquid or powdered coating to each sheet in an
605 implementation and/or site-defined manner.

606 'lamine' (16): Apply a protective (solid) material to each sheet in an
607 implementation and/or site-defined manner.

608 'staple-triple-left' (32): Bind the Set(s) with three staples (wire stitches) along the left
609 edge assuming a portrait document (see section 6).

610 'staple-triple-top' (33): Bind the Set(s) with three staples (wire stitches) along the top
611 edge assuming a portrait document (see section 6).

612 'staple-triple-right' (34): Bind the Set(s) with three staples (wire stitches) along the
613 right edge assuming a portrait document (see section 6).

614 'staple-triple-bottom' (35): Bind the Set(s) with three staples (wire stitches) along the
615 top edge assuming a portrait document (see section 6).

616 'punch-top-left' (70): Punch a single hole in the top left of the hardcopy output.

617 'punch-bottom-left' (71): Punch a single hole in the bottom left of the hardcopy
618 output.

619 'punch-top-right' (72): Punch a single hole in the top right of the hardcopy output.

620 'punch-bottom-right' (73): Punch a single hole in the bottom right of the hardcopy
621 output.

622 'punch-dual-left' (74): Punch two holes on the left side of the hardcopy output.

623 'punch-dual-top' (75): Punch two holes at the top of the hardcopy output.

624 'punch-dual-right' (76): Punch two holes on the right side of the hardcopy output.

- 625 'punch-dual-bottom' (77): Punch two holes at the bottom of the hardcopy output.
- 626 'punch-triple-left' (78): Punch three holes on the left side of the hardcopy output.
- 627 'punch-triple-top' (79): Punch three holes at the top of the hardcopy output.
- 628 'punch-triple-right' (80): Punch three holes on the right side of the hardcopy output.
- 629 'punch-triple-bottom' (81): Punch three holes at the bottom of the hardcopy output.
- 630 'punch-quad-left' (82): Punch four holes on the left side of the hardcopy output.
- 631 'punch-quad-top' (83): Punch four holes at the top of the hardcopy output.
- 632 'punch-quad-right' (84): Punch four holes on the right side of the hardcopy output.
- 633 'punch-quad-bottom' (85): Punch four holes at the bottom of the hardcopy output.
- 634 'fold-accordion' (90): Accordion-fold the hardcopy output vertically into four sections.
- 635 'fold-double-gate' (91): Fold the top and bottom quarters of the hardcopy output
636 towards the midline, then fold in half vertically.
- 637 'fold-gate' (92): Fold the top and bottom quarters of the hardcopy output towards the
638 midline.
- 639 'fold-half' (93): Fold the hardcopy output in half vertically.
- 640 'fold-half-z' (94): Fold the hardcopy output in half horizontally, then Z-fold the paper
641 vertically into three sections.
- 642 'fold-left-gate' (95): Fold the top quarter of the hardcopy output towards the midline.
- 643 'fold-letter' (96): Fold the hardcopy output into three sections vertically; sometimes
644 also known as a C fold.
- 645 'fold-parallel' (97): Fold the hardcopy output in half vertically two times, yielding four
646 sections.
- 647 'fold-poster' (98): Fold the hardcopy output in half horizontally and vertically;
648 sometimes also called a cross fold.
- 649 'fold-right-gate' (99): Fold the bottom quarter of the hardcopy output towards the
650 midline.
- 651 'fold-z' (100): Fold the hardcopy output vertically into three sections, forming a Z.

652 5.1.4 PWG 5100.1-2017 “finishings” Values

653 This specification defines the following “finishings” enum values:

654 'fold-engineering-z' (101): Fold the hardcopy output vertically into three sections,
655 forming a Z but leaving room for binding, punching, or stapling along the top edge

656 'punch-multiple-left' (86): Drill or punch more than four holes along the reference
657 edge. For 1-4 holes, the individual explicit value ('punch-top-left', 'punch-dual-left',
658 'punch-triple-left' and 'punch-quad-left') SHOULD be used instead. The number and
659 location of holes can be advertised by the Printer in the "finishings-col-database"
660 and "finishings-col-ready" Printer Description attributes in the "punching" member
661 attribute.

662 'punch-multiple-top' (87): Drill or punch more than four holes along the reference
663 edge. For 1-4 holes, the individual explicit value ('punch-top-top', 'punch-dual-top',
664 'punch-triple-top' and 'punch-quad-top') SHOULD be used instead. The number and
665 location of holes can be advertised by the Printer in the "finishings-col-database"
666 and "finishings-col-ready" Printer Description attributes in the "punching" member
667 attribute.

668 'punch-multiple-right' (88): Drill or punch more than four holes along the reference
669 edge. For 1-4 holes, the individual explicit value ('punch-top-right', 'punch-dual-
670 right', 'punch-triple-right' and 'punch-quad-right') SHOULD be used instead. The
671 number and location of holes can be advertised by the Printer in the "finishings-col-
672 database" and "finishings-col-ready" Printer Description attributes in the "punching"
673 member attribute.

674 'punch-multiple-bottom' (89): Drill or punch more than four holes along the reference
675 edge. For 1-4 holes, the individual explicit value ('punch-top-bottom', 'punch-dual-
676 bottom', 'punch-triple-bottom' and 'punch-quad-bottom') SHOULD be used instead.
677 The number and location of holes can be advertised by the Printer in the "finishings-
678 col-database" and "finishings-col-ready" Printer Description attributes in the
679 "punching" member attribute.

680 5.1.5 PWG 5100.13 “finishings” Values

681 The IPP Job and Printer Extensions - Set 3 (JPS3) [PWG5100.13] defines the following
682 standard enum values:

683 'trim-after-pages' (60): Trim output after each page.

684 'trim-after-documents' (61): Trim output after each Document.

685 'trim-after-copies' (62): Trim output after each Set.

686 'trim-after-job' (63): Trim output after Job.

687 **5.2 finishings-col (no-value | 1setOf collection)**

688 The "finishings-col" Job Template attribute (originally defined in section 3.2 of [PWG5100.3])
 689 augments the "finishings" Job Template attribute (section 5.1) and allows the Client to
 690 specify detailed finishing instructions that cannot be specified using the simple enumerated
 691 values of the "finishings" attribute. Printers that support any of the finishing processes listed
 692 in section 4 SHOULD support this attribute and MUST support the "finishings" attribute.

693 Clients MUST NOT specify both the "finishings" and "finishings-col" attributes in a Job
 694 Creation request. Printers MUST reject Job Creation requests containing both the
 695 "finishings" and "finishings-col" attributes with the 'client-error-conflicting-attributes' status
 696 code.

697 The "finishings-col" member attributes are listed in Table 1. The order of values supplied in
 698 the "finishings-col" attribute is not significant. Supported values are provided in the "xxx-
 699 supported" Printer Description attributes defined in section 6. Printers MUST NOT require
 700 Clients to supply values in a particular order. If the Client does not want any finishings
 701 applied it sends the 'no-value' out-of-band value.

702 The "xxx-reference-edge" member attributes are single valued, e.g., top-left is not allowed.
 703 The standard keyword values are:

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

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

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

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

708 **Table 1 - "finishings-col" Member Attributes**

Member Attribute	Client Support	Printer Support
finishing-template (type2 keyword name(MAX))	MUST	MUST
baling (collection)	MAY	MUST (note 1)
binding (collection)	MAY	MUST (note 1)
coating (collection)	MAY	MUST (note 1)
covering (collection)	MAY	MUST (note 1)
folding (1setOf collection)	MAY	MUST (note 1)
imposition-template (type2 keyword name(MAX))	MAY	MAY (note 2)
laminating (collection)	MAY	MUST (note 1)
media-sheets-supported (rangeOfInteger(1:MAX))	MAY	MAY (note 2)
media-size (collection)	MAY	MAY (note 2)
media-size-name (type2 keyword)	MAY	MAY (note 2)
punching (collection)	MAY	MUST (note 1)
stitching (collection)	MAY	MUST (note 1)
trimming (1setOf collection)	MAY	MUST (note 1)

709 Note 1: MUST be supported when the corresponding finishing option is supported.

710 Note 2: Only returned in the "finishings-col-database" and "finishings-col-ready"
711 attributes.

712 **5.2.1 finishing-template (type2 keyword | name(MAX))**

713 The REQUIRED "finishing-template" member attribute (originally defined in section 3.2.1 of
714 [PWG5100.3]) specifies the particular finishing process using either one of the standard
715 IANA-registered "finishing-template" keywords (many of which have matching "finishings"
716 enum equivalents) or an implementation or site defined name. Specifying only the "finishing-
717 template" member attribute with no other member attributes results in the default values for
718 those member attributes.

719 Keywords can be extended by appending a qualifying label to the existing keyword,
720 separated by an underscore. For example, 'punch-quad-left_trio-binder', where 'punch-
721 quad-left' is the IANA registered type2 keyword, and 'trio-binder' is the qualifying label. This
722 allows a more specific localized user visible string to be presented (retrieved from the string
723 catalog at the URI from the "printer-strings-uri" Printer Description attribute. These qualifying
724 labels also allows variants' specific values for locations or offsets to be characterized
725 precisely, while limiting the need to register a number of new keywords for obscure and/or
726 locale-specific variations.

727 In addition to the registered keywords corresponding to the registered "finishings" enum
728 value labels, this specification also defines keywords for each JDF @FoldCatalog [JDF1.5]
729 value of the form 'jdf-fN-N'. For example, the JDF @FoldCatalog value 'F8-6' (a triple fold
730 instruction similar to 'fold-parallel') would be specified using a "finishing-template" value of
731 'jdf-f8-6'.

732 Vendor extensions, as expressed using the vendor-unique enum values for the "finishings"
733 Job Template attribute, SHOULD use unique keyword values. Vendor unique keywords
734 SHOULD begin with a reverse-DNS identifier prefix, for example a vendor whose domain is
735 "example.com" uses keyword values starting with "com.example-".

736 Localized strings for "finishing-template" values unique to the Printer SHOULD be made
737 available by the Printer using the language-specific strings file at the URI referenced by the
738 "printer-strings-uri" Printer Description attribute [PWG5100.13].

739 **5.2.2 baling (collection)**

740 The "baling" member attribute specifies which baling to apply to the hardcopy output.
741 Printers with a baling finisher MUST support this member attribute and all "baling-xxx"
742 member attributes if they support the "finishings-col" attribute.

743 **5.2.2.1 baling-type (type2 keyword | name(MAX))**

744 The "baling-type" member attribute specifies the type of baling to apply. The following values
745 are defined by this specification:

746 'band': each Set is baled with a paper or plastic band.

747 'shrink-wrap': each Set is shrink-wrapped in plastic.

748 'wrap': each Set is wrapped in paper.

749 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

750 **5.2.2.2 baling-when (type2 keyword)**

751 The "baling-when" member attribute specified when baling is performed. The default value
752 can be derived from the "finishing-template" value or, if a default value cannot be determined
753 from that value, using an implementation or site defined value. The following values are
754 defined by this specification:

755 'after-sets': Baling occurs after each Set (the typical default).

756 'after-job': Baling occurs only after the entire Job is printed.

757 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

758 **5.2.3 binding (collection)**

759 The "binding" member attribute specifies the location and type of binding to apply to the
760 hardcopy output. Printers with a binding finisher MUST support this member attribute and
761 all "binding-xxx" member attributes if they support the "finishings-col" attribute.

762 **5.2.3.1 binding-reference-edge (type1 keyword)**

763 The "binding-reference-edge" member attribute specifies which edge ('bottom', 'left', 'right',
764 or 'top') is bound. If not specified, the default value is either derived from the "finishing-
765 template" keyword value ('bind-bottom', 'bind-left', 'bind-right', 'bind-top') or, if no edge is
766 specified, is an implementation or site defined value.

767 **5.2.3.2 binding-type (type2 keyword | name(MAX))**

768 The "binding-type" member attribute specifies the type of binding to apply. If not specified,
769 an implementation or site defined value is used. The following keyword values are defined
770 by this specification:

771 'adhesive': sheets are bound using glue or adhesive.

- 772 'comb': sheets are bound by placing small rectangular holes along the binding edge
773 and using a tube-shaped plastic binding strip with comb like fingers that fit through
774 the holes.
- 775 'flat': sheets are bound so that they can lay flat when the hardcopy output is opened.
776 The specific method of producing such a binding is implementation defined.
- 777 'padding': sheets are bound by applying a non-penetrating adhesive to the edge of
778 the stack of sheets so that the sheets can be easily peeled off one at a time.
- 779 'perfect': sheets are bound by roughing the binding edge and applying an adhesive.
- 780 'spiral': sheets are bound by placing small round holes along the binding edge and
781 winding plastic or metal wire through the holes in a spiral pattern.
- 782 'tape': sheets are bound by placing tape along the binding edge, overlapping the top
783 and bottom sheets of the stack.
- 784 'velo': sheets are bound by placing small holes along the binding edge and joining
785 the sheets using plastic strips with pins that extend through those holes.

