



The Printer Working Group

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Working Draft

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IPP Job Extensions v2.0 (JOBEXT)

Status: Stable

Abstract: This specification defines the "media-col" Job Template attribute and extends the Job management, monitoring, and processing capabilities of IPP.

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

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

This specification is available electronically at:

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79 multiple independent and interoperable implementations. Printer manufacturers and
80 vendors of printer related software benefit from the interoperability provided by voluntary
81 conformance to these standards.

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298 1. Introduction

299 This specification defines the "media-col" Job Template attribute and extends the Job
300 management, monitoring, and processing capabilities of IPP. This specification obsoletes
301 portions of the previous version of this specification [PWG5100.7-2003] - a list of changes
302 can be found in section 15. This specification also incorporates portions of the original IPP
303 Production Printing Attributes - Set 1 [PWG5100.3-2001], obsolete IPP Job and Printer
304 Extensions - Set 2 [PWG5100.11-2010], and IPP Job and Printer Extensions - Set 3 (JPS3)
305 [PWG5100.13-2012] specifications.

306 1.1 Document Natural Language and Character Set

307 Certain Document formats are ambiguous about the natural language and character set
308 used in a file. The Internet Printing Protocol/1.1 [STD92] defines the "document-natural-
309 language" operation attribute to specify the natural language in Document Creation
310 operations but does not provide a way to specify the character set. In addition, there is no
311 way for a Client to discover which languages and character sets are supported by a Printer
312 for a given Document format. This specification defines attributes for specifying and
313 discovering supported languages and character sets.

314 1.2 Attribute Fidelity

315 The Internet Printing Protocol/1.1 [STD92] defines the "ipp-attribute-fidelity" operation
316 attribute to enforce the fidelity of all attributes in the Job Creation request. This specification
317 defines an operation attribute to enforce the fidelity of a subset of attributes in the Job
318 Creation request.

319 1.3 Rendering Optimizations

320 Most Printers are able to optimize output for different kinds of Document data using a higher
321 resolution for black text and lines, for example. However, the Internet Printing Protocol/1.1
322 [STD92] only defines the "print-quality" and "printer-resolution" Job Template attributes that
323 specify the overall quality and resolution of the output. This specification defines an attribute
324 with corresponding values for specifying the type of optimizations to perform.

325 1.4 Printing on a Specific Output Device

326 The Internet Printing Protocol/1.1 [STD92] defines the "output-device-assigned" Job Status
327 attribute but does not define corresponding Job Template or Printer Description attributes
328 for specifying which Output Device to use for a Job.

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329 1.5 Results of Job/Document Processing

330 The Internet Printing Protocol/1.1 [STD92] defines some Job Status attributes and values
331 but none of them provide information about processing issues that do not prevent a Job or
332 Document from being printed. This specification defines attributes and values for discovering
333 those processing issues.

334 1.6 Job Scheduling and Lifecycle

335 The Internet Printing Protocol/1.1 [STD92] defines the "job-hold-until (keyword |
336 name(MAX))" Job Template attribute to hold a Job for processing until a named time period.
337 This specification defines an additional Job Template attribute that holds the Job for
338 processing until the specified date and time.

339 This specification also includes the "job-delay-output-until (keyword | name(MAX))" and "job-
340 delay-output-until-time (dateTime)" Job Template attributes [PWG5100.11-2010] that delay
341 output of a Job until the specified time.

342 In addition, this specification defines Job Template attributes to schedule when a pending
343 Job is canceled automatically, Job Template attributes to specify when a Job should
344 transition from the retained phase to the history phase, and Printer Description attributes to
345 specify how long a Job stays in the history phase.

346 1.7 Job Operations

347 The Internet Printing Protocol/1.1 [STD92] defines many operations that operate on a single
348 Job object. This specification defines new operations that:

- 349 • Cancel all Jobs on a given Printer;
- 350 • Cancel all Jobs owned by a User on a given Printer;
- 351 • Close a Job in the 'pending' state that is still open for additional Document
352 submissions; and
- 353 • Resubmit an existing Job for processing as a new Job, potentially with different Job
354 Template attributes and values.

355 This specification also extends the Get-Jobs operation to support additional values for the
356 "which-jobs" operation attribute.

357 1.8 Obsolete Attributes and Values

358 The original version of this specification [PWG5100.7-2003] defines several attributes and
359 values that have proven problematic from an interoperability and privacy standpoint. This
360 specification obsoletes these attributes and values.

361 2. Terminology

362 2.1 Conformance Terminology

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

368 The term DEPRECATED is used for previously defined and approved protocol elements that
369 SHOULD NOT be used or implemented. The term OBSOLETE is used for previously defined
370 and approved protocol elements that MUST NOT be used or implemented.

371 2.2 Printing Terminology

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

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

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

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

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

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

384 2.3 Protocol Role Terminology

385 This document also defines the following protocol roles to specify unambiguous
386 conformance requirements:

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

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

392 2.4 Other Terminology

393 *Completed Job*: a Job in the 'aborted', 'canceled', or 'completed' state.

394 *Document Creation Operation*: operations that accept Document Content. Specifically:
395 Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are
396 both Job Creation and Document Creation operations.

397 *Job Creation Operation*: operations that create Job objects, specifically: Print-Job, Print-URI,
398 and Create-Job [STD92].

399 *Not Completed Job*: a Job in the 'pending', 'pending-held', 'processing', or 'processing-
400 stopped' state.

401 *Retained Job*: a Completed Job whose attributes and Document data are still available to
402 the Printer.

403 2.5 Acronyms and Organizations

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

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

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

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

408 3. Requirements

409 3.1 Rationale

410 The Internet Printing Protocol/1.1 [STD92] defines many attributes and values for specifying
411 how Jobs and Documents are processed by a Printer. Given the need for managing Jobs,
412 specifying Job processing options, and retrieving processing status information, this
413 specification should define:

- 414 1. Attributes and values that specify detailed media requirements;
- 415 2. Attributes that specify Job accounting identifiers;
- 416 3. Attributes and values that specify the Document character set and rendering
417 optimizations;
- 418 4. An attribute for doing selective fidelity enforcement;
- 419 5. A media size for automatically printing Documents on the correct size;
- 420 6. Attributes and values that allow a Client to discover the results of Document
421 processing;
- 422 7. Attributes for delaying the output from a Job until a specified time period;
- 423 8. Attributes for holding a Job until a specified date and time;

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- 424 9. Attributes for retaining a Job for a specified time period;
425 10. Attributes for configuring the Job history attributes and time period;
426 11. Attributes for automatically canceling a Job after a specified time period;
427 12. Operations for managing one or more Jobs; and
428 13. Values that allow a Client to monitor specific groups of Jobs.

429 Rationale for the changes from the previous versions of this specification can be found in
430 section 15.

431 **3.2 Use Cases**

432 **3.2.1 Print a Plain Text File**

433 Jane has a plain text file report using a character set other than UTF-8 that she would like
434 to print. She submits the file for printing using her Client software, which allows her to specify
435 the exact character set used for the report.

436 **3.2.2 Print a Document Using a Matching Size**

437 John is viewing a document in a web browser and decides to print it. He submits the file for
438 printing from the browser which specifies the output should be formatted for US Letter or
439 ISO A4 media, as available on the printer.

440 **3.2.3 Force a Document to Print on a Specific Media Size**

441 Elizabeth has a contract that must be printed on US Legal media. She uses her Client
442 software to submit the print job, specifying that US Legal size must be used with no
443 substitutions.

444 **3.2.4 Print a Presentation with Best Quality**

445 Bob wants to print a presentation. He submits the presentation for printing using his Client
446 software, specifying that the output should be optimized for text and graphics.

447 **3.2.5 Print Using a Specific Output Device**

448 Sally needs to print a poster on a specific output device. She uses her Client software to
449 select the large format printer associated with the local print service and submit the poster
450 for printing.

451 **3.2.6 Print Using Loaded Media**

452 User is viewing a photo and would like to print the photo on the largest borderless
453 photographic media loaded on her Printer.

454 After the User initiates a print from the phone and selects a Printer, the Client automatically
455 selects the largest borderless photographic media loaded on the Selected Printer and the

456 highest print quality. The User selects additional processing intent for the Job and confirms
457 the print action. The Client sends a print job request to the Printer with the Job Ticket and
458 local photo. The Printer validates the Job Ticket and document data and then prints the
459 photo.

460 Preconditions: Printer can report loaded media information such as size, type, coating, and
461 weight. This may be detected automatically or manually entered by the User or Operation
462 when loading the media.

463 **3.2.7 Print on a Roll**

464 Mike has a series of photos to print on a roll of photo media. Mike submits a multi-document
465 job for printing and specifies that the roll be cut between each document in the job.

466 **3.2.8 Manual Duplex Printing**

467 Larry has a long whitepaper he would like to print 2-sided on an entry-level laser printer
468 without an automatic duplexer accessory. Larry submits the document for printing and
469 specifies 2-sided printing. The Client software queries the Printer to determine the page
470 stacking order and delivery order for both the input and output trays and then sends the even
471 numbered pages in the correct order to the Printer. When those pages have been printed,
472 the Client software instructs Larry to insert the pages back in the input tray in the correct
473 orientation. Once the pages are loaded in the input tray, the Client software sends the odd
474 numbered pages to the Printer.

475 **3.2.9 Monitor Whether Jobs are Printed Correctly**

476 Mary is the administrator for the office printers and wants to know whether users are having
477 difficulty printing their documents. She uses Client software to query the history of jobs on
478 each printer, including any errors or warnings that were encountered during processing.

479 **3.2.10 Hold a Job Until a Specific Date and Time**

480 John wants to withhold printing of a weekly newsletter until Monday morning. He uses his
481 Client software to submit the print job with the correct date and time.

482 **3.2.11 Delay Output Until a Specific Time Period**

483 Bob has a large print job he would like printed overnight. He uses his Client software to
484 submit the job for printing, specifying that output should not begin until 6pm.

485 **3.2.12 Submit a Variable Number of Documents in a Job**

486 Elizabeth has a print job that contains a variable number of documents for printing. She uses
487 her Client software to create a new job and then add each document to the job. When she
488 is sure she has all of the documents for the job, she uses her Client software to close the
489 job so that the printer can begin processing the documents for printing.

490 3.2.13 Cancel a Job After a Specific Time Period

491 Sally operates a high-volume printer for her company. She configures the printer to
492 automatically cancel any jobs that take longer than four hours to print so as to maintain the
493 availability of the printer to other users.

494 3.2.14 Cancel Multiple Jobs

495 Bob needs to cancel a group of jobs that were incorrectly submitted to a printer. He uses his
496 Client software to send a request to cancel a list of those jobs. The printer then cancels the
497 jobs all at once.

498 3.2.15 Resubmit a Job

499 Mary needs to reprint a job with different settings. She uses her Client software to pick a
500 retained job on the printer, chooses the settings to use for the reprint, and submits the reprint
501 request. The printer then makes a copy of the original job, substituting any new settings for
502 the copied job.

503 3.2.16 Retain Jobs for a Specific Time Period

504 John's company needs to retain all print jobs for at least one year for legal reasons. He
505 configures the printer with a default retention policy of one year, allowing users to specify
506 longer periods of time as needed.

507 3.2.17 Keep Job History Information for a Specific Time Period

508 Bob's company needs to keep an accounting history of all print jobs for at least one year.
509 He configures the printer to keep the job history for at least one year, including the job
510 identifier, owner, name, and number of pages.