786 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

787 **5.2.4 coating (collection)**

788 The "coating" member attribute specifies which coating to apply to the hardcopy output.
789 Typically, the coating is applied to the entire page, although some Printers MAY only coat
790 those areas that have been marked on. Printers with a coating finisher MUST support this
791 member attribute and all "coating-xxx" member attributes if they support the "finishings-col"
792 attribute.

793 **5.2.4.1 coating-sides (type1 keyword)**

794 The "coating-sides" member attribute specifies which sides of the sheets are coated: 'front',
795 'back', or 'both', If not specified, an implementation or site defined default value is used.

796 **5.2.4.2 coating-type (type2 keyword | name(MAX))**

797 The "coating-type" member attribute specifies the type of coating to apply. The following
798 values are defined by this specification:

- 799 'archival': each sheet is coated to preserve the output for an extended period of
800 time, e.g., a UV protectant.
- 801 'archival-glossy': each sheet is coated to produce a glossy surface that preserves
802 the output for an extended period of time, e.g., a UV protectant.

803 'archival-matte': each sheet is coated to produce a matte surface that preserves the
804 output for an extended period of time, e.g., a UV protectant.

805 'archival-semi-gloss': each sheet is coated to produce a semi-gloss surface that
806 preserves the output for an extended period of time, e.g., a UV protectant.

807 'glossy': each sheet is coated to produce a glossy surface.

808 'high-gloss': each sheet is coated to produce a high-gloss surface.

809 'matte': each sheet is coated to produce a matte surface.

810 'semi-gloss': each sheet is coated to produce a semi-gloss surface.

811 'silicone': each sheet is coated to produce a water resistant surface.

812 'translucent': each sheet is coated to produce a translucent surface.

813 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

814 **5.2.4.3 covering (collection)**

815 The "covering" member attribute specifies which cover to apply over the hardcopy output.
816 Printers with a cover finisher MUST support this member attribute and all "covering-xxx"
817 member attributes if they support the "finishings-col" attribute.

818 Note: Unlike the "cover-back" and "cover-front" Job Template attributes [PWG5100.3],
819 finishing covers are applied over any binding, edge stitching, or staples and do not contain
820 print-stream pages.

821 **5.2.4.4 covering-name (type2 keyword | name(MAX))**

822 The "covering-name" member attribute specifies which cover to apply. The default is
823 implementation or site defined. The name typically represents a pre-printed, pre-cut, or
824 generic cover that is available to the Printer. Clients MUST query the value of the "covering-
825 name-supported" (section 6.7) Printer attribute for the list of supported values. The following
826 values are defined by this specification:

827 'plain': a plain (blank) cover is applied.

828 'pre-cut': a pre-cut cover is applied.

829 'pre-printed': a pre-printed cover is applied.

830 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

831 5.2.5 folding (1setOf collection)

832 The "folding" member attribute specifies the location and direction of folds to apply to the
833 hardcopy output. Printers with a folding finisher **MUST** support this member attribute and all
834 "folding-xxx" member attributes if they support the "finishings-col" attribute.

835 Note: The order of "folding" values is significant and is part of the fold intent. Printers **MAY**
836 re-order "folding" values so long as the final result matches the specified intent.

837 Note: This specification only defines folds parallel to the reference edge. Diagonal folds are
838 explicitly not supported.

839 5.2.5.1 folding-direction (type1 keyword)

840 The "folding-direction" member attribute specifies whether the sheets are pushed outward
841 ('outward') or pulled inward ('inward') for the current fold. The default value can be derived
842 from the "finishing-template" value or, if a default value cannot be determined from that
843 value, using an implementation or site defined value.

844 5.2.5.2 folding-offset (integer(0:MAX))

845 The "folding-offset" member attribute specifies where the fold is made. The value is the
846 distance from the reference edge specified by the "folding-reference-edge" member attribute
847 toward the center of the medium in hundredths of millimeters (1/2540th of an inch). The
848 default value is generally derived from the "finishing-template" value and output media.

849 5.2.5.3 folding-reference-edge (type1 keyword)

850 The "folding-reference-edge" member attribute specifies which edge is used as the basis
851 of the fold instructions: 'bottom', 'left', 'right', or 'top'. Folds are placed parallel to the
852 reference edge at the offset specified by the "folding-location" member attribute. The
853 default value is generally derived from the "finishing-template" value and output media.

854 5.2.5.4 "folding" Examples

855 The following example shows a "finishings-col-database" expressing the definitions of
856 "folding" values for the standard folds in Figure 1 applied to A4 media sheets.

```
857     finishings-col-database=
858     {
859         finishing-template='fold-accordion'
860         media-size-name="iso_a4_210x297mm"
861         folding=
862         {
863             folding-direction='inward'
864             folding-location=7425
865             folding-reference-edge='top'
866         },
867         {
868             folding-direction='inward'
869             folding-location=22275
```



```
870         folding-reference-edge='top'
871     },
872     {
873         folding-direction='outward'
874         folding-location=14850
875         folding-reference-edge='top'
876     }
877 },
878 {
879     finishing-template='fold-double-gate'
880     media-size-name="iso_a4_210x297mm"
881     folding=
882     {
883         folding-direction='inward'
884         folding-offset=7425
885         folding-reference-edge='top'
886     },
887     {
888         folding-direction='inward'
889         folding-offset=22275
890         folding-reference-edge='top'
891     },
892     {
893         folding-direction='inward'
894         folding-offset=14850
895         folding-reference-edge='top'
896     }
897 },
898 {
899     finishing-template='fold-engineering-z'
900     media-size-name="iso_a4_210x297mm"
901     folding=
902     {
903         folding-direction='inward'
904         folding-offset=11593
905         folding-reference-edge='top'
906     },
907     {
908         folding-direction='outward'
909         folding-offset=20646
910         folding-reference-edge='top'
911     }
912 },
913 {
914     finishing-template='fold-gate'
915     media-size-name="iso_a4_210x297mm"
916     folding=
917     {
918         folding-direction='inward'
919         folding-offset=7425
920         folding-reference-edge='top'
921     },
922     {
923         folding-direction='inward'
924         folding-offset=22275
925         folding-reference-edge='top'
926     }
927 },
928 {
929     finishing-template='fold-half'
930     media-size-name="iso_a4_210x297mm"
931     folding=
```

```

932     {
933         folding-direction='inward'
934         folding-offset=14850
935         folding-reference-edge='top'
936     }
937 },
938 {
939     finishing-template='fold-half-z'
940     media-size-name="iso_a4_210x297mm"
941     folding=
942     {
943         folding-direction='inward'
944         folding-offset=10500
945         folding-reference-edge='left'
946     },
947     {
948         folding-direction='inward'
949         folding-offset=9900
950         folding-reference-edge='top'
951     },
952     {
953         folding-direction='outward'
954         folding-offset=19800
955         folding-reference-edge='top'
956     }
957 },
958 {
959     finishing-template='fold-left-gate'
960     media-size-name="iso_a4_210x297mm"
961     folding=
962     {
963         folding-direction='inward'
964         folding-offset=7425
965         folding-reference-edge='top'
966     }
967 },
968 {
969     finishing-template='fold-letter'
970     media-size-name="iso_a4_210x297mm"
971     folding=
972     {
973         folding-direction='inward'
974         folding-offset=9900
975         folding-reference-edge='top'
976     },
977     {
978         folding-direction='inward'
979         folding-offset=19800
980         folding-reference-edge='top'
981     }
982 },
983 {
984     finishing-template='fold-parallel'
985     media-size-name="iso_a4_210x297mm"
986     folding=
987     {
988         folding-direction='inward'
989         folding-offset=14850
990         folding-reference-edge='top'
991     },
992     {
993         folding-direction='inward'

```

```

994         folding-offset=7425
995         folding-reference-edge='top'
996     }
997 },
998 {
999     finishing-template='fold-poster'
1000    media-size-name="iso_a4_210x297mm"
1001    folding=
1002    {
1003        folding-direction='inward'
1004        folding-offset=10500
1005        folding-reference-edge='left'
1006    },
1007    {
1008        folding-direction='outward'
1009        folding-offset=14850
1010        folding-reference-edge='top'
1011    }
1012 },
1013 {
1014     finishing-template='fold-right-gate'
1015     media-size-name="iso_a4_210x297mm"
1016     folding=
1017     {
1018         folding-direction='inward'
1019         folding-offset=22275
1020         folding-reference-edge='top'
1021     }
1022 },
1023 {
1024     finishing-template='fold-z'
1025     media-size-name="iso_a4_210x297mm"
1026     folding=
1027     {
1028         folding-direction='inward'
1029         folding-offset=9900
1030         folding-reference-edge='top'
1031     },
1032     {
1033         folding-direction='outward'
1034         folding-offset=19800
1035         folding-reference-edge='top'
1036     }
1037 }
1038

```

1039 5.2.6 imposition-template (type2 keyword | name(MAX))

1040 The "imposition-template" member attribute specifies the default imposition template used
1041 for the specified finishing process. The "imposition-template" member attribute is only
1042 allowed in "finishings-col" collections in the "finishings-col-database" (section 6.9) and
1043 "finishings-col-ready" (section 6.11) Printer description attributes. For example, when
1044 applying a 'booklet-maker' finishing process a Printer could automatically apply a 'signature'
1045 imposition template when processing input pages.

1046 5.2.7 laminating (collection)

1047 The "laminating" member attribute specifies which material to apply to the hardcopy output.
1048 Printers with a laminating finisher MUST support this member attribute and all "laminating-
1049 xxx" member attributes if they support the "finishings-col" attribute.

1050 5.2.7.1 laminating-sides (type2 keyword)

1051 The "laminating-sides" member attribute specifies which sides of the sheets are laminated:
1052 'front', 'back', or 'both', If not specified, an implementation or site defined default value is
1053 used.

1054 5.2.7.2 laminating-type (type2 keyword | name(MAX))

1055 The "laminating-type" member attribute specifies the type of material to laminate with. The
1056 following values are defined by this specification:

1057 'archival': each sheet is laminated to preserve the output for an extended period of
1058 time, e.g., a UV protectant.

1059 'glossy': each sheet is laminated to produce a glossy surface.

1060 'high-gloss': each sheet is laminated to produce a high-gloss surface.

1061 'matte': each sheet is laminated to produce a matte surface.

1062 'semi-gloss': each sheet is laminated to produce a semi-gloss surface.

1063 'translucent': each sheet is laminated to produce a translucent surface.

1064 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

1065 5.2.8 media-sheets-supported (rangeOfInteger(1:MAX))

1066 The "media-sheets-supported" member attribute specifies the minimum and maximum
1067 number of sheets supported for that set of finishing values. This attribute is related to the
1068 "job-media-sheets-supported" attribute [RFC2911] in that the value of "media-sheets-
1069 supported" MUST be within the range of "job-media-sheets-supported". The "media-sheets-
1070 supported" member attribute is only allowed in "finishings-col" collections in the "finishings-
1071 col-database" (section 6.9) and "finishings-col-ready" (section 6.11) Printer description
1072 attributes. As an example, if a Printer implementing the 'fold-half' finishing template has a
1073 minimum of 1 sheet and a maximum of 5 sheets, the Printer's "media-sheets-supported"
1074 attribute specifies this limit with a value of '1-5'.

1075 5.2.9 media-size (collection)

1076 The "media-size" member attribute specifies the applicable media size dimensions for the
1077 specified finishing values and is only provided in "finishings-col-database" (section 6.9) and

1078 "finishings-col-ready" (section 6.11) Printer attribute values. For example, a Printer can list
1079 the supported "punching-locations" values for ISO A4 and US Letter media sizes.

1080 The "x-dimension (integer(0:MAX))" and "y-dimension (integer(0:MAX))" member attributes
1081 provide the dimensions of the media.

1082 **5.2.10 media-size-name (type2 keyword)**

1083 The "media-size-name" member attribute specifies the applicable media size for the
1084 specified finishing values and is only provided in "finishings-col-database" (section 6.9) and
1085 "finishings-col-ready" (section 6.11) Printer attribute values. For example, a Printer can list
1086 the supported "punching-locations" values for ISO A4 and US Letter media sizes.

1087 The values are PWG media size names [PWG5101.1].

1088 **5.2.11 punching (collection)**

1089 The "punching" member attribute specifies the locations of holes to make in the hardcopy
1090 output. Printers with a hole punching/drilling finisher MUST support this member attribute
1091 and all "punching-xxx" member attributes if they support the "finishings-col" attribute.