511 3.3 Exceptions**512 3.3.1 Too Many Jobs on a Printer**

513 Jane has several documents to print for a meeting. While submitting the documents for
514 printing from her Client software, the printer responds that there are too many queued jobs.

515 3.3.2 Too Many Documents in a Job

516 Bob is submitting multiple documents in a single job. While submitting the documents from
517 his Client software, the printer responds that there are too many documents in the job.

518 3.4 Out of Scope

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

- 520 1. Definition of new file formats; and
- 521 2. Definition of new protocol bindings.

522 3.5 Design Requirements

523 The design requirements for this specification are to define:

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- 524 1. Attributes for supported languages and character sets in Document data;
- 525 2. Attributes and values to describe the kind of processing optimizations that
- 526 should be performed on Document data;
- 527 3. An attribute to specify fidelity requirements;
- 528 4. Attributes to select an Output Device for printing;
- 529 5. Attributes and values to report processing errors and warnings;
- 530 6. Attributes to hold Jobs until a specific date and time;
- 531 7. Attributes to cancel Jobs after a specific time period;
- 532 8. Attributes and values to retain Jobs for a specific time period;
- 533 9. An operation to close an open Job;
- 534 10. Attributes and operations to cancel groups of Jobs;
- 535 11. An operation to resubmit a Job with new Job Template attributes; and
- 536 12. Sections to register all attributes, values, and operations with IANA.
- 537

538 4. New Operations

539 4.1 Cancel-Jobs

540 This REQUIRED operation allows the Operator or Administrator for the Printer to cancel a
541 list of Not Completed Jobs or *all* Not Completed Jobs on the Printer. This operation works
542 like the Cancel-Job operation [STD92] except that it works on a number of Jobs at once. If
543 the Printer cannot cancel all of the requested Jobs successfully, it MUST NOT cancel any
544 and MUST return an error code along with the list of offending "job-id" values.

545 Access Rights: The authenticated user [STD92] performing this operation must be an
546 Operator or Administrator of the Printer. Otherwise, the Printer MUST reject the operation
547 and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-
548 authorized' as appropriate.

549 4.1.1 Cancel-Jobs Request

550 The following groups of attributes are part of a Cancel-Jobs request.

551 Group 1: Operation Attributes

552 "attributes-charset" (charset) and
553 "attributes-natural-language" (naturalLanguage):

554 The Client MUST supply and the Printer MUST support both of these
555 attributes.

556 "printer-uri" (uri):

557 The Client MUST supply and the Printer MUST support the "printer-uri"
558 operation attribute which is the target Printer for the operation.

559 "job-ids" (1setOf integer(1:MAX)):

560 The Client MAY supply and the Printer MUST support this operation attribute
561 which specifies the target Job(s) for the operation.

562 "requesting-user-name" (name(MAX)) and
563 "requesting-user-uri" (uri):

564 The Client SHOULD supply and the Printer MUST support these attributes.

565 "message" (text(127)):

566 The Client MAY supply and the Printer MAY support this attribute, which
567 provides a message to the Operator. How or where to display this message
568 to the Operator (if at all) is an implementation decision.

569 4.1.2 Cancel-Jobs Response

570 The following groups of attributes are part of Cancel-Jobs response.

571 Group 1: Operation Attributes

572 "attributes-charset" (charset) and
573 "attributes-natural-language" (naturalLanguage):

574 The Printer MUST return both of these attributes.

575 "status-message" (text(255)) and/or
576 "detailed-status-message" (text(MAX)):

577 The Printer MAY return one or both of these attributes.

578 Group 2: Unsupported Attributes

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

580 4.2 Cancel-My-Jobs

581 This REQUIRED operation allows a User to cancel a list of Not Completed Jobs or *all* their
582 own Not Completed Jobs on the Printer. This operation works like the Cancel-Job operation
583 [STD92] except that it works on a number of Jobs at once. If the Printer cannot cancel all of
584 the requested Jobs successfully, it MUST NOT cancel any and MUST return an error code
585 along with the list of offending "job-id" values.

586 Access Rights: The authenticated user [STD92] performing this operation must be the Job
587 owner. Otherwise, the Printer MUST reject the operation and return 'client-error-forbidden',
588 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

589 4.2.1 Cancel-My-Jobs Request

590 The following groups of attributes are part of a Cancel-My-Jobs request.

591 Group 1: Operation Attributes

592 "attributes-charset" (charset) and
593 "attributes-natural-language" (naturalLanguage):

594 The Client MUST supply and the Printer MUST support both of these
595 attributes.

596 "printer-uri" (uri):

597 The Client MUST supply and the Printer MUST support the "printer-uri"
598 operation attribute which is the target Printer for the operation.

- 599 "job-ids" (1setOf integer(1:MAX)):
- 600 The Client MAY supply and the Printer MUST support this operation attribute
601 which specifies the target Job(s) for the operation.
- 602 "requesting-user-name" (name(MAX)) and
603 "requesting-user-uri" (uri):
- 604 The Client SHOULD supply and the Printer MUST support these attributes.
- 605 "message" (text(127)):
- 606 The Client MAY supply and the Printer MAY support this attribute, which
607 provides a message to the Operator. How or where to display this message
608 to the Operator (if at all) is an implementation decision.
- 609 **4.2.2 Cancel-My-Jobs Response**
- 610 The following groups of attributes are part of a Cancel-My-Jobs response.
- 611 Group 1: Operation Attributes
- 612 "attributes-charset" (charset) and
613 "attributes-natural-language" (naturalLanguage):
- 614 The Printer MUST return both of these attributes.
- 615 "status-message" (text(255)) and/or
616 "detailed-status-message" (text(MAX)):
- 617 The Printer MAY return one or both of these attributes.
- 618 Group 2: Unsupported Attributes
- 619 See [STD92] for details on returning Unsupported Attributes.
- 620 **4.3 Close-Job**
- 621 This REQUIRED operation allows a Client to close a Job that was created using the Create-
622 Job [STD92] operation. It is semantically similar to a Send-Document [STD92] operation
623 with the "last-document" operation attribute supplied with a 'true' value with no Document
624 data, except that the Printer MUST NOT add an additional Document object when accepting
625 a Close-Job operation.
- 626 A Client SHOULD check whether the Printer supports the Close-Job operation by querying
627 the values of the "operations-supported" [STD92] Printer Description attribute.

628 Access Rights: The authenticated user [STD92] performing this operation must be either the
629 Job owner or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject
630 the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-
631 error-not-authorized' as appropriate.

632 4.3.1 Close-Job Request

633 The following attributes are part of a Close-Job request.

634 Group 1: Operation Attributes

635 "attributes-charset" (charset) and
636 "attributes-natural-language" (naturalLanguage):

637 The Client MUST supply and the Printer MUST support both of these
638 attributes.

639 "printer-uri" (uri) and "job-id" (integer(1:MAX)):

640 The Client MUST supply and the Printer MUST support the "printer-uri" and
641 "job-id" operation attributes which are the target Job for the operation.

642 "requesting-user-name" (name(MAX)) and
643 "requesting-user-uri" (uri):

644 The Client SHOULD supply and the Printer MUST support these attributes.

645 4.3.2 Close-Job Response

646 The following attributes are part of a Close-Job response.

647 Group 1: Operation Attributes

648 "attributes-charset" (charset) and
649 "attributes-natural-language" (naturalLanguage):

650 The Printer MUST return both of these attributes.

651 "status-message" (text(255)) and/or
652 "detailed-status-message" (text(MAX)):

653 The Printer MAY return one or both of these attributes.

654 Group 2: Unsupported Attributes

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

656 Group 3: Job Attributes

- 657 "job-state" (type1 enum):
- 658 The Printer MUST return the Job's REQUIRED "job-state" attribute. The
659 value of this attribute along with the value of the "job-state-reasons" attribute
660 is a "snapshot" of the new Job's state when the Printer returns the response.
- 661 "job-state-reasons" (1setOf type2 keyword):
- 662 The Printer MUST return the Job's REQUIRED "job-state-reasons" attribute.
- 663 "job-state-message" (text(MAX)):
- 664 The Printer SHOULD return the Job's RECOMMENDED "job-state-message"
665 attribute. If the Printer supports this attribute, then it MUST be returned in the
666 response. If this attribute is not returned in the response, the Client can
667 assume that the "job-state-message" attribute is not supported and will not
668 be returned in a subsequent Job query.
- 669 "number-of-intervening-jobs" (integer(0:MAX)):
- 670 The Printer SHOULD return the Job's RECOMMENDED "number-of-
671 intervening-jobs" attribute. If the Printer supports this attribute, then it MUST
672 be returned in the response. If this attribute is not returned in the response,
673 the Client can assume that the "number-of-intervening-jobs" attribute is not
674 supported and will not be returned in a subsequent Job query.

675 4.4 Resubmit-Job

- 676 This RECOMMENDED operation allows a Client to create a copy of a Retained Job and
677 change or add attributes for the new Job. Once accepted, a Printer MUST create a new Job
678 object and assign a unique "job-id" and "job-uri" value for the new Job, just as if the Client
679 had sent a Create-Job request. Operation and Job Template attributes from the original Job
680 are copied to the new Job unless overridden in the Resubmit-Job request. If any of the
681 Documents in the Job were passed by reference (Print-URI or Send-URI), the Printer MUST
682 re-fetch the data.
- 683 Printers MUST reject a Resubmit-Job request if the Job is not retained or is in the 'pending',
684 'pending-held', 'processing', or 'processing-stopped' states with the status 'client-error-not-
685 possible'. Otherwise, the Printer returns a status code as defined for the Print-Job [STD92]
686 operation.
- 687 Access Rights: The authenticated user [STD92] performing this operation must be either the
688 Job owner or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject
689 the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-
690 error-not-authorized' as appropriate.

691 4.4.1 Resubmit-Job Request

692 The following attributes are part of a Resubmit-Job request.

693 Group 1: Operation Attributes

694 "attributes-charset" (charset) and
695 "attributes-natural-language" (naturalLanguage):

696 The Client MUST supply and the Printer MUST support both of these
697 attributes.

698 "printer-uri" (uri) and "job-id" (integer(1:MAX)):

699 The Client MUST supply and the Printer MUST support the "printer-uri" and
700 "job-id" operation attributes which are the target Job for the operation.

701 "requesting-user-name" (name(MAX)) and
702 "requesting-user-uri" (uri):

703 The Client SHOULD supply and the Printer MUST support these attributes.

704 "ipp-attribute-fidelity" (boolean) or "job-mandatory-attributes" (1setOf keyword):

705 The Client MAY supply and the Printer MUST support either of these
706 attributes.

707 Group 2: Job Template Attributes

708 The Client MAY supply and the Printer MUST support Job Template attributes to
709 apply to the newly created Job. The 'delete-attribute' out-of-band value MAY be
710 used to remove an attribute that was specified in the original Job.