1092 The diameter of the hole made by the punch is indicated by the "punching-hole-diameter-
1093 configured" Printer description attribute (section 6.22).

1094 A Client that chooses to request custom punching using the "punching" collection attribute
1095 MUST specify the "punching-locations", the "punching-offset", and the "punching-reference-
1096 edge" member attributes. If the Client supplies a malformed request by not supplying all
1097 three member attributes, the Printer MUST (depending on implementation) either reject the
1098 request and return the 'client-error-bad-request' (see [RFC2911] section 13.1.4.1) or default
1099 the omitted member attributes, independent of the value of the "ipp-attribute-fidelity" attribute
1100 [RFC2911] supplied by the Client.

1101 **5.2.11.1 punching-locations (1setOf integer(0:MAX))**

1102 The "punching-locations" member attribute specifies the locations to be punched or drilled
1103 along the reference edge. Each value in the 1setOf MUST be in order of increasing distance.

1104 If the "punching-reference-edge" is either 'top' or 'bottom', then each value in the "punching-
1105 locations" represents an offset in hundredths of millimeters (1/2540th of an inch) from the
1106 left edge toward the center of the medium. If the "punching-reference-edge" is either 'left' or
1107 'right', then each value in the "punching-locations" represents an offset in hundredths of
1108 millimeters (1/2540th of an inch) from the bottom edge toward the center of the medium.

1109 The default value can be derived from the "finishing-template" value or, if a default value
1110 cannot be determined from that value, using an implementation or site defined value.

1111 5.2.11.2 punching-offset (integer(0:MAX))

1112 The "punching-offset" member attribute specifies the distance from the center of the hole to
1113 the reference edge (specified by the "punching-reference-edge" member attribute)
1114 measured in hundredths of millimeters (1/2540th of an inch). The default value can be
1115 derived from the "finishing-template" value or, if a default value cannot be determined from
1116 that value, using an implementation or site defined value.

1117 5.2.11.3 punching-reference-edge (type1 keyword)

1118 The "punching-reference-edge" member attribute specifies which edge of the sheets will be
1119 punched or drilled: 'bottom', 'left', 'right', or 'top'. The default value can be derived from the
1120 "finishing-template" value or, if a default value cannot be determined from that value, using
1121 an implementation or site defined value.

1122 5.2.12 stitching (collection)

1123 The "stitching" member attribute (originally defined in section 3.2.2 of [PWG5100.3])
1124 specifies the locations of stitches or staples that are used to bind the hardcopy output.
1125 Printers with a stapler and/or stitching finisher MUST support this member attribute and all
1126 "stitching-xxx" member attributes if they support the "finishings-col" attribute.

1127 A Client that chooses to request custom stitching using the "stitching" collection attribute
1128 MUST specify the "stitching-reference-edge", the "stitching-offset", and the "stitching-
1129 locations" member attributes. If the Client supplies a malformed request by not supplying all
1130 three member attributes, the Printer MUST (depending on implementation) either reject the
1131 request and return the 'client-error-bad-request' (see [RFC2911] section 13.1.4.1) or default
1132 the omitted member attributes, independent of the value of the "ipp-attribute-fidelity" attribute
1133 [RFC2911] supplied by the Client.

1134 5.2.12.1 stitching-angle (integer(0:359))

1135 The "stitching-angle" member attribute specifies the staple or stitch's angle of rotation in a
1136 counter-clockwise direction around the center of the staple, measured in degrees. A staple
1137 or stitch rotated to 0° (zero degrees) shall be parallel to the top edge of the page. The
1138 range of allowable values is 0 (0°) to 359 (359°).

1139 5.2.12.2 stitching-locations (1setOf integer(0:MAX))

1140 Each value of "stitching-locations" specifies an absolute offset along the Finishing Reference
1141 Edge at which a stitch MUST occur. Each value in the 1setOf MUST be in order of increasing
1142 distance.

1143 If the "stitching-reference-edge" is either 'top' or 'bottom', then each value in the "stitching-
1144 locations" represents an offset in hundredths of millimeters from the left edge along the
1145 Finishing Reference Edge toward the center of the medium. If the "stitching-reference-edge"
1146 is either 'left' or 'right', then each value in the "stitching-locations" represents an offset in

1147 hundredths of millimeters from the bottom edge along the Finishing Reference Edge toward
1148 the center of the medium.

1149 The unit of measure for the "stitching-locations" member attribute is one hundredth of a
1150 millimeter. This unit is equivalent to 1/2540th of an inch resolution.

1151 **5.2.12.3 stitching-method (type2 keyword)**

1152 The "stitching-method" member attribute specifies the type of stitching to use. The following
1153 values are defined by this specification:

1154 'auto': Automatically choose a stitching type based on the Set being finished.

1155 'crimp': Crimp the Set together.

1156 'wire': Use wire staples.

1157 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

1158 **5.2.12.4 stitching-offset (integer(0:MAX))**

1159 The "stitching-offset" member attribute specifies the perpendicular distance of the staples
1160 from the Finishing Reference Edge. Since the "stitching-offset" member attribute is positive
1161 or zero, the offset is always in the direction that is both away from the Finishing Reference
1162 Edge and toward the center of the media sheet.

1163 The unit of measure for the "stitching-offset" member attribute is one hundredth of a
1164 millimeter. This unit is equivalent to 1/2540th of an inch resolution.

1165 If the Client specifies a "stitching-offset" then the Printer MUST produce a stitch (or stitches)
1166 along a line that is the specified number of hundredths of millimeters specified by the
1167 "stitching-offset" attribute away from the "stitching-reference-edge".

1168 **5.2.12.5 stitching-reference-edge (type1 keyword)**

1169 The "stitching-reference-edge" member attribute specifies the Finishing Reference Edge of
1170 the output media relative to which the stapling or stitching MUST be applied. The individual
1171 staples or stitches are situated along a line or axis parallel to the Finishing Reference Edge.

1172 A Printer MUST support this member attribute and at least the 'left' value.

1173 Note: The 'left' value works with 'portrait' and 'landscape' Documents since 'landscape'
1174 Documents are rotated anti-clock-wise 90 degrees, i.e., plus 90 degrees, with respect to
1175 'portrait' Documents. The left edge becomes the top edge when the human reader orients
1176 the landscape Document for reading.

1177 5.2.13 trimming (1setOf collection)

1178 The "trimming" member attribute specifies the locations of cuts to make in the hardcopy
1179 output. Printers with a trimming/cutting/perforation/scoring finisher MUST support this
1180 member attribute and all "trimming-xxx" member attributes if they support the "finishings-col"
1181 attribute.

1182 5.2.13.1 trimming-offset (1setOf integer(0:MAX))

1183 The "trimming-offset" member attribute specifies where the cut, perforation, or score is
1184 made. The value is the distance from the Finishing Reference Edge specified by the
1185 "trimming-reference-edge" member attribute toward the center of the medium in hundredths
1186 of millimeters (1/2540th of an inch). The default value is generally derived from the "finishing-
1187 template" value and output media.

1188 5.2.13.2 trimming-reference-edge (type1 keyword)

1189 The "trimming-reference-edge" member attribute specifies which edge is used as the basis
1190 of the cut, perforation, or score: 'bottom', 'left', 'right', or 'top'. Cuts, perforations, and scores
1191 are placed parallel to the reference edge at the offset specified by the "trimming-offset"
1192 member attribute. The default value is generally derived from the "finishing-template" value
1193 and output media.

1194 5.2.13.3 trimming-type (type2 keyword | name(MAX))

1195 The "trimming-type" member attribute specifies the type of trim that is to be performed. The
1196 default value is implementation and/or site defined. The following values are defined by this
1197 specification:

1198 'draw-line': Marks a cut line on the media where it could be cut by an operator

1199 'full': Cuts the hardcopy output the full length parallel to the reference edge.

1200 'partial': Partially cuts the hardcopy output along the length parallel to the reference
1201 edge.

1202 'perforate': Perforates the hardcopy output the full length parallel to the reference
1203 edge.

1204 'score': Scores the hardcopy output the full length parallel to the reference edge.

1205 'tab': Cuts the hardcopy output along the length parallel to the reference edge
1206 leaving a hanging tab.

1207 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

1208 5.2.13.4 trimming-when (type2 keyword)

1209 The "trimming-when" member attribute specified when trimming is performed. The default
1210 value could be derived from the "finishing-template" value or, if a default value cannot be
1211 determined from that value, using an implementation or site defined value. The following
1212 values are defined by this specification:

1213 'after-documents': Trimming occurs after each Document.

1214 'after-job': Trimming occurs only after the entire Job is printed.

1215 'after-sets': Trimming occurs after each Set (the typical default).

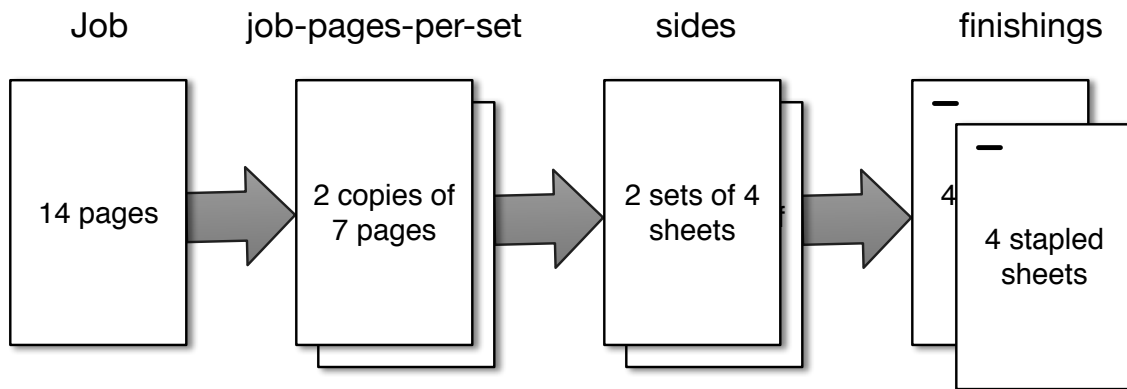
1216 'after-sheets': Trimming occurs after each sheet.

1217 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA].

1218 5.3 job-pages-per-set (integer(1:MAX))

1219 The RECOMMENDED "job-pages-per-set" Job Template attribute specifies the number of
1220 input pages that constitute a set for finishing processes. The value of "job-pages-per-set"
1221 MUST be evenly divisible with the number of Input Pages since it is being used to demarcate
1222 the length of a single copy. This attribute is only needed if the Printer does not support
1223 "copies" for the chosen document format. If the "copies" Job Template attribute is included
1224 in the Job Creation operation or Document Submission operation, then either "job-pages-
1225 per-set" MUST match "copies" or "job-pages-per-set" MUST NOT be sent. See the sections
1226 on the "multiple-document-handling" Job Template attribute [RFC2911] for more information
1227 on using this attribute with multiple Document Jobs.

1228 To illustrate how the "job-pages-per-set" attribute ought to be employed, if a Client submits
1229 a 14 page PWG Raster Format [PWG5102.4] Document for printing that contains two copies
1230 of four duplex pages each, the Client might specify a "job-pages-per-set" Job Template
1231 attribute with a value of 7, a "sides" attribute with a value of 'two-sided-long-edge', and a
1232 "finishings" attribute with a value of 4 (staple) to have the Printer staple two Sets of four
1233 sheets. Figure 4 shows a graphical representation of this example.



1234

1235

Figure 4 - Handling of "job-pages-per-set" Job Template Attribute

1236 **6. Printer Description Attributes**

1237 **6.1 baling-type-supported (1setOf (type2 keyword | name(MAX)))**

1238 The "baling-type-supported" Printer attribute lists the supported values for the "baling-type"
 1239 (section 5.2.2.1) member attribute.

1240 **6.2 baling-when-supported (1setOf type2 keyword)**

1241 The "baling-when-supported" Printer attribute lists the supported values for the "baling-
 1242 when" (section 5.2.2.2) member attribute.

1243 **6.3 binding-reference-edge-supported (1setOf type1 keyword)**

1244 The "binding-reference-edge-supported" Printer attribute lists the supported values for the
 1245 "binding-reference-edge" (section 5.2.3.1) member attribute.

1246 **6.4 binding-type-supported (1setOf type2 keyword)**

1247 The "binding-type-supported" Printer attribute lists the supported values for the "binding-
 1248 type" (section 5.2.3.2) member attribute.

1249 **6.5 coating-sides-supported (1setOf type1 keyword)**

1250 The "coating-sides-supported" Printer attribute lists the supported values for the "coating-
 1251 sides" (section 5.2.4.1) member attribute.

1252 **6.6 coating-type-supported (1setOf (type2 keyword | name(MAX)))**

1253 The "coating-type-supported" Printer attribute lists the supported values for the "coating-
1254 type" (section 5.2.4.2) member attribute.