711 4.4.2 Resubmit-Job Response

712 The following attributes are part of a Resubmit-Job response.

713 Group 1: Operation Attributes

714 "attributes-charset" (charset) and
715 "attributes-natural-language" (naturalLanguage):

716 The Printer MUST return both of these attributes.

717 "status-message" (text(255)) and/or
718 "detailed-status-message" (text(MAX)):

719 The Printer MAY return one or both of these attributes.

Commented [MRS4]: AS1: fix typo

720 Group 2: Unsupported Attributes

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

722 Group 3: Job Attributes

723 "job-id" (integer(1:MAX)):

724 The Printer MUST return the new Job's "job-id" attribute.

725 "job-state" (type1 enum):

726 The Printer MUST return the Job's REQUIRED "job-state" attribute. The
727 value of this attribute along with the value of the "job-state-reasons" attribute
728 is a "snapshot" of the new Job's state when the Printer returns the response.

729 "job-state-reasons" (1setOf type2 keyword):

730 The Printer MUST return the Job's REQUIRED "job-state-reasons" attribute.

731 "job-state-message" (text(MAX)):

732 The Printer SHOULD return the Job's RECOMMENDED "job-state-message"
733 attribute. If the Printer supports this attribute, then it MUST be returned in the
734 response. If this attribute is not returned in the response, the Client can
735 assume that the "job-state-message" attribute is not supported and will not
736 be returned in a subsequent Job query.

737 "job-uri" (uri):

738 The Printer MUST return the new Job's "job-uri" attribute.

739 "number-of-intervening-jobs" (integer(0:MAX)):

740 The Printer SHOULD return the Job's RECOMMENDED "number-of-
741 intervening-jobs" attribute. If the Printer supports this attribute, then it MUST
742 be returned in the response. If this attribute is not returned in the response,
743 the Client can assume that the "number-of-intervening-jobs" attribute is not
744 supported and will not be returned in a subsequent Job query.

745 5. Attributes

746 5.1 Operation Attributes

747 5.1.1 document-format-details (collection)

748 This DEPRECATED attribute specifies details about the source of the Document data and
749 can be included in any Job or Document Creation request. The values supplied by a Client
750 are purely informational and MUST NOT be used for access control, accounting, or policy
751 enforcement. Table 1 lists the member attributes.

752 Note: The previous version of this document [PWG5100.7-2003] allowed Clients to send
753 multiple values for this attribute in order to support "packaging" MIME media types. However,
754 since such formats are not used for IPP printing, Clients MUST NOT send and Printers
755 MUST NOT accept multiple values for "document-format-details".

756 **Table 1 - "document-format-details" Member Attributes**

Member Attribute
document-source-application-name (name(MAX))
document-source-application-version (text(127))
document-source-os-name (name(40))
document-source-os-version (text(40))

757 5.1.1.1 document-source-application-name (name(MAX))

758 This member attribute identifies the application that generated the Document data. The
759 value MUST be all lowercase with any version number portion removed in order to facilitate
760 matching, e.g., "photoshop", "microsoft word", "unknown", etc. The version number MUST
761 NOT be included in this attribute since the "document-source-application-version" member
762 attribute contains that information.

763 5.1.1.2 document-source-application-version (text(127))

764 This member attribute identifies the version number of the application that created the
765 Document data. If specified, the "document-source-application-name" member attribute
766 MUST also be specified. The value MUST be all lowercase in order to facilitate matching,
767 e.g., "8.1 (4331)", "5.0.5 10/26/2001", "2000 (9.0.4119 sr-1)", etc.

768 5.1.1.3 document-source-os-name (name(40))

769 This member attribute identifies the name of the operating system that created the
770 Document data. The value MUST be all lowercase with any version number portion removed
771 in order to facilitate matching, e.g., "android", "chromeos", "ios", "linux", "macos", "solaris",
772 "unix", "windows", etc. The version number MUST NOT be included in this attribute since
773 the "document-source-os-version" member attribute contains that information.

774 Note: The previous version of this specification [PWG5100.7-2003] specified that the IANA
775 Operating System name registry was the source of values, however since this registry is no
776 longer being updated implementors can simply use the marketing name of the Client
777 operating system.

778 5.1.1.4 document-source-os-version (text(40))

779 This member attribute identifies the version number of the operating system that created the
780 Document data. If specified, the "document-source-os-name" member attribute MUST also
781 be specified. The value MUST be all lowercase in order to facilitate matching, e.g., "10.14.4",
782 "18.04", "10 (1903)", etc.

783 5.1.2 job-hold-until-time (dateTime)

784 This RECOMMENDED attribute specifies the date and time after which the Job MUST
785 become a candidate for processing. Printers that support this attribute MUST support the
786 "job-hold-until" [STD92] operation attribute.

787 Clients MUST NOT supply both the "job-hold-until-time" and "job-hold-until" [STD92]
788 operation attributes in a Hold-Job request. If a Client supplies both attributes, the Printer
789 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

790 5.1.3 job-ids (1setOf integer(1:MAX))

791 This REQUIRED attribute specifies a list of "job-id" [STD92] values for the Cancel-Jobs
792 (section 4.1), Cancel-My-Jobs (section 4.2), and Get-Jobs (section 6.1) operations.

793 5.1.4 job-mandatory-attributes (1setOf keyword)

794 This REQUIRED attribute identifies which Job Template attributes the Printer MUST support
795 in the Job Creation request in order to accept the Job. The values are the names of Job
796 Template attributes, for example: 'job-hold-until', 'copies', and 'media'. In order to identify a
797 member attribute of a collection attribute, the keyword names of both the collection attribute
798 and the member attribute are given separated by a period (.) character. For example, to
799 make the "media" attribute of the "cover-front" collection attribute mandatory, supply the
800 keyword value 'cover-front.media'.

801 Note: As with "ipp-attribute-fidelity", the "job-mandatory-attributes" attribute does not
802 determine whether the Printer overrides the PDL with the identified Job Template attributes,
803 as that functionality is defined by the "pdl-override-supported" Printer Description attribute
804 [STD92].

Commented [MRS5]: WW2

805 5.2 Document and Job Status Attributes**806 5.2.1 document-format-details (collection)**

807 This DEPRECATED attribute specifies details about the source of the Document data as
808 provided by the Client in the operation attribute of the same name (section 5.1.1).

809 5.2.2 document-format-details-detected (collection)

810 This DEPRECATED attribute specifies details about the source of the Document data as
811 detected by the Printer. Member attributes are the same as for the "document-format-details"
812 operation attribute (section 5.1.1).

813 5.2.3 errors-count (integer(0:MAX))

814 This RECOMMENDED attribute reports the number of errors encountered processing the
815 Job as a whole. An error is reported when some portion of the printed output is not present,
816 such as a glyph encountered which isn't in a Printer's font or an image in a page was in a
817 format that the Printer didn't support, though the Printer did support the overall Document
818 format.

819 5.2.4 print-content-optimize-actual (1setOf type2 keyword)

820 This RECOMMENDED attribute reports the "print-content-optimize" value(s) that the Printer
821 actually used to produce the Job.

822 5.2.5 warnings-count (integer(0:MAX))

823 This RECOMMENDED attribute reports the number of warnings encountered processing
824 the Job as a whole. A warning is reported when no information is lost but the appearance
825 of the printed output might not be as expected.

826 5.3 Document and Job Template Attributes**827 5.3.1 media-col (collection)**

828 This REQUIRED attribute augments the "media" Job Template attribute [STD92] and allows
829 a Client to specify detailed media characteristics for the Job. Each member attribute of the
830 collection identifies a media characteristic. Clients MUST NOT supply both the "media" and
831 "media-col" attributes in any request to the Printer. Printers that support the "media-col"
832 attribute MUST also support the "media" attribute.

833 Note: Historically some Printers have used common aliases ('folio'), names that combine
834 media size and color ('iso-a4-white'), or names that identify specific input trays ('tray-1').
835 However, the PWG Media Standardized Names v2.0 (MSN2) [PWG5101.1] have replaced
836 this ad-hoc convention and were specifically written to support media specification using
837 either a self-describing "media" value or separate "media-col" member attribute values.

838 When a Printer receives a “media-col” attribute in a Job Creation or Validate-Job request, it
 839 searches for matching “media-col” values. Any member attribute not supplied by the Client
 840 can match any supported value of the corresponding member attribute in the Printer. The
 841 Printer ignores any member attributes supplied by the Client that are not supported by the
 842 Printer.

843 If the number of matched “media-col” values is 0, the Printer MUST either treat the Client-
 844 supplied “media-col” value as an unsupported value [STD92] or accept the “media-col” value
 845 and put the Job in the ‘pending-held’ state if the Job is otherwise accepted.

846 If the number of matched “media-col” values is 1, the Printer MUST either use this single
 847 value of “media-col” as the value specified by the Client or eliminate it if the matching media
 848 is unsuitable for the Job.

849 If the number of matched “media-col” values is 2 or more, the Printer MUST reduce the
 850 number of matching “media-col” values in an implementation-defined manner to 1 or 0. To
 851 reduce the number of “media-col” values, an implementation SHOULD pick an algorithm
 852 that gives reproducible results, such as:

- 853 • Apply defaults for member attributes not specified by the Client and perform the
 854 matching algorithm again on the matched values. This algorithm may result in 0
 855 matches.
- 856 • Find the “closest” or “best” match of the matched “media-col” values, resulting in a
 857 single match.
- 858 • Find the “closest” or “best” match of the matched “media-col” values that are also
 859 ready (i.e. loaded in trays). This algorithm has a chance of being less reproducible
 860 but may still be sufficiently reproducible to be useful. This algorithm may yield 0
 861 matches unless there is a fallback such as to the preceding algorithm.

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

864 Table 2 lists the member attributes of the “media-col” collection attribute.

865 **Table 2 - “media-col” Member Attributes**

Member Attribute	Conformance
media-back-coating (type2 keyword name(MAX))	SHOULD
media-bottom-margin (integer(0:MAX))	MUST
media-color (type2 keyword name(MAX))	SHOULD
media-front-coating (type2 keyword name(MAX))	SHOULD
media-grain (type2 keyword name(MAX))	SHOULD
media-hole-count (integer(0:MAX))	SHOULD
media-info (text(255))	SHOULD
media-key (type2 keyword name(MAX))	SHOULD

Member Attribute	Conformance
media-left-margin (integer(0:MAX))	MUST
media-order-count (integer(1:MAX))	SHOULD
media-pre-printed (type2 keyword name(MAX))	SHOULD
media-recycled (type2 keyword name(MAX))	SHOULD
media-right-margin (integer(0:MAX))	MUST
media-size (collection)	MUST
media-size-name (type2 keyword name(MAX))	SHOULD
media-source (type2 keyword name(MAX))	MUST
media-source-properties (collection) (note 1)	MUST
media-thickness (integer(1:MAX))	SHOULD
media-tooth (type2 keyword name(MAX))	SHOULD
media-top-margin (integer(0:MAX))	MUST
media-type (type2 keyword name(MAX))	MUST
media-weight-metric (integer(0:MAX))	SHOULD

866 Note 1: The "media-source-properties" member attribute is only used for values of
867 the "media-col-database" and "media-col-ready" Printer Description attributes.

868 5.3.1.1 Media Selection and Full-Bleed Printing

869 The "media-bottom-margin", "media-left-margin", "media-right-margin", and "media-top-
870 margin" member attributes specify the Printer's physical margins, allowing a Printer to
871 determine how the content needs to be printed. A Client specifies that it has borderless or
872 "full-bleed" content by setting all of the margins to 0.

873 Printers that support full-bleed printing MUST accept margins of 0 and MAY scale and center
874 the print document to fill as needed to achieve full-bleed output. Printers SHOULD use the
875 document Image Box when scaling for full-bleed output.

876 5.3.1.2 media-back-coating (type2 keyword | name(MAX))

877 This RECOMMENDED member attribute specifies which pre-process coating has been
878 applied to the back of the desired media. Standard keyword values include:

879 'none': The media does not have any coating.

880 'glossy': The media has a "glossy" coating.

881 'high-gloss': The media has a "high-gloss" coating.

882 'semi-gloss': The media has a "semi-gloss" coating.

883 'satin': The media has a "satin" coating.

884 'matte': The media has a "matte" coating.

885 5.3.1.3 media-bottom-margin (integer(0:MAX))

886 The REQUIRED "media-bottom-margin" member attribute defines the Printer's physical
887 bottom margin in hundredths of millimeters from the bottom edge, without respect to the
888 value of the "orientation-requested" Job Template attribute.

889 5.3.1.4 media-color (type2 keyword | name(MAX))

890 This RECOMMENDED member attribute specifies the color of the media. Standard keyword
891 values are defined in the PWG Media Standardized Names v2.0 (MSN2) [PWG5101.1].

892 5.3.1.5 media-front-coating (type2 keyword | name(MAX))

893 This RECOMMENDED member attribute specifies which pre-process coating has been
894 applied to the front of the desired media. Standard keyword values are the same as the
895 "media-back-coating" member attribute (section 5.3.1.2).

896 5.3.1.6 media-grain (type2 keyword | name(MAX))

897 This RECOMMENDED member attribute specifies the desired grain of the media being
898 specified [ISO10175]. Grain affects the curl and the folding of the media. Some marking
899 engines are sensitive to the resulting curl. Standard keyword values for "media-grain"
900 include:

901 'x-direction': The direction of the paper fibers is in the cross-feed direction of the
902 media.

903 'y-direction': The direction of the paper fibers is in the feed direction of the media.

904 5.3.1.7 media-hole-count (integer(0:MAX))

905 This RECOMMENDED member attribute specifies the number of pre-drilled holes in the
906 desired media. A value of 0 (zero) indicates that no holes are present in the media.

907 5.3.1.8 media-info (text(255))

908 This RECOMMENDED member attribute provides a human-readable description of the
909 media.

910 5.3.1.9 media-key (type2 keyword | name(MAX))

911 This RECOMMENDED member attribute contains a unique identifier of the media
912 represented as a keyword or name. Valid "media-key" values are also valid "media" values.

913 Because Printers often support many different kinds and sizes of media, Printers that
914 support this attribute SHOULD automatically assign unique values for all supported
915 combinations of media characteristics, even for values that are locally-defined by an

916 Administrator or Operator. A Client can supply such a Printer-generated value with either
917 the "media-key" member attribute or the "media" Job Template attribute [STD92].

918 **5.3.1.10 media-left-margin (integer(0:MAX))**

919 The REQUIRED "media-left-margin" member attribute defines the Printer's physical left
920 margin in hundredths of millimeters from the left edge, without respect to the value of the
921 "orientation-requested" Job Template attribute.

922 **5.3.1.11 media-order-count (integer(1:MAX))**

923 This RECOMMENDED member attribute indicates the number of Media Sheets, within an
924 ordered sequence of Media Sheets, after which the sequence begins to repeat. For example,
925 third cut tab stock in which all three forms are present has an order count of 3. This is also
926 sometimes called the modulus of the ordered media. Full-cut tab stock can have an order
927 count greater than 1 if it has an ordered sequence, such as a cycle of colors or cycle of pre-
928 printing. If the "media-order-count" is 1, then all media is the same.

929 **5.3.1.12 media-pre-printed (type2 keyword | name(MAX))**

930 This RECOMMENDED member attribute specifies that the pre-printed characteristics of the
931 desired media. Examples of pre-printed media include forms and company letterhead. The
932 standard keyword values for "media-pre-printed" are:

933 'blank': The desired medium is not pre-printed.

934 'pre-printed': The desired medium is pre-printed; the other attributes identify which
935 medium instance and so what is actually pre-printed.

936 'letter-head': The site-defined letterhead is desired.

937 **5.3.1.13 media-recycled (type2 keyword | name(MAX))**

938 This RECOMMENDED member attribute specifies the recycled characteristics of the media.
939 The standard keyword values are:

940 'none': The media is not recycled.

941 'standard': The media is the site-defined standard recycled stock.

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

944 **5.3.1.14 media-right-margin (integer(0:MAX))**

945 The REQUIRED "media-right-margin" member attribute defines the Printer's physical right
946 margin in hundredths of millimeters from the right edge, without respect to the value of the
947 "orientation-requested" Job Template attribute.

948 **5.3.1.15 media-size (collection)**

949 This REQUIRED member attribute is a collection that explicitly specifies the numerical media
 950 width and height dimensions. Clients SHOULD localize the dimensions to the size names
 951 that users are familiar with, such as Letter and A4, and/or provide the exact dimensions
 952 units appropriate for the user's locale, e.g. 8.5_x_11" and 210_x_297mm.

953 A requested media size dimension matches a supported media dimension if it is within an
 954 implementation-defined tolerance. For example, PostScript specifies a tolerance of 5 points
 955 (5/72 of an inch = 1.7 mm) of a supported dimension, i.e., within 176 units of the value of the
 956 dimension.

957 Table 3 lists the "media-size" collection member attributes.

958 **Table 3 - "media-size" Member Attributes**

Member Attribute	Conformance
x-dimension (integer(0:MAX))	MUST
y-dimension (integer(0:MAX))	MUST

959 The REQUIRED "x-dimension" member attribute specifies the width of the media in
 960 hundredths of a millimeter (1/2540th of an inch) along the bottom edge of the media.

961 The REQUIRED "y-dimension" member attribute specifies the height of the media in
 962 hundredths of a millimeter (1/2540th of an inch) along the left edge of the media.

963 **5.3.1.16 media-size-name (type2 keyword | name(MAX))**

964 The RECOMMENDED "media-size-name" member attribute defines the media size using a
 965 PWG media size name [PWG5101.1] instead of the dimensions in the "media-size" member
 966 attribute. Clients and Printers MUST NOT specify both the "media-size" and "media-size-
 967 name" member attributes in a collection.

968 **5.3.1.17 media-source (type2 keyword | name(MAX))**

969 The REQUIRED "media-source" member attribute specifies the input tray, slot, roll, or other
 970 source for the media. The standard keyword values are shown in Table 4.

971 Note: The name "media-source" was chosen over "media-input-tray" since the values
 972 represent more than trays.

973 **Table 4 - "media-source" Keyword Values**

Keyword	Description
alternate	The alternate or secondary input tray
alternate-roll	The alternate or secondary roll
auto	The Printer's automatic choice
bottom	The bottom input tray

Commented [MRS6]: WW2

Keyword	Description
by-pass-tray	The by-pass ("multi-purpose") tray
center	The center feed slot/tray
disc	The CD/DVD/Bluray disc feed slot/tray
envelope	The envelope feed slot/tray
hagaki	The Hagaki feed slot/tray
large-capacity	The large capacity input tray
left	The left feed slot/tray
main	The main or primary input tray
main-roll	The main or primary roll
manual	The manual feed slot
middle	The middle input tray
photo	The photo feed slot/tray
rear	The rear feed slot/tray
right	The right feed slot/tray
roll-1	The first roll
roll-2	The second roll
roll-3	The third roll
roll-4	The fourth roll
roll-5	The fifth roll
roll-6	The sixth roll
roll-7	The seventh roll
roll-8	The eighth roll
roll-9	The ninth roll
roll-10	The tenth roll
side	The side feed slot/tray
top	The topmost input tray
tray-1	The first tray
tray-2	The second tray
tray-3	The third tray
tray-4	The fourth tray
tray-5	The fifth tray
tray-6	The sixth tray
tray-7	The seventh tray
tray-8	The eighth tray
tray-9	The ninth tray
tray-10	The tenth tray
tray-11	The eleventh tray
tray-12	The twelfth tray
tray-13	The thirteenth tray
tray-14	The fourteenth tray
tray-15	The fifteenth tray
tray-16	The sixteenth tray
tray-17	The seventeenth tray
tray-18	The eighteenth tray
tray-19	The nineteenth tray

Keyword	Description
tray-20	The twentieth tray

974 **5.3.1.18 media-source-properties (collection)**

975 The REQUIRED "media-source-properties" member attribute is provided in the "media-col-
976 database" and "media-col-ready" collections to describe the media path and natural
977 orientation for the specified collection. For example, when printing an envelope or form it is
978 important to know which orientation to use for the Document Data.

979 Clients SHOULD use "media-col-ready" instead of "media-col-database" since the latter
980 includes all possible media combinations, including potentially multiple instances of the
981 same media with different "media-source-properties" values.

982 This member attribute MUST NOT be included in the "media-col" Document and Job
983 Template attributes since it is informational rather than specifying intent.

984 **5.3.1.18.1 media-source-feed-direction (type2 keyword)**

985 This REQUIRED member attribute defines whether the long edge ('long-edge-first') or
986 short edge ('short-edge-first') of the media is pulled from the source.

987 **5.3.1.18.2 media-source-feed-orientation (type2 enum)**

988 This REQUIRED member attribute defines the orientation of the media as pulled from the
989 source. The value is an "orientation-requested" [STD92] enumeration.

990 **5.3.1.19 media-thickness (integer(1:MAX))**

991 This RECOMMENDED member attribute specifies the thickness of the media [JDF] in
992 hundreds of millimeters (1/2540th of an inch).

993 **5.3.1.20 media-tooth (type2 keyword | name(MAX))**

994 This RECOMMENDED member attribute specifies the tooth (or roughness) of the media
995 [ISO10175]. The tooth is particularly important for marking engines that use pens (e.g.
996 plotters) to mark the media - the type of pen used matches the tooth of the media for best
997 resolution.

998 Standard keyword values for "media-tooth" include:

999 'antique': Rougher than 'vellum' [JDF].

1000 'calendared': Extra smooth or polished, uncoated paper [JDF].

1001 'coarse': Rough finish.

1002 'fine': Smoother finish than 'smooth'.

1003 'linen': Finish like coarse woven cloth [JDF].

1004 'medium': Regular finish.

1005 'smooth': Smooth finish [JDF].

1006 'stipple': Fine pebble finish [JDF].

1007 'un calendared': Rough, unpolished and uncoated papers [JDF].

1008 'vellum': Slightly rough surface [JDF].

1009 **5.3.1.21 media-top-margin (integer(0:MAX))**

1010 The REQUIRED "media-top-margin" member attribute defines the Printer's physical top
1011 margin in hundredths of millimeters from the top edge, without respect to the value of the
1012 "orientation-requested" Job Template attribute.

1013 **5.3.1.22 media-type (type2 keyword | name(MAX))**

1014 This REQUIRED member attribute identifies the type of media, for example: 'stationery',
1015 'photographic', 'transparency', 'envelope', and 'labels'. Depending on implementation, the
1016 Printer MAY need to behave differently or perform different validation depending on the type
1017 of the media. For example, a Printer might prohibit stapling of transparencies or selecting a
1018 different paper path for an envelope. Standard keyword values for media type are defined
1019 in the PWG Media Standardized Names v2.0 (MSN2) [PWG5101.1].