1255 **6.7 covering-name-supported (1setOf (type2 keyword | name(MAX)))**

1256 The "covering-name-supported" Printer attribute lists the supported values for the "covering-
1257 name" (section 5.2.4.4) member attribute.

1258 **6.8 finishing-template-supported (1setOf (name(MAX) | type2 keyword))**

1259 The "finishing-template-supported" Printer attribute lists the supported values for the
1260 "finishing-template" (section 5.2.1) member. Except for 'none', Printers MUST list all
1261 "finishings-supported" keyword value equivalents in the list of "finishing-template-supported"
1262 values.

1263 **6.9 finishings-col-database (1setOf collection)**

1264 The RECOMMENDED "finishings-col-database" Printer attribute lists the "finishings-col"
1265 member attributes corresponding to each "finishings-supported" value. Unlike the "media-
1266 col-database" Printer attribute [PWG5100.11], the "finishings-col-database" attribute does
1267 not provide a definitive list of the combinations of valid finishing processes. Instead, it lists
1268 the basic finishing processes separately as well as vendor or site defined preset
1269 combinations, each identified by a corresponding "finishing-template" name or keyword.

1270 For example, a Printer that supports the 'booklet-maker', 'punch-triple-left' and 'staple-top-
1271 left' values for "finishings-template" and "finishings-supported" might report the following for
1272 "finishings-col-database":

```
1273     finishings-col-database=  
1274     {  
1275         finishing-template='booklet-maker'  
1276         imposition-template='signature'  
1277         media-size-name='na_tabloid_11x17in'  
1278         media-sheets-supported=1-5  
1279         folding=  
1280         {  
1281             folding-direction='inward'  
1282             folding-offset=21590  
1283             folding-reference-edge='top'  
1284         }  
1285         stitching=  
1286         {  
1287             stitching-locations=9313,18626  
1288             stitching-offset=21590  
1289             stitching-reference-edge='top'  
1290         }  
1291     },
```

```

1292     {
1293         finishing-template='booklet-maker'
1294         imposition-template='signature'
1295         media-sheets-supported=1-8
1296         media-size=
1297         {
1298             x-dimension=29700
1299             y-dimension=42000
1300         }
1301         folding=
1302         {
1303             folding-direction='inward'
1304             folding-offset=21000
1305             folding-reference-edge='top'
1306         }
1307         stitching=
1308         {
1309             stitching-locations=9900,19800
1310             stitching-offset=21000
1311             stitching-reference-edge='top'
1312         }
1313     },
1314     {
1315         finishing-template='punch-triple-left'
1316         media-sheets-supported=1-100
1317         media-size-name='na_letter_8.5x11in'
1318         punching=
1319         {
1320             punching-locations=5715,16510,27305
1321             punching-offset=1300
1322             punching-reference-edge='left'
1323         }
1324     },
1325     {
1326         finishing-template='staple-top-left'
1327         media-sheets-supported=1-150
1328         stitching=
1329         {
1330             stitching-locations=635
1331             stitching-offset=635
1332             stitching-reference-edge='left'
1333         }
1334     }

```

1335 Note that the Printer SHOULD specify each of these separately to limit the size of the value
1336 for "finishings-col-database". While it is possible to create "finishings-col" collections that
1337 each represent one of the combinatorial permutations from combining the discrete "finishing-
1338 template" definitions (e.g. "staple-top-left_punch-triple-left"), that greatly and unnecessarily
1339 expands the size of "finishings-col-database" and "finishings-col-ready" (section 6.11). A
1340 Client creates the "finishings-col" for a Job by itself combining the settings contained within
1341 multiple "finishings-col" collections from "finishings-col-ready" or "finishings-col-database",
1342 after resolving any constraints, as discussed later in this section.

1343 Printers SHOULD report "finishings-col-database" values for each "finishings-supported"
 1344 value other than 'none' (which is equivalent to a no-value for "finishings-col"), and MAY
 1345 report multiple instances with the same "finishing-template" value but different "media-size"
 1346 or "media-size-name" values. This allows a Client to easily discover which finishing
 1347 processes are supported for a given media size, and to preview the results of each finishing
 1348 process for the User. This attribute can also provide Printer and site-defined "presets" for
 1349 compound finishing processes.

1350 The same values SHOULD be returned in the "finishings-col-ready" Printer attribute (section
 1351 6.11) for each finisher Subunit that is available.

1352 There can be situations where a setting within a particular "finishings-col" collection is not
 1353 compatible with some other selected Job Template attribute, such as a particular media type,
 1354 media orientation, etc. These situations are described by the Printer using the IPP "job-
 1355 constraints-supported" and "job-resolvers-supported" Printer Description attributes
 1356 [PWG5100.13]. For example:

```

1357     job-constraints-supported={
1358         resolver-name=A
1359         finishings-col={
1360             finishing-template='staple-top-left','staple-bottom-right'
1361         }
1362         finishings=20,23
1363         media-col={
1364             media-source-properties={
1365                 media-source-feed-direction='long-edge-first'
1366             }
1367         }
1368     }
1369
1370     job-resolvers-supported={
1371         resolver-name=A
1372         media-col={
1373             media-source-properties={
1374                 media-source-feed-direction='short-edge-first'
1375             }
1376         },
1377         {
1378             media-source='manual'
1379         }
1380     }
  
```

1381 Notice that in "job-constraints-supported" the value for "finishing-template" contains multiple
 1382 values.

1383 **6.10 finishings-col-default (1setOf collection | no-value)**

1384 The "finishings-col-default" Printer attribute provides the default "finishings-col" (section 5.2)
 1385 Job Template attribute value. Each collection value MUST contain the "finishing-template"
 1386 member attribute and SHOULD contain all finishing process member attributes that are not

1387 affected by media size. For example, if the default is to staple output in the top left corner
1388 then the collection value SHOULD contain the "stitching" member attribute because the
1389 location of the staple does not depend on the media size. However, if the default is to punch
1390 three holes along the left edge of the media, the collection value SHOULD contain the
1391 "punching-reference-edge" and "punching-offset" member attributes but SHOULD NOT
1392 contain the "punching-locations" member attribute since the value of that member attribute
1393 depends upon the media size.

1394 The "finishings-col-default" Printer attribute MUST report the same finishing processes as
1395 the "finishings-default" [RFC2911] Printer attribute. If "finishings-default" has the value
1396 'none', then "finishings-col-default" MUST have the 'no-value' out-of-band value.

1397 **6.11 finishings-col-ready (1setOf collection)**

1398 The RECOMMENDED "finishings-col-ready" Printer attribute lists the "finishings-col"
1399 member attributes corresponding to each "finishing-template" value for Subunits that are
1400 available and media that is loaded. The values are always the same as, or a subset of, the
1401 "finishings-col-database" Printer attribute (section 6.9).

1402 **6.12 folding-direction-supported (1setOf type1 keyword)**

1403 The "folding-direction-supported" Printer attribute lists the supported values for the "folding-
1404 direction" (section 5.2.5.1) member attribute.

1405 **6.13 folding-offset-supported (1setOf (integer(0:MAX) | 1406 rangeOfInteger(0:MAX)))**

1407 The "folding-offset-supported" Printer attribute lists the supported values for the "folding-
1408 offset" (section 5.2.5.2) member attribute.

1409 **6.14 folding-reference-edge-supported (1setOf type1 keyword)**

1410 The "folding-reference-edge-supported" Printer attribute lists the supported values for the
1411 "folding-reference-edge" (section 5.2.5.3) member attribute.

1412 **6.15 laminating-sides-supported (1setOf type1 keyword)**

1413 The "laminating-sides-supported" Printer attribute lists the supported values for the
1414 "laminating-sides" (section 5.2.7.1) member attribute.

1415 **6.16 laminating-type-supported (1setOf (type2 keyword | name(MAX)))**

1416 The "laminating-type-supported" Printer attribute lists the supported values for the
1417 "laminating-type" (section 5.2.7.2) member attribute.

1418 **6.17 job-pages-per-set-supported (boolean)**

1419 The "job-pages-per-set-supported" Printer Attribute specifies whether the "job-pages-per-
1420 set" Job Template attribute (section 5.3) is supported. This attribute MUST be supported if
1421 the "job-pages-per-set" attribute is supported.

1422 **6.18 printer-finisher (1setOf octetString(MAX))**

1423 The "printer-finisher" Printer Description attribute provides current finisher details mapped
1424 from the SNMP finDeviceTable defined in IETF Finishing MIB [RFC3806]. This attribute
1425 MUST be supported if the Printer implements the IETF Finishing MIB [RFC3806].

1426 The Printer MUST support this attribute if it supports the "printer-finisher-description"
1427 attribute (section 6.18.3). If supported, this attribute MUST have the same cardinality
1428 (contain the same number of values) as the "printer-finisher-description" attribute. The ith
1429 value in the "printer-finisher" attribute corresponds to the ith value in the "printer-finisher-
1430 description" attribute.

1431 As with finDeviceTable, Printers MUST only list those finishers that are currently attached.

1432 **6.18.1 Keywords for printer-finisher**

1433 Table 2 defines the IPP datatypes and keywords for encoding "printer-finisher" from all of
1434 the machine-readable (non-localized) columnar objects in finDeviceTable or
1435 finDeviceAttributeTable [RFC3806].

1436 **Table 2 - Keywords for "printer-finisher"**

Finishing MIB Object	IPP Data Type	IPP Keyword	PWG SM Keyword	Conformance
finDeviceTable (note 1)			Finishers	
finDeviceIndex (note 1)	Integer	index	Id	OPTIONAL
finDeviceType	String	type	FinisherType	REQUIRED
finDeviceCapacityUnit	String	unit	FinisherCapacityUnit	REQUIRED
finDeviceMaxCapacity	Integer	maxcapacity	FinisherMaxCapacity	REQUIRED
finDeviceCurrentCapacity	Integer	capacity	FinisherCurrentCapacity	REQUIRED
finDevicePresentOnOff	String	presentonoff	FinisherPresentOnOff	OPTIONAL
finDeviceAssociatedMediaPaths	---	---	FinisherAssociatedMediaPaths	---
finDeviceAssociatedOutputs	---	---	FinisherAssociatedOutputs	---
finDeviceStatus	Integer	status	SubunitStates	OPTIONAL

1437 Notes:

- 1438 1. finDeviceIndex is OPTIONAL in "printer-finisher", because correlation with the
1439 original MIB order is considered unimportant. If "printer-finisher-supplies" is
1440 implemented, then finDeviceIndex is REQUIRED.

1441 **6.18.2 Encoding of printer-finisher**

1442 Values of "printer-finisher" MUST be encoded using a visible subset of the US-ASCII
 1443 character set [RFC20]. Control codes (0x00 to 0x1F and 0x7F) MUST NOT be used. The
 1444 ABNF [STD68] [FIN-ABNF] in Figure 5 defines the standard encoding in "printer-finisher"
 1445 for all the machine-readable (non-localized) columnar objects in finDeviceTable
 1446 [RFC3806].

1447 **Figure 5 - ABNF for "printer-finisher" Values**

```

1448 printer-finisher = 1*finisher-required *finisher-optional
1449 ; set of finisher elements encoded into one value
1450 finisher-required = finisher-req ";"
1451 finisher-req = finisher-type / finisher-unit /
1452             finisher-max-capacity /
1453             finisher-capacity
1454 finisher-optional = finisher-opt ";"
1455 finisher-opt = finisher-index / finisher-presentonoff /
1456             finisher-status / finisher-ext
1457
1458 finisher-type = "type" "=" 1*ALPHA
1459 ; enumerated value as an alpha string (e.g.,
1460 ; 'stitcher') of finDeviceType in [RFC3806] mapped
1461 ; indirectly from the *label* in FinDeviceTypeTC
1462
1463 finisher-unit = "unit" "=" 1*ALPHA
1464 ; enumerated value as an alpha string (e.g., 'other') of
1465 ; finDeviceCapacityUnit in [RFC3806] mapped indirectly from
1466 ; the *label* in PrtCapacityUnitTC in [RFC3805]
1467
1468 finisher-max-capacity = "maxcapacity" "=" 1*[DIGIT / "-"]
1469 ; integer value as a numeric string mapped directly from
1470 ; finDeviceMaxCapacity in [RFC3806]
1471
1472 finisher-capacity = "capacity" "=" 1*[DIGIT / "-"]
1473 ; integer value as a numeric string mapped directly from
1474 ; finDeviceCurrentCapacity in [RFC3806]
1475
1476 finisher-index = "index" "=" 1*DIGIT
1477 ; integer value as a numeric string mapped directly from
1478 ; finDeviceIndex in [RFC3806]
1479
1480 finisher-presentonoff = "presentonoff" "=" 1*ALPHA
1481 ; string value as an alpha string mapped directly from
1482 ; PresentOnOff in [RFC3805]
1483
1484 finisher-status = "status" "=" 1*DIGIT
1485 ; integer value as a numeric string mapped directly from
1486 ; finDeviceStatus in [RFC3806]
1487
1488 finisher-ext      = finisher-extname "=" finisher-extvalue
1489 finisher-extname  = 1*[ALPHA / DIGIT / "-"]
1490 finisher-extvalue = 1*[ALPHA / DIGIT / "-" / "." / ","]
1491 ; extension point for other MIB values not mapped

```


1492 6.18.3 Example of printer-finisher

1493 The following example shows a "printer-finisher" attribute where its value is a set of two
1494 octetString strings encoding the machine-readable (non-localized) columnar objects from
1495 the Finisher MIB [RFC3806] finDeviceTable, presented using a PAPI [PAPI] encoding. Each
1496 string is wrapped in double-quotes (") for readability.

```
1497 printer-finisher="type=stitcher;unit=sheets;maxcapacity=500;capacity=100;",  
1498                 "type=puncher;unit=sheets;maxcapacity=100;capacity=20;"
```

1499 6.19 printer-finisher-description (1setOf text(MAX))

1500 The "printer-finisher-description" READ-ONLY Printer Status attribute provides current
1501 supply descriptions mapped from the SNMP finDeviceDescription object in the
1502 finDeviceTable defined in IETF Finishing MIB [RFC3806]. This attribute MUST be supported
1503 if the Printer implements the IETF Finishing MIB [RFC3806].