Commented [MRS7]: WW4

Commented [MRS8]: WW5

1020 **5.3.1.23 media-weight-metric (integer(0:MAX))**

1021 This RECOMMENDED member attribute indicates the weight of the desired media rounded
1022 to the nearest whole number of grams per square meter.

1023 **5.3.2 output-device (name(127))**

1024 This attribute requests a named Output Device for a Printer that fans-out to multiple devices.
1025 If omitted, the Printer selects the best Output Device for the Job in an implementation
1026 dependent manner.

1027 **5.3.3 print-content-optimize (type2 keyword)**

1028 This RECOMMENDED attribute specifies the type of content optimization to perform on the
1029 Document data. Keyword values specify the type of content to optimize, including:

1030 'graphics': Graphs and line drawings.

1031 'photo': Photographs.

1032 'text': Text.

1033 'text-and-graphics': Text and graphics.

1034 **5.4 Job Template Attributes**

1035 **5.4.1 job-account-id (name(MAX))**

1036 This RECOMMENDED attribute specifies the account associated with the Job, such as a
1037 customer name, a sequence of digits referencing an internal billing number, or even a credit
1038 card number. How the Printer uses this attribute is implementation dependent.

1039 A zero-length value indicates that there is no account name.

1040 **5.4.2 job-accounting-user-id (name(MAX))**

1041 This RECOMMENDED attribute specifies the user ID associated with the account specified
1042 by the "job-account-id" attribute (see section 5.4.1) used for this Job. These two attributes
1043 can be used for account tracking.

1044 A zero-length value indicates that there is no user accounting ID.

1045 **5.4.3 job-cancel-after (integer(0:MAX))**

1046 This RECOMMENDED attribute specifies the maximum number of seconds allowed for
1047 processing a Job. When specified, the Printer cancels the Job automatically if it cannot be
1048 completed within the specified timeframe. The completion timer does not begin until the Job
1049 enters the 'processing' state'.

1050 **5.4.4 job-delay-output-until (type2 keyword | name(MAX))**

1051 This RECOMMENDED attribute specifies a time period in the future when the Printer will
1052 produce the output for the Job. If the specified time period has not yet arrived, the Printer
1053 MUST set the Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The
1054 Printer MUST NOT produce any output until the time period arrives but MAY perform pre-
1055 processing. When the time period arrives, the Job MUST become a candidate for output,
1056 including any processing required to produce the output. The only way to alter the delay
1057 period for a Job is by using the Set-Job-Attributes [RFC3380] operation.

1058 Standard keyword values for named time periods are:

1059 'day-time': Delay output until daylight, typically 6am to 6pm.

1060 'evening': Delay output until the evening, typically from 6pm to 12am.

1061 'indefinite': Delay output indefinitely; the time period can be changed using the Set-
1062 Job-Attributes [RFC3380] operation.

1063 'night': Delay output until the night, typically from 12am to 6am.

- 1064 'no-delay-output': Do not delay the output.
- 1065 'second-shift': Delay output until the second work shift, typically from 4pm to 12am.
- 1066 'third-shift': Delay output until the third work shift, typically from 12am to 8am.
- 1067 'weekend': Delay output until the weekend.
- 1068 Clients MUST NOT supply both the "job-delay-output-until" and "job-delay-output-until-time"
1069 (section 5.4.5) Job Template attributes in a Job Creation request. If a Client supplies both
1070 attributes, the Printer MUST reject the request and return the 'client-error-conflicting-
1071 attributes' status code.
- 1072 Note: Unlike the "job-hold-until" [STD92] Job Template attribute, the "job-delay-output-until"
1073 attribute does not cause the Job to enter the 'pending-held' state.
- 1074 **5.4.5 job-delay-output-until-time (dateTime)**
- 1075 This RECOMMENDED attribute specifies a date and time when the Printer will produce the
1076 output for the Job. If the specified time period has not yet arrived, the Printer MUST set the
1077 Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The Printer MUST NOT
1078 produce any output until the time period arrives but MAY perform pre-processing. When the
1079 time period arrives, the Job MUST become a candidate for output, including any processing
1080 required to produce the output. The only way to alter the delay period for a Job is by using
1081 the Set-Job-Attributes [RFC3380] operation.
- 1082 Clients MUST NOT supply both the "job-delay-output-until-time" and "job-delay-output-until"
1083 (section 5.4.4) Job Template attributes in a Job Creation request. If a Client supplies both
1084 attributes, the Printer MUST reject the request and return the 'client-error-conflicting-
1085 attributes' status code.
- 1086 Note: Unlike the "job-hold-until-time" (section 5.4.6) Job Template attribute, the "job-delay-
1087 output-until-time" attribute does not cause the Job to enter the 'pending-held' state.
- 1088 **5.4.6 job-hold-until-time (dateTime)**
- 1089 This RECOMMENDED attribute specifies the date and time after which the Job MUST
1090 become a candidate for processing. Printers that support this attribute MUST support the
1091 "job-hold-until" [STD92] Job Template attribute.
- 1092 Clients MUST NOT supply both the "job-hold-until-time" and "job-hold-until" [STD92] Job
1093 Template attributes in a Job Creation request. If a Client supplies both attributes, the Printer
1094 MUST reject the request and return the 'client-error-conflicting-attributes' status code.
- 1095 **5.4.7 job-retain-until (type2 keyword | name(MAX))**
- 1096 This RECOMMENDED attribute specifies how long the Job remains in the Job Retention
1097 phase of a Job's life cycle [STD92]. Standard values include:

- 1098 'end-of-day': Retain the Job until the end of the current day.
- 1099 'end-of-month': Retain the Job until the end of the current month.
- 1100 'end-of-week': Retain the Job until the end of the current week.
- 1101 'indefinite': Retain the Job indefinitely.
- 1102 'none': Do not retain the Job.
- 1103 Clients MUST NOT supply the "job-retain-until", "job-retain-until-interval" (section 5.4.8),
 1104 and/or "job-retain-until-time" (section 5.4.9) Job Template attributes together in a Job
 1105 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
 1106 reject the request and return the 'client-error-conflicting-attributes' status code.

1107 **5.4.8 job-retain-until-interval (integer(0:MAX))**

- 1108 This RECOMMENDED attribute specifies the number of seconds the Job remains in the Job
 1109 Retention phase of a Job's life cycle [STD92].

- 1110 Clients MUST NOT supply the "job-retain-until" (section 5.4.7), "job-retain-until-interval",
 1111 and/or "job-retain-until-time" (section 5.4.9) Job Template attributes together in a Job
 1112 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
 1113 reject the request and return the 'client-error-conflicting-attributes' status code.

1114 **5.4.9 job-retain-until-time (dateTime)**

- 1115 This RECOMMENDED attribute specifies the date and time when the Job can leave the Job
 1116 Retention phase of a Job's life cycle [STD92].

- 1117 Clients MUST NOT supply the "job-retain-until" (section 5.4.7), "job-retain-until-interval"
 1118 (section 5.4.8), and/or "job-retain-until-time" Job Template attributes together in a Job
 1119 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
 1120 reject the request and return the 'client-error-conflicting-attributes' status code.

1121 **5.4.10 job-sheets-col (collection)**

- 1122 This RECOMMENDED attribute augments the "job-sheets" Job Template attribute [STD92]
 1123 and allows a Client to specify media for Job Sheets that is different than the current media
 1124 being used for the Job. Table 5 lists the member attributes.

1125 **Table 5 - "job-sheets-col" Member Attributes**

Member Attribute

job-sheets (type2 keyword name(MAX))
media (type2 keyword name(MAX))
media-col (collection)

1126 5.4.10.1 job-sheets (type2 keyword | name(MAX))

1127 This REQUIRED member attribute specifies which Job Sheets to print on the specified
1128 media. The values for this member attribute are identical to the keyword and name values
1129 for the "job-sheets" Job Template attribute [STD92] itself, including the 'none' value, and
1130 convey the same semantics.

1131 5.4.10.2 media (type2 keyword | name(MAX))

1132 This REQUIRED member attribute specifies which media to use for the Job Sheets. If
1133 specified, the "media-col" member attribute (section 5.4.10.3) MUST NOT be specified.

1134 5.4.10.3 media-col (collection)

1135 This REQUIRED member attribute specifies which media to use for the Job Sheets. If
1136 specified, the "media" member attribute (section 5.4.10.2) MUST NOT be specified.

1137 5.5 Printer Description Attributes**1138 5.5.1 document-charset-default (charset)**

1139 This CONDITIONALLY REQUIRED attribute specifies the default charset that the Printer
1140 will assume for charset-ambiguous Document formats when the Client omits the "document-
1141 charset" operation attribute [PWG5100.5]. Printers that support the "document-charset"
1142 operation attribute MUST support this attribute.

1143 5.5.2 document-charset-supported (1setOf charset)

1144 This CONDITIONALLY REQUIRED attribute lists the charsets that the Printer supports for
1145 charset-ambiguous Document formats. Printers that support the "document-charset"
1146 operation attribute [PWG5100.5] MUST support this attribute.

1147 5.5.3 document-format-details-supported (1setOf keyword)

1148 This DEPRECATED attribute lists the supported member attributes of the "document-
1149 format-details" operation attribute (section 5.1.1) and "document-format-details"
1150 Document/Job Status attributes (section 5.2.1).

1151 5.5.4 document-natural-language-default (naturalLanguage)

1152 This CONDITIONALLY REQUIRED attribute specifies the default natural language that the
1153 Printer will assume for Document data when the Client omits the "document-natural-
1154 language" operation attribute [STD92]. Printers that support the "document-natural-
1155 language" attribute MUST support this attribute.

Commented [MRS9]: AS2: Clarify we mean the document-format-details attributes in the corresponding groups/sections.

1156 5.5.5 document-natural-language-supported (1setOf naturalLanguage)

1157 This CONDITIONALLY REQUIRED attribute lists the natural languages supported for
1158 Printer-supported Document formats. Printers that support the "document-natural-language"
1159 attribute MUST support this attribute.

1160 5.5.6 job-account-id-default (name(MAX) | no-value)

1161 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-account-
1162 id" Job Template attribute (section 5.4.1). Printers MUST support this attribute if the "job-
1163 account-id" attribute is supported.

1164 5.5.7 job-account-id-supported (boolean)

1165 This CONDITIONALLY REQUIRED attribute specifies whether the "job-account-id" Job
1166 Template attribute (section 5.4.1) is supported. Printers MUST support this attribute if the
1167 "job-account-id" attribute is supported.

1168 5.5.8 job-accounting-user-id-default (name(MAX) | no-value)

1169 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-
1170 accounting-user-id" Job Template attribute (section 5.4.2). Printers MUST support this
1171 attribute if the "job-accounting-user-id" attribute is supported.

1172 5.5.9 job-accounting-user-id-supported (boolean)

1173 This CONDITIONALLY REQUIRED attribute specifies whether the "job-accounting-user-id"
1174 Job Template attribute (section 5.4.2) is supported. Printers MUST support this attribute if
1175 the "job-accounting-user-id" attribute is supported.

1176 5.5.10 job-cancel-after-default (integer(0:MAX) | no-value)

1177 This CONDITIONALLY REQUIRED attribute specifies the default value for the "job-cancel-
1178 after" (section 5.4.3) Job Template attribute. Printers that support the "job-cancel-after"
1179 attribute MUST support this attribute.

Commented [MRS10]: AS3: Fixed reference

1180 5.5.11 job-cancel-after-supported (rangeOfInteger(0:MAX))

1181 This CONDITIONALLY REQUIRED attribute specifies the range of values supported for the
1182 "job-cancel-after" (section 5.4.3) Job Template attribute. Printers that support the "job-
1183 cancel-after" attribute MUST support this attribute.

Commented [MRS11]: AS3: Fixed reference

1184 5.5.12 job-creation-attributes-supported (1setOf keyword)

1185 This REQUIRED attribute lists the names of the operation and Job Template attributes that
1186 can be sent in a Job Creation or Validate-Job request.

1187 5.5.13 job-delay-output-until-default (type2 keyword | name(MAX))

1188 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-delay-
1189 output-until" (section 5.4.4) Job Template attribute. Printers that support the "job-delay-
1190 output-until" attribute MUST support this attribute.

1191 5.5.14 job-delay-output-until-supported (1setOf (type2 keyword | name(MAX)))

1192 This CONDITIONALLY REQUIRED attribute lists the supported values of the "job-delay-
1193 output-until" (section 5.4.4) Job Template attribute. Printers that support the "job-delay-
1194 output-until" attribute MUST support this attribute.

1195 5.5.15 job-delay-output-until-time-supported (rangeOfInteger(0:MAX))

1196 This CONDITIONALLY REQUIRED attribute specifies the range of time values supported
1197 by the "job-delay-output-until-time" (section 5.4.5) Job Template attribute. Printers that
1198 support the "job-delay-output-until-time" attribute MUST support this attribute.

1199 5.5.16 job-history-attributes-configured (1setOf keyword)

1200 This REQUIRED attribute lists the Job attributes that will be retained in the history phase of
1201 each Job. IPP/1.1 [STD92] specifies that at least the "job-id", "job-printer-uri", "job-state",
1202 and "job-state-reasons" attributes MUST be retained in the history phase. Printers that
1203 support the "job-history-attributes-supported" (section 5.5.17) attribute MUST support this
1204 attribute.

1205 5.5.17 job-history-attributes-supported (1setOf keyword)

1206 This REQUIRED attribute lists the Job attributes that can be retained in the history phase of
1207 each Job. Printers that support the "job-history-attributes-configured" (section 5.5.16)
1208 attribute MUST support this attribute.

1209 5.5.18 job-history-interval-configured (integer(0:MAX))

1210 This REQUIRED attribute specifies the minimum number of seconds that a Job will remain
1211 in the history phase of its lifecycle [STD92]. Printers SHOULD have a default configured
1212 value of at least 60 seconds to allow Clients to discover the disposition of any Jobs that have
1213 reached a terminating state. Printers that support the "job-history-interval-supported"
1214 (section 5.5.19) attribute MUST support this attribute.

1215 5.5.19 job-history-interval-supported (rangeOfInteger(0:MAX))

1216 This REQUIRED attribute specifies the range of values that are supported for the "job-
1217 history-interval-configured" Printer Description attribute. Printers that support the "job-
1218 history-interval-configured" (section 5.5.18) attribute MUST support this attribute.

Commented [MRS12]: AS4: Fixed references.

1219 5.5.20 job-ids-supported (boolean)

1220 This REQUIRED attribute specifies whether the "job-ids" operation attribute (section 5.1.3)
1221 is supported.

1222 5.5.21 job-mandatory-attributes-supported (boolean)

1223 This REQUIRED attribute specifies that the "job-mandatory-attributes" operation attribute
1224 (section 5.1.4) is supported. Printers MUST report a value of 'true' for this attribute.

1225 5.5.22 job-retain-until-default (type2 keyword | name(MAX))

1226 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-retain-
1227 until" (section 5.4.7) Job Template attribute. Printers that support the "job-retain-until"
1228 attribute MUST support this attribute.

1229 5.5.23 job-retain-until-interval-default (integer(0:MAX) | no-value)

1230 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-retain-
1231 until-interval" (section 5.4.8) Job Template attribute. Printers that support the "job-retain-
1232 until-interval" attribute MUST support this attribute.

1233 5.5.24 job-retain-until-interval-supported (rangeOfInteger(0:MAX))

1234 This CONDITIONALLY REQUIRED attribute specifies the supported values of the "job-
1235 retain-until-interval" (section 5.4.8) Job Template attribute. Printers that support the "job-
1236 retain-until-interval" attribute MUST support this attribute.

1237 5.5.25 job-retain-until-supported (1setOf (type2 keyword | name(MAX)))

1238 This CONDITIONALLY REQUIRED attribute lists the supported values of the "job-retain-
1239 until" (section 5.4.7) Job Template attribute. Printers that support the "job-retain-until"
1240 attribute MUST support this attribute.

1241 5.5.26 job-retain-until-time-supported (rangeOfInteger(0:MAX))

1242 This CONDITIONALLY REQUIRED attribute specifies the supported values of the "job-
1243 retain-until-time" (section 5.4.9) Job Template attribute. Printers that support the "job-retain-
1244 until-time" attribute MUST support this attribute.

1245 5.5.27 job-sheets-col-default (collection)

1246 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-sheets-
1247 col" Job Template attribute (section 5.4.10). Printers that support the "job-sheets-col"
1248 attribute MUST support this attribute.

1249 5.5.28 job-sheets-col-supported (1setOf keyword)

1250 This CONDITIONALLY REQUIRED attribute lists the supported member attributes of the
1251 "job-sheets-col" Job Template attribute (section 5.4.10). Printers that support the "job-
1252 sheets-col" attribute MUST support this attribute.

1253 5.5.29 job-spooling-supported (type2 keyword)

1254 This REQUIRED attribute specifies whether Jobs are spooled before the Document data is
1255 processed. The value of this attribute returned in a Get-Printer-Attributes response MAY
1256 depend on the "document-format" attribute supplied in the Get-Printer-Attributes request
1257 [STD92]. If the Printer does not support this attribute, then the spooling behavior is
1258 implementation dependent.

1259 Standard keyword values include:

1260 'automatic': The Printer chooses whether to process the Document data as it is
1261 received or after spooling (storage).

1262 'spool': The printer processes the Document data after it has been spooled (stored).

1263 'stream': The printer processes the Document data as it is received.

1264 5.5.30 media-back-coating-supported (1setOf (type2 keyword | name(MAX)))

1265 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-back-
1266 coating" member attribute (section 5.3.1.2). Printers that support the "media-back-coating"
1267 member attribute MUST support this attribute.

1268 5.5.31 media-bottom-margin-supported (1setOf integer(0:MAX))

1269 This REQUIRED attribute lists the supported values for the "media-bottom-margin" member
1270 attribute (section 5.3.1.3).

1271 5.5.32 media-col-database (1setOf collection)

1272 This REQUIRED attribute lists the set of pre-defined "media-col" collections available in the
1273 Printer's media database. This attribute is similar to "media-col-ready" (section 5.5.34) but
1274 returns the entire set of pre-defined "media-col" collections known by the Printer instead of
1275 just the media loaded in the Printer.

1276 Because the number and size of values of this attribute can be very large, the Printer MUST
1277 NOT return this attribute in the response to the Get-Printer-Attributes operation unless the
1278 Client explicitly requests it by including the 'media-col-database' value in the "requested-
1279 attributes" [STD92] operation attribute.

1280 In order to limit the number and size of values of this attribute, Printers MAY exclude the
1281 "media-source" and/or "media-type" member attributes from collection values when all

1282 values of the corresponding member attribute are supported when combined with the other
1283 member attributes and values.

1284 Because a Printer may support multiple values for the "media-bottom-margin", "media-left-
1285 margin", "media-right-margin", and "media-top-margin" member attributes, a Printer MAY
1286 only enumerate the best (smallest) values of these attributes to reduce the number of
1287 collection values returned in the "media-col-database" attribute. However, if full-bleed and
1288 non-full-bleed margins have a significant performance, scaling, or quality differences, a
1289 Printer MUST enumerate both the full-bleed (all zeroes) and smallest non-zero hardware
1290 margins in the "media-col-database" attribute.

1291 For example, a Printer that supports ISO A4, ISO DL Envelope, US Letter, US Legal, and
1292 US #10 Envelope media, a single removable tray and a multi-purpose tray, and cardstock,
1293 envelopes, plain paper, labels, letterhead, and transparency media types might report the
1294 following attributes and values:

```
1295     media-size-supported={...}
1296     media-source-supported='by-pass-tray','main','manual'
1297     media-type-supported='cardstock','envelope','labels','stationery',
1298                          'stationery-letterhead','transparency'
1299     media-col-database={
1300         /* ISO A4 cardstock only from manual feed */
1301         media-size={
1302             x-dimension=21000
1303             y-dimension=29700
1304         }
1305         media-source='manual'
1306         media-type='cardstock'
1307     },{
1308         /* ISO A4 transparency only from manual feed */
1309         media-size={
1310             x-dimension=21000
1311             y-dimension=29700
1312         }
1313         media-source='manual'
1314         media-type='transparency'
1315     },{
1316         /* ISO A4 plain paper from any source */
1317         media-size={
1318             x-dimension=21000
1319             y-dimension=29700
1320         }
1321         media-type='stationery'
1322     },{
1323         /* ISO A4 letterhead from any source */
1324         media-size={
1325             x-dimension=21000
1326             y-dimension=29700
1327         }
1328         media-type='stationery-letterhead'
1329     },... /* Lots of other values */
```

1330 5.5.33 media-col-default (collection)

1331 This REQUIRED attribute specifies the default value of the "media-col" Job Template
1332 attribute (section 5.3.1). Printers that conform to this specification MUST support the "media-
1333 default" Printer Description attribute [STD92]. The "media-default" and "media-col-default"
1334 Printer attributes MUST both be configured to specify the same media instance. If the
1335 Administrator sets one of them to a value (either locally or with the Set-Printer-Attributes
1336 [RFC3380] operation), the Printer MUST set the other attribute's value to the same media
1337 instance or to the 'unknown' out-of-band value, if there isn't a corresponding value to be set
1338 for the other attribute. If a Client attempts to set both attributes, but their values specify
1339 different media instances, the Printer MUST reject the Set-Printer-Attributes operation and
1340 return the 'client-error-conflicting-attributes' status code.

1341 5.5.34 media-col-ready (1setOf collection)

1342 This REQUIRED attribute lists the "media-col" (section 5.3.1) values representing media
1343 that are available for use without human intervention, i.e., the media that are ready to be
1344 printed on without interaction. Printers that conform to this specification MUST support the
1345 "media-ready" Printer Description attribute [STD92]. The i^{th} value of the "media-col-ready"
1346 attribute corresponds to the i^{th} value of the "media-ready" attribute so that the Client can
1347 correlate the media names or keywords with the collection values and determine the
1348 characteristics of each ready media instance.

1349 5.5.35 media-col-supported (1setOf keyword)

1350 This REQUIRED attribute lists the supported member attributes of the "media-col"
1351 Job/Document Template attribute (section 5.3.1).

1352 5.5.36 media-color-supported (1setOf (type2 keyword | name(MAX)))

1353 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-color"
1354 member attribute (section 5.3.1.4). Printers that support the "media-color" member attribute
1355 MUST support this attribute.

1356 5.5.37 media-front-coating-supported (1setOf (type2 keyword | name(MAX)))

1357 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-front-
1358 coating" member attribute (section 5.3.1.5). Printers that support the "media-front-coating"
1359 member attribute MUST support this attribute.