1504 This attribute MUST be supported if the "printer-finisher" (section 6.18) Printer attribute is
1505 supported. If supported, this attribute MUST have the same cardinality (contain the same
1506 number of values) as the "printer-finisher" attribute. The i^{th} value in the "printer-finisher-
1507 description" attribute corresponds to the i^{th} value in the "printer-finisher" attribute.

1508 6.19.1 Encoding of printer-finisher-description

1509 Values of the "printer-finisher-description" attribute MUST be mapped from the
1510 corresponding human-readable (localized) values of finDeviceDescription, exactly as
1511 follows:

- 1512 1. Each value of finDeviceDescription MUST be converted from the character set
1513 [RFC3808] specified by prtGeneralCurrentLocalization and
1514 prtLocalizationCharacterSet into the charset specified by "charset-configured" and
1515 then copied into a text value of "printer-finisher-description"; and
- 1516 2. Each value of "printer-finisher-description" MUST be tagged with the natural
1517 language [RFC5646] specified by prtGeneralCurrentLocalization,
1518 prtLocalizationLanguage, and prtLocalizationCountry unless the natural language
1519 matches the default language used in the response.

1520 6.19.2 Example of printer-finisher-description

1521 The first example shows two instances of the human-readable (localized) columnar object
1522 finDeviceDescription in the finDeviceTable encoded into corresponding values of "printer-
1523 finisher-description", presented using a PAPI [PAPI] encoding:

```
1524 printer-finisher-description="Stapler S/N:EXAMPLE-12345","Hole Punch  
1525 S/N:EXAMPLE-67890"
```

1526 The second example shows the same values, but also demonstrates tagging with a natural
1527 language identifier, presented using a PAPI [PAPI] encoding:

1528 printer-finisher-description="Hefter SN:BEISPIEL-12345" (de), "Lochstanze
 1529 S/N:BEISPIEL-67890" (de)

1530 **6.20 printer-finisher-supplies (1setOf octetString(MAX))**

1531 The "printer-finisher-supplies" Printer Description attribute describes the finishing unit's
 1532 supplies, mapped from the SNMP finSupplyTable defined in IETF Finishing MIB [RFC3806].
 1533 Although some supplies could be described by the "printer-supply" attribute [PWG5100.13]
 1534 this attribute supports the full fidelity of the finSupplyTable, which is more descriptive. This
 1535 attribute MUST be supported if the Printer implements the IETF Finishing MIB [RFC3806]
 1536 finSupplyTable.

1537 This attribute MUST be supported if the "printer-finisher-supplies-description" (section 6.21)
 1538 Printer attribute is supported. If supported, this attribute MUST have the same cardinality
 1539 (contain the same number of values) as the "printer-finisher-supplies-description" attribute.
 1540 The ith value in the "printer-finisher-supplies" attribute corresponds to the ith value in the
 1541 "printer-finisher-supplies-description" attribute.

1542 **6.20.1 Keywords for printer-finisher-supplies**

1543 Table 3 defines the IPP datatypes and keywords for encoding "printer-finisher-supplies" from
 1544 all of the machine-readable (non-localized) columnar objects in finSupplyTable [RFC3806].

1545 **Table 3 - Keywords for "printer-finisher-supplies"**

Finishing MIB Object	IPP Data Type	IPP Keyword	PWG SM Keyword	Conformance
finSupplyTable (note 1)			FinisherSupplies	
finSupplyIndex (note 1)	Integer	index	Id	OPTIONAL
finSupplyDeviceIndex (note 2)	Integer	deviceIndex	Id	REQUIRED
finSupplyClass	String	class	FinisherClass	REQUIRED
finSupplyType	String	type	FinisherSupplyType	REQUIRED
finSupplyUnit	String	unit	FinisherSupplyCapacityUnit	REQUIRED
finSupplyMaxCapacity	Integer	max	FinisherSupplyMaxCapacity	REQUIRED
finSupplyCurrentLevel	Integer	level	FinisherSupplyCurrentLevel	REQUIRED
finSupplyColorName	String	color	FinisherSupplyColorName	---

1546 Notes:

- 1547 1. finSupplyIndex is OPTIONAL in "printer-finisher-supplies", because correlation
- 1548 with the original MIB order is considered unimportant
- 1549 2. finSupplyDeviceIndex is REQUIRED in "printer-finisher-supplies" because a
- 1550 connection between the supply and the finisher is needed if User / Operator
- 1551 engagement is required for resolving a supply level condition.

1552 **6.20.2 Encoding of printer-finisher-supplies**

1553 Values of "printer-finisher-supplies" MUST be encoded using a visible subset of the US-
 1554 ASCII character set [RFC20]. Control codes (0x00 to 0x1F and 0x7F) MUST NOT be used.
 1555 The ABNF [STD68] [FIN-ABNF] in Figure 5 defines the standard encoding in "printer-

1556 finisher-supplies" for all the machine-readable (non-localized) columnar objects in
 1557 finSupplyTable [RFC3806].

1558 **Figure 6 - ABNF for "printer-finisher-supplies" Values**

```

1559 finisher-supply = 1*supply-required *supply-optional
1560 ; set of finisher supply elements encoded into one value
1561 supply-required = supply-req ";"
1562 supply-req = supply-class / supply-type / supply-description /
1563 supply-unit / supply-max / supply-current-level /
1564 supply-color
1565
1566 supply-optional = supply-opt ";"
1567 supply-opt = supply-index / supply-device-index / supply-ext
1568
1569 supply-class = "class" "=" 1*ALPHA
1570 ; enumerated value as an alpha string (e.g., 'supplyThatIsConsumed')
1571 ; of prtMarkerSuppliesClass in [RFC3805] mapped indirectly from
1572 ; the *label* in PrtMarkerSuppliesClassTC in [RFC3805]
1573
1574 supply-type = "type" "=" 1*ALPHA
1575 ; enumerated value as an alpha string (e.g., 'staples') of
1576 ; prtMarkerSuppliesType in [RFC3805] mapped indirectly from
1577 ; the *label* in PrtMarkerSuppliesTypeTC in [RFC3805]
1578
1579 supply-unit = "unit" "=" 1*ALPHA
1580 ; enumerated value as an alpha string (e.g., 'items' or 'percent')
1581 ; of finSupplyUnit in [RFC3806] mapped indirectly from the *label*
1582 ; in PrtMarkerSuppliesSupplyUnitTC in [RFC3805]
1583
1584 supply-max = "max" "=" 1*[DIGIT / "-"]
1585 ; integer value as a numeric string mapped directly from
1586 ; finSupplyMaxCapacity in [RFC3806]
1587
1588 supply-current-level = "level" "=" 1*[DIGIT / "-"]
1589 ; integer value as a numeric string mapped directly from
1590 ; finSupplyCurrentLevel in [RFC3806]
1591
1592 supply-color = "color" "=" 1*ALPHA
1593 ; enumerated value as an alpha string (e.g., 'silver') of
1594 ; finSupplyColorName in [RFC3806] mapped indirectly from the color
1595 ; names from PWG Media Standardized Names 2.0 [PWG5101.1]
1596
1597 supply-index = "index" "=" 1*DIGIT
1598 ; integer value as a numeric string mapped directly from
1599 ; finSupplyIndex in [RFC3806]
1600
1601 supply-device-index = "deviceIndex" "=" 1*ALPHA
1602 ; string value as an alpha string mapped directly from
1603 ; finSupplyDeviceIndex in [RFC3806]
1604
1605 supply-ext = supply-extname "=" supply-extvalue
1606 supply-extname = 1*[ALPHA / DIGIT / "-"]
1607 supply-extvalue = 1*[ALPHA / DIGIT / "-" / "." / ","]
1608 ; extension point for other MIB values not mapped

```

1609 **6.20.3 Example of printer-finisher-supplies**

1610 The following is an example of "printer-finisher-supplies", which contains one supply,
1611 presented using a PAPI [PAPI] encoding:

```
1612 printer-finisher-  
1613 supplies="class=supplyThatIsConsumed;type=staples;unit=items;max=500;level=100;c  
1614 olor=silver;"
```

1615 **6.21 printer-finisher-supplies-description (1setOf text(MAX))**

1616 The "printer-finisher-supplies-description" READ-ONLY Printer Status attribute provides
1617 current supply descriptions mapped from the SNMP finSupplyDescription object in the
1618 finSupplyEntry sequences in the finSupplyTable defined in IETF Finishing MIB [RFC3806].
1619 This attribute MUST be supported if the Printer implements the IETF Finishing MIB
1620 [RFC3806] finSupplyTable.

1621 This attribute MUST be supported if the "printer-finisher-supplies" (section 6.18) Printer
1622 attribute is supported. If supported, this attribute MUST have the same cardinality (contain
1623 the same number of values) as the "printer-finisher-supplies" attribute. The i^{th} value in the
1624 "printer-finisher-supplies-description" attribute corresponds to the i^{th} value in the "printer-
1625 finisher-supplies" attribute.

1626 **6.21.1 Encoding of printer-finisher-supplies-description**

1627 Values of the "printer-finisher-supplies-description" attribute MUST be mapped from the
1628 corresponding human-readable (localized) values of finSupplyDescription, exactly as
1629 follows:

- 1630 1. Each value of finSupplyDescription MUST be converted from the character set
1631 [RFC3808] specified by prtGeneralCurrentLocalization and
1632 prtLocalizationCharacterSet into the charset specified by "charset-configured" and
1633 then copied into a text value of "printer-finisher-supplies-description"; and
- 1634 2. Each value of "printer-finisher-supplies-description" MUST be tagged with the
1635 natural language [RFC5646] specified by prtGeneralCurrentLocalization,
1636 prtLocalizationLanguage, and prtLocalizationCountry unless the natural language
1637 matches the default language used in the response.

1638 **6.21.2 Example of printer-finisher-supplies-description**

1639 The first example shows two instances of the human-readable (localized) columnar object
1640 finSupplyDescription in the finSupplyTable encoded into corresponding values of "printer-
1641 finisher-supplies-description", presented using a PAPI [PAPI] encoding:

```
1642 printer-finisher-supplies-description="Staples", "Staples"
```

1643 The second example shows the same values, but also demonstrates tagging with a natural
1644 language identifier, presented using a PAPI [PAPI] encoding:

1645 `printer-finisher-supplies-description="Heftklammern" (de), "Heftklammern" (de)`

1646 **6.22 punching-hole-diameter-configured (integer(0:MAX))**

1647 The "punching-hole-diameter-configured" member attribute specifies the diameter of the
1648 punched hole, measured in hundredths of millimeters (1/2540th of an inch). If this attribute
1649 is not provided by the Printer, the value is assumed to be 790 (7.9mm or 5/16in.) for media
1650 sizes whose dimensions are measured in inches, or 650 (6.5mm) for media sizes whose
1651 dimensions are measured in millimeters.

1652 **6.23 punching-locations-supported (1setOf (integer(0:MAX) |** 1653 **rangeOfInteger(0:MAX)))**

1654 The "punching-locations-supported" Printer attribute lists the supported values for the
1655 "punching-locations" (section 5.2.11.1) member attribute.