1360 5.5.38 media-grain-supported (1setOf (type2 keyword | name(MAX)))

1361 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-grain"
1362 member attribute (section 5.3.1.6). Printers that support the "media-grain" member attribute
1363 MUST support this attribute.

1364 5.5.39 media-hole-count-supported (1setOf rangeOfInteger(0:MAX))

1365 This CONDITIONALLY REQUIRED attribute lists the supported ranges of values of the
1366 "media-hole-count" member attribute (section 5.3.1.7). Printers that support the "media-
1367 hole-count" member attribute MUST support this attribute.

Commented [MRS13]: AS5: Fix typo and reference

1368 5.5.40 media-key-supported (1setOf (type2 keyword | name(MAX)))

1369 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-key"
1370 member attribute (section 5.3.1.9). Printers that support the "media-key" member attribute
1371 MUST support this attribute.

1372 5.5.41 media-left-margin-supported (1setOf integer(0:MAX))

1373 This REQUIRED attribute lists the supported values for the "media-left-margin" member
1374 attribute (section 5.3.1.10).

1375 5.5.42 media-order-count-supported (1setOf rangeOfInteger(1:MAX))

1376 This CONDITIONALLY REQUIRED attribute lists the ranges of supported values of the
1377 "media-order-count" member attribute (section 5.3.1.8). Printers that support the "media-
1378 order-count" member attribute MUST support this attribute.

1379 5.5.43 media-pre-printed-supported (1setOf (type2 keyword | name(MAX)))

1380 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-pre-
1381 printed" member attribute (section 5.3.1.12). Printers that support the "media-pre-printed"
1382 member attribute MUST support this attribute.

Commented [MRS14]: AS6: Fixed reference

1383 5.5.44 media-recycled-supported (1setOf (type2 keyword | name(MAX)))

1384 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-
1385 recycled" member attribute (section 5.3.1.13). Printers that support the "media-recycled"
1386 member attribute MUST support this attribute and MUST include the 'none' keyword value.

1387 5.5.45 media-right-margin-supported (1setOf integer(0:MAX))

1388 This REQUIRED attribute lists the supported values for the "media-right-margin" member
1389 attribute (section 5.3.1.14).

1390 5.5.46 media-size-supported (1setOf collection)

1391 This REQUIRED attribute lists the supported values of the "media-size" member attribute
1392 (section 5.3.1.15). Unlike the "media-size" member attribute, the "x-dimension" and "y-
1393 dimension" member attributes of "media-size-supported" have a syntax of "integer(1:MAX)
1394 | rangeOfInteger(1:MAX)" to allow for arbitrary ranges of sizes for custom and roll-fed media.

Commented [MRS15]: AS8

1395 5.5.47 media-source-supported (1setOf (type2 keyword | name(MAX)))

1396 This REQUIRED attribute lists the supported values of the "media-source" member attribute
1397 (section 5.3.1.17).

1398 5.5.48 media-thickness-supported (1setOf rangeOfInteger(1:MAX))

1399 This CONDITIONALLY REQUIRED attribute lists the ranges of supported values for the
1400 "media-thickness" member attribute (section 5.3.1.19). Printers that support the "media-
1401 thickness" member attribute MUST support this attribute.

1402 5.5.49 media-tooth-supported (1setOf (type2 keyword | name(MAX)))

1403 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-tooth"
1404 member attribute (section 5.3.1.20). Printers that support the "media-tooth" member
1405 attribute MUST support this attribute.

1406 5.5.50 media-top-margin-supported (1setOf integer(0:MAX))

1407 This REQUIRED attribute lists the supported values for the "media-top-margin" member
1408 attribute (section 5.3.1.21).

1409 5.5.51 media-type-supported (1setOf (type2 keyword | name(MAX)))

1410 This REQUIRED attribute lists the supported values of the "media-type" member attribute
1411 (section 5.3.1.22).

Commented [MRS16]: AS9

1412 5.5.52 media-weight-metric-supported (1setOf rangeOfInteger(1:MAX))

1413 This CONDITIONALLY REQUIRED attribute lists the supported ranges of values of the
1414 "media-weight-metric" member attribute (section 5.3.1.23). Printers that support the "media-
1415 weight-metric" member attribute MUST support this attribute.

1416 5.5.53 output-device-supported (1setOf name(127))

1417 This CONDITIONALLY REQUIRED attribute lists the supported "output-device" values.
1418 Printers MUST support this attribute if the "output-device" Job Template attribute (section
1419 5.3.1) is supported.

1420 5.5.54 print-content-optimize-default (type2 keyword)

1421 This CONDITIONALLY REQUIRED attribute specifies the default "print-content-optimize"
1422 (section 5.3.3) value. Printers that support the "print-content-optimize" attribute MUST
1423 support this attribute.

1424 **5.5.55 print-content-optimize-supported (1setOf type2 keyword)**

1425 This CONDITIONALLY REQUIRED attribute lists the supported “print-content-optimize”
1426 (section 5.3.3) values. Printers that support the "print-content-optimize" attribute MUST
1427 support this attribute.

1428 **5.5.56 which-jobs-supported (1setOf type2 keyword)**

1429 This REQUIRED attribute lists the supported values for the "which-jobs" operation attribute
1430 [STD92] that is used with the Get-Jobs operation [STD92].

1431 **5.6 Printer Status Attributes**

1432 **5.6.1 printer-detailed-status-messages (1setOf text(MAX))**

1433 This attribute specifies additional detailed and technical information about the Printer,
1434 including information such as fault and warning messages, in the same way that the “job-
1435 detailed-status-messages” [STD92] Job Status attribute provides additional information
1436 about a Job. Because the messages are human-readable text, Clients MUST NOT attempt
1437 to parse the value(s) of this attribute.

1438 **6. Additional Semantics for Existing Operations**

1439 **6.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-
1440 attributes**

1441 This specification extends the Create-Job, Print-Job, Print-URI, and Validate-Job operations
1442 to support the "job-mandatory-attributes" operation attribute (section 5.1.4) in the request
1443 sent by the Client, which specifies a list of Job Template attributes that MUST be supported
1444 by the Printer for the request to be accepted.

1445 The Client MAY supply and the Printer MUST accept the “job-mandatory-attributes”
1446 operation attribute in any Job Creation or Validate-Job request.

1447 The Printer MUST reject the Job Creation request if the Client supplies an unsupported Job
1448 Template attribute or value in the request that is included in this list of "job-mandatory-
1449 attributes" values.

1450 If the Client supplies both the “job-mandatory-attributes” and “ipp-attribute-fidelity” operation
1451 attributes, the Printer MUST ignore the “job-mandatory-attributes” attribute.

1452 **6.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status**
1453 **Code**

1454 This specification extends the Job Creation operations to return the 'server-error-too-many-
1455 jobs' status code value when the Printer is currently unable to create a new Job object.

1456 **6.3 Get-Jobs Operation: "job-ids (1setOf integer(1:MAX))"**

1457 The "job-ids" (section 5.1.3) operation attribute, if supplied, specifies a list of target Jobs to
1458 be returned in the response to a Get-Jobs [STD92] request. Printers MUST support it in Get-
1459 Jobs requests to limit the list of Jobs that are returned.

1460 If the Client supplies the "job-ids" operation attribute in a Get-Jobs request, the Client MUST
1461 NOT also supply any of the following operation attributes in the same request: "limit", "my-
1462 jobs", or "which-jobs". If the Client does supply prohibited operation attributes, the Printer
1463 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1464 **6.4 Hold-Job Operation: "job-hold-until-time (dateTime)"**

1465 The "job-hold-until-time" (section 5.1.2) operation attribute can be provided to specify a date
1466 and time when the Job will become a candidate for processing. Printers that support the
1467 "job-hold-until-time" attribute and Hold-Job operation MUST support its use with the Hold-
1468 Job operation. If accepted, the "job-hold-until-time" operation attribute is copied to the Job,
1469 replacing any existing "job-hold-until" [STD92] or "job-hold-until-time" attribute.

1470 Clients MUST NOT send both the "job-hold-until" [STD92] and "job-hold-until-time" operation
1471 attributes in a Hold-Job request. If both attributes are sent, Printers MUST reject the request
1472 and return the 'client-error-conflicting-attributes' status code.

1473 **6.5 Print-Job, Print-URI, Send-Document, Send-URI: server-error-too-**
1474 **many-documents Status Code**

1475 This specification extends the Document Creation operations to return the 'server-error-too-
1476 many-documents' status code value when the Printer is currently unable to create a new
1477 Document object.

1478 **6.6 Set-Job-Attributes Operation: "job-hold-until-time (dateTime)"**

1479 The "job-hold-until-time" (section 5.4.6) Job Template attribute can be provided to specify a
1480 date and time when the Job will become a candidate for processing. Printers that support
1481 the "job-hold-until-time" attribute and Set-Job-Attributes operation MUST support its use with
1482 the Set-Job-Attributes operation. If accepted, the "job-hold-until-time" operation attribute is
1483 copied to the Job, replacing any existing "job-hold-until" [STD92] or "job-hold-until-time"
1484 attribute.

Commented [MRS17]: AS10

1485 Clients MUST NOT send both the "job-hold-until" [STD92] and "job-hold-until-time" Job
1486 Template attributes in a Set-Job-Attributes request. If both attributes are sent, Printers
1487 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1488 **7. Additional Values for Existing Attributes**

1489 **7.1 job-sheets (type2 keyword | name(MAX))**

1490 The following additional values are defined for the "job-sheets" Job Template attribute
1491 [STD92]:

1492 'job-start-sheet': A Job Sheet is printed to indicate the start of the Job.

1493 'job-end-sheet': A Job Sheet is printed to indicate the end of the Job.

1494 'job-both-sheets': Job Sheets is printed to indicate the start and end of all the output
1495 associated with the Job.

1496 'first-print-stream-page': The first Input Page in the Document Data is printed as the
1497 Job Sheet and the Printer's standard Job Sheet is suppressed.

1498 **7.2 job-state-reasons (1setOf type2 keyword)**

1499 This specification adds the following new keyword values for the "job-state-reasons" Job
1500 Status attribute [STD92]:

1501 'digital-signature-did-not-verify': One or more documents in the Job contains a
1502 digital signature that could not be verified by the Printer.

1503 'errors-detected': The Printer has detected one or more errors during processing of
1504 the Job.

1505 'job-delay-until-specified': The Job's output is delayed because the "job-delay-
1506 output-until" or "job-delay-output-until-time" Job Template attribute was specified.

1507 'warnings-detected': The Printer has detected one or more warnings during
1508 processing of the Job.

1509 **7.3 media (type2 keyword | name(MAX))**

1510 This specification adds the following new keyword value for the "media" Job Template
1511 attribute [STD92]:

1512 'choice_iso_a4_210x297mm_na_letter_8.5x11in': Print using US Letter or ISO A4
1513 media (whichever is available).

1514 Note: The semantics of the 'choice' prefix are documented in the PWG Media Standardized
1515 Names v2.0 (MSN2) specification [PWG5101.1].