1656 **6.24 punching-offset-supported (1setOf (integer(0:MAX) |** 1657 **rangeOfInteger(0:MAX)))**

1658 The "punching-offset-supported" Printer attribute lists the supported values for the
1659 "punching-offset" (section 5.2.11.2) member attribute.

1660 **6.25 punching-reference-edge-supported (1setOf type1 keyword)**

1661 The "punching-reference-edge-supported" Printer attribute lists the supported values for the
1662 "punching-reference-edge" (section 5.2.11.3) member attribute.

1663 **6.26 stitching-angle-supported (1setOf (integer(0:359) |** 1664 **rangeOfInteger(0:359)))**

1665 The "stitching-angle-supported" Printer attribute lists the supported values for the "stitching-
1666 angle" (section 5.2.12.1) member attribute.

1667 **6.27 stitching-locations-supported (1setOf (integer(0:MAX) |** 1668 **rangeOfInteger(0:MAX)))**

1669 The "stitching-locations-supported" Printer attribute lists the supported values for the
1670 "stitching-locations" (section 5.2.12.1) member attribute.

1671 **6.28 stitching-method-supported (1setOf type2 keyword)**

1672 The "stitching-method-supported" Printer attribute lists the supported values for the
1673 "stitching-method" (section 5.2.12.3) member attribute.

1674 **6.29 stitching-offset-supported (1setOf (integer(0:MAX) |**
1675 **rangeOfInteger(0:MAX)))**

1676 The "stitching-offset-supported" Printer attribute lists the supported values for the "stitching-
1677 offset" (section 5.2.12.3) member attribute.

1678 **6.30 stitching-reference-edge-supported (1setOf type1 keyword)**

1679 The "stitching-reference-edge-supported" Printer attribute lists the supported values for the
1680 "stitching-reference-edge" (section 5.2.12.5) member attribute.

1681 **6.31 trimming-offset-supported (1setOf (integer(0:MAX) |**
1682 **rangeOfInteger(0:MAX)))**

1683 The "trimming-offset-supported" Printer attribute lists the supported values for the "trimming-
1684 offset" (section 5.2.13.1) member attribute.

1685 **6.32 trimming-reference-edge-supported (1setOf type1 keyword)**

1686 The "trimming-reference-edge-supported" Printer attribute lists the supported values for the
1687 "trimming-reference-edge" (section 5.2.13.2) member attribute.

1688 **6.33 trimming-type-supported (1setOf type2 keyword)**

1689 The "trimming-type-supported" Printer attribute lists the supported values for the "trimming-
1690 type" (section 5.2.13.3) member attribute.

1691 **6.34 trimming-when-supported (1setOf type2 keyword)**

1692 The "trimming-when-supported" Printer attribute lists the supported values for the "trimming-
1693 when" (section 5.2.13.4) member attribute.

1694

1695 **7. Conformance Requirements**

1696 This section summarizes the Conformance Requirements detailed in the definitions in this
1697 document for Clients and Printers.

1698 **7.1 Conformance Requirements for Clients**

1699 In order for a Client to claim conformance to this specification, a Client **MUST** support:

- 1700 1. The IPP Printer attributes defined in section 6;
- 1701 2. The IPP Job Template attributes defined in section 5;
- 1702 3. The internationalization considerations in section 8; and
- 1703 4. The security considerations in section 9.

1704 **7.2 Conformance Requirements for Printers**

1705 In order for a Printer to claim conformance to this specification, a Printer **MUST** support:

- 1706 1. The IPP Printer attributes for any supported finishings defined in section 6;
- 1707 2. The IPP Job Template attributes for any supported finishings defined in section
1708 5;
- 1709 3. The internationalization considerations in section 8; and
- 1710 4. The security considerations in section 9.

1711 **8. Internationalization Considerations**

1712 For interoperability and basic support for multiple languages, conforming implementations
1713 **MUST** support:

- 1714 5. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
1715 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1716 6. The Unicode Format for Network Interchange [RFC5198] which requires
1717 transmission of well-formed UTF-8 strings and recommends transmission of
1718 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1719 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1720 characters and combining marks) followed by Canonical Composition (into canonical
1721 composed characters wherever Unicode has assigned them).

1722 **WARNING** – Performing normalization on UTF-8 strings received from IPP Clients and
1723 subsequently storing the results (e.g., in IPP Job objects) could cause false negatives in IPP
1724 Client searches and failed access (e.g., to IPP Printers with percent-encoded UTF-8 URIs
1725 now 'hidden').

1726 **9. Security Considerations**

1727 In addition to the security considerations described in the IPP/1.1: Model and Semantics
 1728 [RFC2911], implementations MAY support different access control to various finishing
 1729 features, depending on the identity of the User submitting the Job.

1730 **10. IANA and PWG Considerations**

1731 **10.1 Attribute Registrations**

1732 The attributes defined in this document will be published by IANA according to the
 1733 procedures in IPP Model and Semantics [RFC2911] section 6.2 in the following file:

1734 <http://www.iana.org/assignments/ipp-registrations>

1735 The registry entries will contain the following information:

1736 Job Template attributes:	Reference
1737 -----	-----
1738 finishings-col (no-value 1setOf collection)	[PWG5100.1]
1739 baling (collection)	[PWG5100.1]
1740 baling-type (type2 keyword name(MAX))	[PWG5100.1]
1741 baling-when (type2 keyword)	[PWG5100.1]
1742 binding (collection)	[PWG5100.1]
1743 binding-reference-edge (type1 keyword)	[PWG5100.1]
1744 binding-type (type2 keyword name(MAX))	[PWG5100.1]
1745 coating (collection)	[PWG5100.1]
1746 coating-sides (type1 keyword)	[PWG5100.1]
1747 coating-type (type2 keyword name(MAX))	[PWG5100.1]
1748 covering (collection)	[PWG5100.1]
1749 covering-name (type2 keyword name(MAX))	[PWG5100.1]
1750 finishing-template (name(MAX) type2 keyword)	[PWG5100.1]
1751 folding (1setOf collection)	[PWG5100.1]
1752 folding-direction (type1 keyword)	[PWG5100.1]
1753 folding-offset (integer(0:MAX))	[PWG5100.1]
1754 folding-reference-edge (type1 keyword)	[PWG5100.1]
1755 laminating (collection)	[PWG5100.1]
1756 laminating-sides (type1 keyword)	[PWG5100.1]
1757 laminating-type (type2 keyword name(MAX))	[PWG5100.1]
1758 punching (collection)	[PWG5100.1]
1759 punching-locations (1setOf integer(0:MAX))	[PWG5100.1]
1760 punching-offset (integer(0:MAX))	[PWG5100.1]
1761 punching-reference-edge (type1 keyword)	[PWG5100.1]
1762 stitching (collection)	[PWG5100.3]
1763 stitching-angle (integer(0:359))	[PWG5100.1]
1764 stitching-method (type2 keyword)	[PWG5100.1]
1765 trimming (1setOf collection)	[PWG5100.1]
1766 trimming-offset (integer(0:MAX))	[PWG5100.1]
1767 trimming-reference-edge (type1 keyword)	[PWG5100.1]
1768 trimming-type (type2 keyword name(MAX))	[PWG5100.1]
1769 trimming-when (type2 keyword)	[PWG5100.1]

1770	job-pages-per-set (integer(1:MAX))	[PWG5100.1]
1771		
1772		
1773	Printer Description attributes:	Reference
1774	-----	-----
1775	balancing-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1776	balancing-when-supported (1setOf type2 keyword)	[PWG5100.1]
1777	binding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1778	binding-type-supported (1setOf type2 keyword)	[PWG5100.1]
1779	coating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1780	coating-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1781	covering-name-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1782		[PWG5100.1]
1783	finishing-template-supported (1setOf (name(MAX) type2 keyword))	[PWG5100.1]
1784		[PWG5100.1]
1785	finishings-col-database (1setOf collection)	[PWG5100.1]
1786	< member attributes are the same as finishings-col >	[PWG5100.1]
1787	folding-direction-supported (1setOf type1 keyword)	[PWG5100.1]
1788	folding-offset-supported (1setOf (integer(0:MAX) rangeOfInteger(0:MAX)))	[PWG5100.1]
1789		[PWG5100.1]
1790	folding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1791	laminating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1792	laminating-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1793		[PWG5100.1]
1794	job-pages-per-set-supported (boolean)	[PWG5100.1]
1795	printer-finisher (1setOf octetString(MAX))	[PWG5100.1]
1796	printer-finisher-description (1setOf text(MAX))	[PWG5100.1]
1797	punching-hole-diameter-configured (integer(0:MAX))	[PWG5100.1]
1798	punching-locations-supported (1setOf (integer(0:MAX)	
1799	rangeOfInteger(0:MAX)))	[PWG5100.1]
1800	punching-offset-supported (1setOf (integer(0:MAX)	
1801	rangeOfInteger(0:MAX)))	[PWG5100.1]
1802	punching-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1803	stitching-angle-supported (1setOf (integer(0:359)	
1804	rangeOfInteger(0:359)))	[PWG5100.1]
1805	stitching-method-supported (1setOf (type2 keyword))	[PWG5100.1]
1806	trimming-offset-supported (1setOf (integer(0:MAX)	
1807	rangeOfInteger(0:MAX)))	[PWG5100.1]
1808	trimming-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1809	trimming-type-supported (1setOf type2 keyword)	[PWG5100.1]
1810	trimming-when-supported (1setOf type2 keyword)	[PWG5100.1]

1811 **10.2 Attribute Value Registrations**

1812 The keyword attribute values defined in this document will be published by IANA according
 1813 to the procedures in the IPP Model and Semantics [RFC2911] section 6.1 in the following
 1814 file:

1815 <http://www.iana.org/assignments/ipp-registrations>

1816 The registry entries will contain the following information:

1817	Attributes (attribute syntax)	
1818	Keyword Attribute Value	Reference

1819	-----	-----
1820	baling-type (type2 keyword name(MAX))	[PWG5100.1]
1821	band	[PWG5100.1]
1822	shrink-wrap	[PWG5100.1]
1823	wrap	[PWG5100.1]
1824	baling-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1825	< all baling-type values >	
1826		
1827	baling-when (type2 keyword)	[PWG5100.1]
1828	after-sets	[PWG5100.1]
1829	after-job	[PWG5100.1]
1830	baling-when-supported (1setOf type2 keyword)	[PWG5100.1]
1831	< all baling-when values >	[PWG5100.1]
1832		
1833	binding-reference-edge (type1 keyword)	[PWG5100.1]
1834	bottom	[PWG5100.1]
1835	left	[PWG5100.1]
1836	right	[PWG5100.1]
1837	top	[PWG5100.1]
1838	binding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1839	< all binding-reference-edge values >	[PWG5100.1]
1840		
1841	binding-type (type2 keyword name(MAX))	[PWG5100.1]
1842	adhesive	[PWG5100.1]
1843	comb	[PWG5100.1]
1844	flat	[PWG5100.1]
1845	padding	[PWG5100.1]
1846	perfect	[PWG5100.1]
1847	spiral	[PWG5100.1]
1848	tape	[PWG5100.1]
1849	velo	[PWG5100.1]
1850	binding-type-supported ((1setOf type2 keyword name(MAX)))	[PWG5100.1]
1851	< all binding-type values >	[PWG5100.1]
1852		
1853	coating-sides (type1 keyword)	[PWG5100.1]
1854	back	[PWG5100.1]
1855	both	[PWG5100.1]
1856	front	[PWG5100.1]
1857	coating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1858	< all coating-sides values >	[PWG5100.1]
1859		
1860	coating-type (type2 keyword name(MAX))	[PWG5100.1]
1861	archival	[PWG5100.1]
1862	archival-glossy	[PWG5100.1]
1863	archival-matte	[PWG5100.1]
1864	archival-semi-gloss	[PWG5100.1]
1865	glossy	[PWG5100.1]
1866	high-gloss	[PWG5100.1]
1867	matte	[PWG5100.1]
1868	semi-gloss	[PWG5100.1]
1869	silicone	[PWG5100.1]
1870	translucent	[PWG5100.1]
1871	coating-type-supported ((1setOf type2 keyword name(MAX)))	[PWG5100.1]
1872	< all coating-type values >	[PWG5100.1]
1873		
1874	covering-name (type2 keyword name(MAX))	[PWG5100.1]

1875	plain	[PWG5100.1]
1876	pre-cut	[PWG5100.1]
1877	pre-printed	[PWG5100.1]
1878	covering-name-supported (1setOf (type2 keyword name(MAX)))	
1879		[PWG5100.1]
1880	< all covering-name values >	[PWG5100.1]
1881		
1882	finishing-template (name(MAX) type2 keyword)	[PWG5100.1]
1883	bale	[PWG5100.1]
1884	bind	[PWG5100.1]
1885	bind-bottom	[PWG5100.1]
1886	bind-left	[PWG5100.1]
1887	bind-right	[PWG5100.1]
1888	bind-top	[PWG5100.1]
1889	booklet-maker	[PWG5100.1]
1890	coat	[PWG5100.1]
1891	cover	[PWG5100.1]
1892	edge-stitch	[PWG5100.1]
1893	edge-stitch-bottom	[PWG5100.1]
1894	edge-stitch-left	[PWG5100.1]
1895	edge-stitch-right	[PWG5100.1]
1896	edge-stitch-top	[PWG5100.1]
1897	fold	[PWG5100.1]
1898	fold-accordion	[PWG5100.1]
1899	fold-double-gate	[PWG5100.1]
1900	fold-engineering-z	[PWG5100.1]
1901	fold-gate	[PWG5100.1]
1902	fold-half	[PWG5100.1]
1903	fold-half-z	[PWG5100.1]
1904	fold-left-gate	[PWG5100.1]
1905	fold-letter	[PWG5100.1]
1906	fold-parallel	[PWG5100.1]
1907	fold-poster	[PWG5100.1]
1908	fold-right-gate	[PWG5100.1]
1909	fold-z	[PWG5100.1]
1910	jdf-f2-1	[PWG5100.1]
1911	jdf-f4-1	[PWG5100.1]
1912	jdf-f4-2	[PWG5100.1]
1913	jdf-f6-1	[PWG5100.1]
1914	jdf-f6-2	[PWG5100.1]
1915	jdf-f6-3	[PWG5100.1]
1916	jdf-f6-4	[PWG5100.1]
1917	jdf-f6-5	[PWG5100.1]
1918	jdf-f6-6	[PWG5100.1]
1919	jdf-f6-7	[PWG5100.1]
1920	jdf-f6-8	[PWG5100.1]
1921	jdf-f8-1	[PWG5100.1]
1922	jdf-f8-2	[PWG5100.1]
1923	jdf-f8-3	[PWG5100.1]
1924	jdf-f8-4	[PWG5100.1]
1925	jdf-f8-5	[PWG5100.1]
1926	jdf-f8-6	[PWG5100.1]
1927	jdf-f8-7	[PWG5100.1]
1928	jdf-f10-1	[PWG5100.1]
1929	jdf-f10-2	[PWG5100.1]
1930	jdf-f10-3	[PWG5100.1]

1931	jdf-f12-1	[PWG5100.1]
1932	jdf-f12-2	[PWG5100.1]
1933	jdf-f12-3	[PWG5100.1]
1934	jdf-f12-4	[PWG5100.1]
1935	jdf-f12-5	[PWG5100.1]
1936	jdf-f12-6	[PWG5100.1]
1937	jdf-f12-7	[PWG5100.1]
1938	jdf-f12-8	[PWG5100.1]
1939	jdf-f12-9	[PWG5100.1]
1940	jdf-f12-10	[PWG5100.1]
1941	jdf-f12-11	[PWG5100.1]
1942	jdf-f12-12	[PWG5100.1]
1943	jdf-f12-13	[PWG5100.1]
1944	jdf-f12-14	[PWG5100.1]
1945	jdf-f14-1	[PWG5100.1]
1946	jdf-f16-1	[PWG5100.1]
1947	jdf-f16-2	[PWG5100.1]
1948	jdf-f16-3	[PWG5100.1]
1949	jdf-f16-4	[PWG5100.1]
1950	jdf-f16-5	[PWG5100.1]
1951	jdf-f16-6	[PWG5100.1]
1952	jdf-f16-7	[PWG5100.1]
1953	jdf-f16-8	[PWG5100.1]
1954	jdf-f16-9	[PWG5100.1]
1955	jdf-f16-10	[PWG5100.1]
1956	jdf-f16-11	[PWG5100.1]
1957	jdf-f16-12	[PWG5100.1]
1958	jdf-f16-13	[PWG5100.1]
1959	jdf-f16-14	[PWG5100.1]
1960	jdf-f18-1	[PWG5100.1]
1961	jdf-f18-2	[PWG5100.1]
1962	jdf-f18-3	[PWG5100.1]
1963	jdf-f18-4	[PWG5100.1]
1964	jdf-f18-5	[PWG5100.1]
1965	jdf-f18-6	[PWG5100.1]
1966	jdf-f18-7	[PWG5100.1]
1967	jdf-f18-8	[PWG5100.1]
1968	jdf-f18-9	[PWG5100.1]
1969	jdf-f20-1	[PWG5100.1]
1970	jdf-f20-2	[PWG5100.1]
1971	jdf-f24-1	[PWG5100.1]
1972	jdf-f24-2	[PWG5100.1]
1973	jdf-f24-3	[PWG5100.1]
1974	jdf-f24-4	[PWG5100.1]
1975	jdf-f24-5	[PWG5100.1]
1976	jdf-f24-6	[PWG5100.1]
1977	jdf-f24-7	[PWG5100.1]
1978	jdf-f24-8	[PWG5100.1]
1979	jdf-f24-9	[PWG5100.1]
1980	jdf-f24-10	[PWG5100.1]
1981	jdf-f24-11	[PWG5100.1]
1982	jdf-f28-1	[PWG5100.1]
1983	jdf-f32-1	[PWG5100.1]
1984	jdf-f32-2	[PWG5100.1]
1985	jdf-f32-3	[PWG5100.1]
1986	jdf-f32-4	[PWG5100.1]

1987	jdf-f32-5	[PWG5100.1]
1988	jdf-f32-6	[PWG5100.1]
1989	jdf-f32-7	[PWG5100.1]
1990	jdf-f32-8	[PWG5100.1]
1991	jdf-f32-9	[PWG5100.1]
1992	jdf-f36-1	[PWG5100.1]
1993	jdf-f36-2	[PWG5100.1]
1994	jdf-f40-1	[PWG5100.1]
1995	jdf-f48-1	[PWG5100.1]
1996	jdf-f48-2	[PWG5100.1]
1997	jdf-f64-1	[PWG5100.1]
1998	jdf-f64-2	[PWG5100.1]
1999	jog-offset	[PWG5100.1]
2000	laminate	[PWG5100.1]
2001	punch	[PWG5100.1]
2002	punch-bottom-left	[PWG5100.1]
2003	punch-bottom-right	[PWG5100.1]
2004	punch-dual-bottom	[PWG5100.1]
2005	punch-dual-left	[PWG5100.1]
2006	punch-dual-right	[PWG5100.1]
2007	punch-dual-top	[PWG5100.1]
2008	punch-multiple-bottom	[PWG5100.1]
2009	punch-multiple-left	[PWG5100.1]
2010	punch-multiple-right	[PWG5100.1]
2011	punch-multiple-top	[PWG5100.1]
2012	punch-quad-bottom	[PWG5100.1]
2013	punch-quad-left	[PWG5100.1]
2014	punch-quad-right	[PWG5100.1]
2015	punch-quad-top	[PWG5100.1]
2016	punch-top-left	[PWG5100.1]
2017	punch-top-right	[PWG5100.1]
2018	punch-triple-bottom	[PWG5100.1]
2019	punch-triple-left	[PWG5100.1]
2020	punch-triple-right	[PWG5100.1]
2021	punch-triple-top	[PWG5100.1]
2022	saddle-stitch	[PWG5100.1]
2023	staple	[PWG5100.1]
2024	staple-bottom-left	[PWG5100.1]
2025	staple-bottom-right	[PWG5100.1]
2026	staple-dual-bottom	[PWG5100.1]
2027	staple-dual-left	[PWG5100.1]
2028	staple-dual-right	[PWG5100.1]
2029	staple-dual-top	[PWG5100.1]
2030	staple-top-left	[PWG5100.1]
2031	staple-top-right	[PWG5100.1]
2032	staple-triple-bottom	[PWG5100.1]
2033	staple-triple-left	[PWG5100.1]
2034	staple-triple-right	[PWG5100.1]
2035	staple-triple-top	[PWG5100.1]
2036	trim	[PWG5100.1]
2037	trim-after-copies	[PWG5100.1]
2038	trim-after-documents	[PWG5100.1]
2039	trim-after-job	[PWG5100.1]
2040	trim-after-pages	[PWG5100.1]
2041	finishing-template-supported (1setOf (type2 keyword name (MAX)))	
2042		[PWG5200.FIN]

2043	< any finishing-template value >	[PWG5100.1]
2044		
2045	folding-direction (type1 keyword)	[PWG5100.1]
2046	inward	[PWG5100.1]
2047	outward	[PWG5100.1]
2048	folding-direction-supported (1setOf type1 keyword)	[PWG5100.1]
2049	< all folding-direction values >	[PWG5100.1]
2050		
2051	folding-reference-edge (type1 keyword)	[PWG5100.1]
2052	bottom	[PWG5100.1]
2053	left	[PWG5100.1]
2054	right	[PWG5100.1]
2055	top	[PWG5100.1]
2056	folding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2057	< all folding-reference-edge values >	[PWG5100.1]
2058		
2059	laminating-sides (type1 keyword)	[PWG5100.1]
2060	back	[PWG5100.1]
2061	both	[PWG5100.1]
2062	front	[PWG5100.1]
2063	laminating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
2064	< all laminating-sides values >	[PWG5100.1]
2065		
2066	laminating-type (type2 keyword name(MAX))	[PWG5100.1]
2067	archival	[PWG5100.1]
2068	glossy	[PWG5100.1]
2069	high-gloss	[PWG5100.1]
2070	matte	[PWG5100.1]
2071	semi-gloss	[PWG5100.1]
2072	translucent	[PWG5100.1]
2073	laminating-type-supported ((1setOf type2 keyword name(MAX)))	[PWG5100.1]
2074	< all laminating-type values >	[PWG5100.1]
2075		
2076		
2077	punching-reference-edge (type1 keyword)	[PWG5100.1]
2078	bottom	[PWG5100.1]
2079	left	[PWG5100.1]
2080	right	[PWG5100.1]
2081	top	[PWG5100.1]
2082	punching-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2083	< all punching-reference-edge values >	[PWG5100.1]
2084		
2085	stitching-method (type2 keyword)	[PWG5100.1]
2086	auto	[PWG5100.1]
2087	crimp	[PWG5100.1]
2088	wire	[PWG5100.1]
2089	stitching-method-supported (1setOf type2 keyword)	[PWG5100.1]
2090	< all stitching-method values >	[PWG5100.1]
2091		
2092	trimming-reference-edge (type1 keyword)	[PWG5100.1]
2093	bottom	[PWG5100.1]
2094	left	[PWG5100.1]
2095	right	[PWG5100.1]
2096	top	[PWG5100.1]
2097	trimming-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2098	< all trimming-reference-edge values >	[PWG5100.1]

2099		
2100	trimming-type (type2 keyword name(MAX))	[PWG5100.1]
2101	draw-line	[PWG5100.1]
2102	full	[PWG5100.1]
2103	partial	[PWG5100.1]
2104	perforate	[PWG5100.1]
2105	score	[PWG5100.1]
2106	tab	[PWG5100.1]
2107	trimming-type-supported (1setOf type2 keyword)	[PWG5100.1]
2108	< all trimming-type values >	[PWG5100.1]
2109		
2110	trimming-when (type2 keyword)	[PWG5100.1]
2111	after-documents	[PWG5100.1]
2112	after-job	[PWG5100.1]
2113	after-sheets	[PWG5100.1]
2114	after-sets	[PWG5100.1]
2115	trimming-when-supported (1setOf type2 keyword)	[PWG5100.1]
2116	< all trimming-when values >	[PWG5100.1]

2117 **10.3 Type2 enum Attribute Value Registrations**

2118 The enumerations defined in this document will be published by IANA according to the
 2119 procedures in the IPP Model and Semantics [RFC2911] section 6.2 in the following file:

2120 <http://www.iana.org/assignments/ipp-registrations>

2121 The registry entries will contain the following information:

2122	Attributes (attribute syntax)		
2123	Enum Value	Enum Symbolic Name	Reference
2124	-----	-----	-----
2125	finishings (1setOf type2 enum)		[RFC2911]
2126	15	coat	[PWG5100.1]
2127	16	laminate	[PWG5100.1]
2128	32	staple-triple-left	[PWG5100.1]
2129	33	staple-triple-top	[PWG5100.1]
2130	34	staple-triple-right	[PWG5100.1]
2131	35	staple-triple-bottom	[PWG5100.1]
2132	70	punch-top-left	[PWG5100.1]
2133	71	punch-bottom-left	[PWG5100.1]
2134	72	punch-top-right	[PWG5100.1]
2135	73	punch-bottom-right	[PWG5100.1]
2136	74	punch-dual-left	[PWG5100.1]
2137	75	punch-dual-top	[PWG5100.1]
2138	76	punch-dual-right	[PWG5100.1]
2139	77	punch-dual-bottom	[PWG5100.1]
2140	78	punch-triple-left	[PWG5100.1]
2141	79	punch-triple-top	[PWG5100.1]
2142	80	punch-triple-right	[PWG5100.1]
2143	81	punch-triple-bottom	[PWG5100.1]
2144	82	punch-quad-left	[PWG5100.1]
2145	83	punch-quad-top	[PWG5100.1]
2146	84	punch-quad-right	[PWG5100.1]
2147	85	punch-quad-bottom	[PWG5100.1]

2148	86	punch-multiple-left	[PWG5100.1]
2149	87	punch-multiple-top	[PWG5100.1]
2150	88	punch-multiple-right	[PWG5100.1]
2151	89	punch-multiple-bottom	[PWG5100.1]
2152	90	fold-accordion	[PWG5100.1]
2153	91	fold-double-gate	[PWG5100.1]
2154	92	fold-gate	[PWG5100.1]
2155	93	fold-half	[PWG5100.1]
2156	94	fold-half-z	[PWG5100.1]
2157	95	fold-left-gate	[PWG5100.1]
2158	96	fold-letter	[PWG5100.1]
2159	97	fold-parallel	[PWG5100.1]
2160	98	fold-poster	[PWG5100.1]
2161	99	fold-right-gate	[PWG5100.1]
2162	100	fold-z	[PWG5100.1]
2163	101	fold-engineering-z	[PWG5100.1]

2164 10.4 PWG Semantic Model Registrations

2165 The IPP attributes and values defined in this specification and listed in the preceding
 2166 sections will be added to the PWG Semantic Model XML schema using the method defined
 2167 in section 21 of [PWG5108.07].

2168 11. Overview of Changes

2169 11.1 Changes in IPP Finishings v2.1

2170 The following changes were made for IPP Finishings v2.1:

- 2171 • Added finishing enums and templates for multiple-hole punching and an engineering Z
 2172 fold.
- 2173 • Defined an extension naming convention for the "finishing-template" member attribute.
- 2174 • Added the "media-sheets-supported" member attribute for the "finishings-col-database"
 2175 and "finishings-col-ready" attributes.
- 2176 • Added the "stitching-method" member attribute for the "finishings-col", "finishings-col-
 2177 database", and "finishings-col-ready" attributes.
- 2178 • Added the "printer-finisher-supplies" and "printer-finisher-supplies-description"
 2179 attributes.

2180 11.2 Changes in IPP Finishings v2.0

2181 The following changes were made for IPP Finishings v2.0:

2182

- 2183 • Moved definition of PWG 5100.3 "finishings-col" attribute to this document and added
2184 new member attributes for all finishings processes.
- 2185 • Added finishing enums and templates for coating, lamination, triple stapling, different
2186 kinds of punching, and common folds.
- 2187 • Added the "finishings-col-database" and "job-pages-per-set" attributes.
- 2188 • Added the "media-size" and "media-size-name" member attributes for the "finishings-col-
2189 database" and "finishings-col-ready" attributes.

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2277

2278 **13. Authors' Addresses**

2279 Michael Sweet
2280 1 Infinite Loop
2281 M/S 111-HOMC
2282 Cupertino, CA 95014
2283 msweet@apple.com
2284

2285 Smith Kennedy
2286 11311 Chinden Blvd. MS 506
2287 Boise, ID 83714
2288 smith.kennedy@hp.com

2289 The author would also like to thank the following individuals for their contributions to this
2290 standard:

2291 Richard Blanchard (Apple)
2292 Don Fullman (original Author)
2293 Tom Hastings (original Author)
2294 Ira McDonald (High North)
2295 Rick Yardumian (Canon)
2296

2297 **14. Change History**

2298 **14.1 January 11, 2017**

2299 Last Call Resolved Comments draft:

- 2300
- 2301 • SK1: Add to the definition of "job-pages-per-set" mention that the value for this
2302 attribute MUST match "copies" if "copies" is included in the job creation / document
submission operation.
 - 2303 • SK2: Replace "media-source-feed-orientation" with "media-source-feed-direction" in
2304 the "job-constraints-supported" / "job-resolvers-supported" example on page 45
 - 2305 • JR1: Section 3.3.3 explicitly discusses ordering of options yet in 3.4 Out of Scope #1
2306 claims the opposite.

2307 **14.2 November 9, 2016**

2308 Minor editorial changes

- 2309
- Added new section 11 "Overview of Changes"

- 2310 • Minor rewording of a sentence to fix Word formatting weirdness that occurs when a
2311 reference is at the start of a paragraph.

2312 **14.3 October 25, 2016**

2313 Updated as per notes from Oct. 19, 2016 IPP WG Meeting to resolve a wide range of editorial
2314 issues. No technical updates. Possibly ready for WGLC.

- 2315 • Fixed ABNF / tables / examples in 6.18-6.21
- 2316 • Cross-referenced "job-media-sheets-supported"
- 2317 • Various editorial fixes

2318 **14.4 October 18, 2016**

2319 A variety of issues resolved following feedback and discussion in the WG meeting and on
2320 the reflector:

- 2321 • Added a new "media-sheets-supported" member attribute to "finishings-col" to specify
2322 the minimum and maximum number of sheets supported by the finishing template
2323 described in the "finishings-col", because this now allows it to be specified on a per-
2324 finishing-template basis.
- 2325 • Updated definition of "printer-finisher-supplies" to have correct ABNF and examples
- 2326 • Added a new "printer-finisher-supplies-description" attribute to convey the localized
2327 string label for a "printer-finisher-supplies" supply.
- 2328 • Add a non-normative reference to the PAPI specification.
- 2329 • Fixed the structure of several of the examples to use a PAPI syntactic presentation,
2330 for consistency with other recent PWG specifications and other examples within this
2331 specification
- 2332 • Added IANA listings for 'punch-multiple-bottom', 'punch-multiple-left', 'punch-multiple-
2333 right', and 'punch-multiple-top', for completeness.

2334 **14.5 October 4, 2016**

2335 Updated following discussion on IPP reflector and other discussions:

- 2336 • In section 5.3 , enhanced definition of "job-pages-per-set" to clarify that the value
2337 needs to be an exact multiple of the number of pages in all Documents in the Job,
2338 which also clarifies the expectations of how that attribute value is set in the case of a
2339 multiple document Job.

- 2340 • Modified the "job-constraints-supported" attribute example at the end of section 6.9:
 - 2341 ○ Removed mention of "media-source"='tray-2' because the input source doesn't
 - 2342 matter.
 - 2343 ○ Added a second value to "finishings" and "finishing-template" so that the
 - 2344 example illustrates that attributes in a constraint can have more than one value
 - 2345 even when the attribute itself is defined to have only one value. Also called this
 - 2346 out with an additional sentence below the example.
 - 2347 ○ Moved open curly braces to the same line as the equal sign to reduce number
 - 2348 of lines used
- 2349 • Modified the "job-resolvers-supported" attribute example at the end of section 6.9:
 - 2350 ○ make the resolution either use "short-edge-feed" or to change the media
 - 2351 source to 'manual' where the user might be instructed via a prompt to provide
 - 2352 the needed media size and feed orientation.
 - 2353 ○ Moved open curly braces to the same line as the equal sign to reduce number
 - 2354 of lines used
 - 2355 ○ Removed mention of alternate stitching angles because they don't resolve the
 - 2356 problem

2357 **14.6 September 26, 2016**

- 2358 In the process of considering how the Printer can indicate the maximum number of sheets
2359 supported by one of its finisher units, a few additions were made.
- 2360 • Made some modifications to the "printer-finisher" definition including updates to 'Table
2361 2 - Keywords for "printer-finisher"'.
 - 2362 • Added a new "printer-finisher-supplies" attribute that conveys the finisher unit's
 - 2363 supplies information, which is defined in "Printer Finishing MIB" [RFC3806] but has
 - 2364 no IPP equivalent.
 - 2365 • Added a comment to section 5.3 "job-pages-per-set" asking for a description of how
 - 2366 "job-pages-per-set" would work in the case where the Job contains multiple
 - 2367 Documents.

2368 **14.7 August 15, 2016**

- 2369 Updated to Stable draft status. No changes other than updating the status label and the
2370 date.

2371 14.8 July 28, 2016

2372 Updated to become a Prototype draft as per minutes and discussion in July 25, 2016 IPP
2373 WG meeting:

- 2374 • Fix wording in section 5.1
- 2375 • Fix formatting in section 5.2
- 2376 • Update text in 5.2.1
- 2377 • Change all double quotes around values to single quotes
- 2378 • Change all uses of the word "Job" to be capitalized
- 2379 • Reworded section 6.10 a bit, and fixed example for "job-constraints-supported" and
2380 "job-resolvers-supported"
- 2381 • Fixed formatting of subsections of 6.18 which got messed up through the amazing
2382 powers of MS Word
- 2383 • Various editorial fixes to clean up the document

2384 14.9 July 20, 2016

2385 Updated as per minutes from IPP Working Group meetings on May 23 and June 13, 2016
2386 and additional email dialogs on the IPP Working Group reflector:

- 2387 • Added subtype naming convention to definition of "finishing-template" to support, for
2388 instance, the Swedish "trio binding" 4-hole punch pattern without having to define a
2389 new base "finishings" enum value and "finishing-template" keyword
- 2390 • Elaborated description of "finishings-col-database" to cover several needed topics
 - 2391 ○ Updated the example to include "punch-triple-left" and renamed "staple" to be
2392 "staple-top-left"
 - 2393 ○ Used the example to clarify that the "finishings-col" collections each could
2394 define the details of a particular "finishing-template" keyword, and that
2395 combinatorial permutations produced by combining 2 or more keyword
2396 definitions (e.g. "staple-top-left_punch-triple-left") could not be enumerated in
2397 "finishings-col-database" or "finishings-col-ready"; a Client could be able to
2398 combine them on its own
 - 2399 ○ Recommended the use of "job-constraints-supported" and "job-resolvers-
2400 supported" to define limitations between "finishings-col" collections and

- 2401 particular feed orientations or similar interactions between finishings attributes
2402 and other Job Template attributes (e.g.
- 2403 • Removed "feed-orientation" member attribute from "finishings-col" because this is
2404 now handled using "job-constraints-supported" and "job-resolvers-supported"
- 2405 • Updated Figure 1 and Figure 2 and added a new Figure 3 to show the orientation and
2406 leading edge with "feed-orientation" = 'long-edge-first'
- 2407 • Added a missing "fold-engineering-z" entry in section 10.2 for "finishing-template"

2408 **14.10 May 9, 2016**

- 2409 Updated as per minutes from April 2016 F2F IPP WG minutes (ippv2-f2f-minutes-
2410 20160427.pdf):
- 2411 • Moved the new use 3.2.17 to the exceptions sub-section (3.3) and reworded
- 2412 • Removed "punching-hole-diameter" as a member attribute of "punching", and
2413 replaced "punching-hole-diameter-supported" with "punching-hole-diameter-
2414 configured" since at this time there are no printers with finishers that support alternate
2415 hole diameters.
- 2416 • Changed staple rotation back to use counter-clockwise rotation, and specified
2417 horizontal as 0°
- 2418 • Cleaned up IANA registration listings to remove some that are unnecessarily
2419 redundant with 5100.3
- 2420 • Added references to 5101.1 and RFC 20

2421

2422 **14.11 April 18, 2016**

- 2423 Updated as per feedback from 2016-04-11 conference call, in preparation for April 2016
2424 F2F.
- 2425 • Updated IANA Attribute Registrations to add attribute listings new in 2.1, as well as
2426 ones in 2.0 that were missing in this section
- 2427 • Fixed text for punching and stitching to simplify descriptions of location, and
2428 stopped using the term "origin"
- 2429 • Added the "stitching-method" member attribute to "stitching", and the "stitching-
2430 method-supported" Printer Description attribute

- 2431 • Updated references to list Finishings 2.0 as an informative reference
- 2432 • Added mention of 'fold-engineering-z' in 5.2.6.4 and in 5.1.x "finishings" value
2433 listings
- 2434 • Added 'draw-line' keyword to "trimming-type"
2435
- 2436 **14.12 April 11, 2016**
- 2437 Initial revision of v2.1.
- 2438 • Added statement clarifying the location of the origin (primary point of reference) of a
2439 punch hole
- 2440 • Added "punching-hole-diameter" attribute to allow the punch hole's diameter to be
2441 specified, and corresponding "punching-hole-diameter-supported" Printer attribute
- 2442 • Added statement clarifying the location of the origin (primary point of reference) of a
2443 stitch / staple
- 2444 • Added "stitching-angle" member attribute to stitching to allow the stitch or staple's
2445 angle to be specified, and corresponding "stitching-angle-supported" Printer
2446 attribute
2447