1516 **7.4 pdl-override-supported (type2 keyword)**

1517 This specification defines a new 'guaranteed' value for the "pdl-override-supported" [STD92]
1518 Printer Description attribute. This value indicates that the Printer guarantees that:

- 1519 1. Document and/or Job Template attribute values take precedence over instructions of
1520 any form embedded anywhere in the Document data;
- 1521 2. Document and/or Job Template attributes that have only a single supported value
1522 take precedence over instructions of any form embedded anywhere in the Document
1523 data, even if the attribute is not included in the Job or Document Creation request;
1524 and
- 1525 3. No PDL instruction is performed that does not correspond to a current value in the
1526 corresponding "xxx-supported" Printer Description attribute.

1527 If a Printer cannot honor the advertised "pdl-override-supported" value for a Job, it can abort
1528 the Job, stop the Printer, hold the Job, or substitute a supported value. This choice can be
1529 fixed by the implementation or configurable by the Administrator and can depend on the
1530 Document and/or Job Template attribute.

1531 **7.5 which-jobs (type2 keyword)**

1532 This specification adds the following new keyword values for the "which-jobs" operation
1533 attribute [STD92]:

- 1534 'aborted': Any Job in the 'aborted' state.
- 1535 'all': All Jobs regardless of state.
- 1536 'canceled': Any Job in the 'canceled' state.
- 1537 'pending': Any Job in the 'pending' state.
- 1538 'pending-held': Any Job in the 'pending-held' state.
- 1539 'processing': Any Job in the 'processing' state.
- 1540 'processing-stopped': Any Job in the 'processing-stopped' state.

1541 **8. New Status Codes**

1542 This section defines additional status code values.

1543 **8.1 server-error-too-many-jobs (0x050B)**

1544 The Client has attempted to create a Job using any of the Job Creation operations which
1545 would exceed the capacity of the Printer. The Client can retry the unmodified request.

1546 **8.2 server-error-too-many-documents (0x050C)**

1547 The Client has attempted to create a Document using any of the Document Creation
1548 operations which would exceed the capacity of the Printer for this Job. The Client can retry
1549 the unmodified request.

1550

1551 **9. Obsolete Attributes**1552 **9.1 Obsolete Operation Attributes**

1553 Table 6 lists the operation attributes from the previous version of this specification
1554 [PWG5100.7-2003] which are now OBSOLETE.

1555 **Table 6 - OBSOLETE Operation Attributes**

Attribute	Notes
document-digital-signature (type2 keyword)	Not usable
document-format-version (text(127))	Interoperability issues

1556 **9.2 Obsolete Member Attributes**

1557 Table 7 lists the member attributes of the "document-format-details" operation attribute
1558 (section) which are now OBSOLETE.

1559 **Table 7 - OBSOLETE "document-format-details" Member Attributes**

Member Attribute	Notes
document-format (mimeType)	Redundant, security issues
document-format-device-id (text(127))	Too short, not used
document-format-version (text(127))	Redundant, obsolete parent attribute
document-natural-language (1setOf naturalLanguage)	Redundant, not used

Commented [MRS18]: WW6

1560 **9.3 Obsolete Job Status Attributes**

1561 Table 8 lists the Job Status attributes from the previous version of this specification
1562 [PWG5100.7-2003] which are now OBSOLETE.

1563 **Table 8 - OBSOLETE Job Status Attributes**

Attribute	Notes
compression-supported (type2 keyword)	Not usable
document-charset-supported (charset)	Superseded by PWG 5100.5
document-digital-signature-supplied (type2 keyword)	Obsolete parent attribute
document-format-supplied (mimeType)	Superseded by PWG 5100.5
document-format-version-supplied (text(127))	Obsolete parent attribute
document-message-supplied (text(MAX))	Superseded by PWG 5100.5
document-name-supplied	Superseded by PWG 5100.5
document-natural-language-supplied (naturalLanguage)	Superseded by PWG 5100.5
ipp-attribute-fidelity (boolean)	Only used at time of creation
job-copies-actual (integer(1:MAX))	Obsolete parent attribute

Attribute	Notes
job-cover-back-actual (collection)	Obsolete parent attribute
job-cover-front-actual (collection)	Obsolete parent attribute
job-finishings-actual (1setOf type2 enum)	Obsolete parent attribute
job-finishings-col-actual (1setOf collection)	Obsolete parent attribute
job-mandatory-attributes (1setOf keyword)	Only used at time of creation
output-device-actual (1setOf name(127))	Redundant

1564 9.4 Obsolete Job Template Attributes

1565 Table 9 lists the Job Templates attributes from the previous version of this specification
1566 [PWG5100.7-2003] which are now OBSOLETE.

1567 **Table 9 - OBSOLETE Job Template Attributes**

Commented [MRS19]: WW7

Attribute	Notes
job-copies (integer(1:MAX))	Interoperability issues
job-cover-back (collection)	Interoperability issues
job-cover-front (collection)	Interoperability issues
job-finishings (1setOf type2 enum)	Interoperability issues
job-finishings-col (1setOf collection)	Interoperability issues

1568 9.5 Obsolete Printer Description Attributes

1569 The following Printer Description attributes from the previous version of this specification
1570 [PWG5100.7-2003] which are now OBSOLETE.

1571 **Table 10 - OBSOLETE Printer Description Attributes**

Attribute	Notes
document-digital-signature-default (type2 keyword)	Obsolete parent attribute
document-digital-signature-supported (1setOf type2 keyword)	Obsolete parent attribute
document-format-details-default (collection)	Does not make sense
document-format-version-default (text(127))	Obsolete parent attribute
document-format-version-supported (1setOf text(127))	Obsolete parent attribute
job-copies-default (integer(1:MAX))	Obsolete parent attribute
job-copies-supported (rangeOfInteger(1:MAX))	Obsolete parent attribute
job-cover-back-default (collection)	Obsolete parent attribute
job-cover-back-supported (1setOf keyword)	Obsolete parent attribute
job-cover-front-default (collection)	Obsolete parent attribute
job-cover-front-supported (1setOf keyword)	Obsolete parent attribute
job-finishings-col-default (1setOf collection)	Obsolete parent attribute
job-finishings-col-ready (1setOf collection)	Obsolete parent attribute
job-finishings-col-supported (1setOf keyword)	Obsolete parent attribute

Attribute	Notes
job-finishings-default (1setOf type2 enum)	Obsolete parent attribute
job-finishings-ready (1setOf type2 enum)	Obsolete parent attribute
job-finishings-supported (1setOf type2 enum)	Obsolete parent attribute
media-info-supported (boolean)	Unnecessary attribute

1572 10. Obsolete Values

1573 10.1 Obsolete "job-state-reasons" Values

1574 The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' keyword values
 1575 from the previous version of this specification [PWG5100.7-2003] are now OBSOLETE
 1576 because the corresponding Job Template attribute is OBSOLETE.

1577 11. Conformance Requirements

1578 11.1 Printer Conformance Requirements

1579 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1580 1. The new operations defined in section 4;
- 1581 2. The operation attributes defined in 5.1;
- 1582 3. The Job Status attributes defined in section 5.2 that correspond to any
 1583 supported Job Template attributes defined in section 5.3;
- 1584 4. The Document Status attributes defined in section 5.2 that correspond to any
 1585 supported Document Template attributes defined in section 5.3;
- 1586 5. The Printer Description attributes defined in section 5.5 that correspond to any
 1587 supported Document/Job Template attributes defined in section 5.3;
- 1588 6. The additional semantics defined in section 6;
- 1589 7. The additional values defined in section 7;
- 1590 8. The internationalization considerations defined in section 12; and
- 1591 9. The security considerations defined in section 13.

1592 Printers MUST NOT support the OBSOLETE attributes listed in section 9 and MUST NOT
 1593 support the OBSOLETE values in section 10.

Commented [MRS20]: SK4

1594 11.2 Client Conformance Requirements

1595 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1596 1. The internationalization considerations defined in section 12; and
- 1597 2. The security considerations defined in section 13.

1598 12. Internationalization Considerations

1599 For interoperability and basic support for multiple languages, conforming implementations
1600 MUST support:

- 1601 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
1602 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1603 2. The Unicode Format for Network Interchange [RFC5198] which requires
1604 transmission of well-formed UTF-8 strings and recommends transmission of
1605 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1606 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1607 characters and combining marks) followed by Canonical Composition (into canonical
1608 composed characters wherever Unicode has assigned them).

1609 WARNING – Performing normalization on UTF-8 strings received from Clients and
1610 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client
1611 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now
1612 'hidden').

1613 Implementations of this specification SHOULD conform to the following standards on
1614 processing of human-readable Unicode text strings, see:

- 1615 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 1616 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 1617 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 1618 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 1619 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 1620 Unicode Collation Algorithm [UTS10] – sorting
- 1621 Unicode Locale Data Markup Language [UTS35] – locale databases

1622 Implementations of this specification are advised to also review the following informational
1623 documents on processing of human-readable Unicode text strings:

- 1624 Unicode Character Encoding Model [UTR17] – multi-layer character model
- 1625 Unicode Character Property Model [UTR23] – character properties
- 1626 Unicode Conformance Model [UTR33] – Unicode conformance basis

1627 13. Security Considerations

1628 The IPP extensions defined in this document require the same security considerations as
1629 defined in the Internet Printing Protocol/1.1 [STD92].

1630 Implementations of this specification SHOULD conform to the following standard on
1631 processing of human-readable Unicode text strings, see:

1632 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1633 Implementations of this specification are advised to also review the following informational
1634 document on processing of human-readable Unicode text strings:

1635 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

1636 14. IANA Considerations

1637 14.1 Attribute Registrations

1638 The attributes defined in this specification will be published by IANA according to the
1639 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1640 <http://www.iana.org/assignments/ipp-registrations>

1641 The registry entries will contain the following information:

1642	Document Status attributes:	Reference
1643	-----	-----
1644	document-format-details(deprecated) (collection)	[PWG5100.7]
1645	document-format-details-detected(deprecated) (collection)	[PWG5100.7]
1646	document-format-supplied(obsolete) (mimeType)	[PWG5100.7]
1647	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1648	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1649	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1650	errors-count (integer(0:MAX))	[PWG5100.7]
1651	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1652	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1653	warnings-count (integer(0:MAX))	[PWG5100.7]
1654		
1655	Document Template attributes:	Reference
1656	-----	-----
1657	media-col (collection)	[PWG5100.7]
1658	<Any "media-col" member attribute>	[PWG5100.7]
1659	output-device (name(127))	[PWG5100.7]
1660	print-content-optimize (type2 keyword)	[PWG5100.7]
1661		
1662	Job Status attributes:	Reference
1663	-----	-----
1664	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1665	document-charset-supplied(obsolete) (charset)	[PWG5100.7]

1666	document-digital-signature-supplied(obsolete) (type2 keyword)	
1667		[PWG5100.7]
1668	document-format-details(deprecated) (collection)	[PWG5100.7]
1669	document-format-details-detected(deprecated) (collection)	[PWG5100.7]
1670	document-format-details-supplied(obsolete) (1setOf collection)	
1671		[PWG5100.7]
1672	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1673	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1674	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1675	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1676	document-natural-language-supplied(obsolete) (naturalLanguage)	
1677		[PWG5100.7]
1678	errors-count (integer(0:MAX))	[PWG5100.7]
1679	ipp-attribute-fidelity(obsolete) (boolean)	[PWG5100.7]
1680	job-copies-actual(obsolete) (integer(1:MAX))	[PWG5100.7]
1681	job-cover-back-actual(obsolete) (collection)	[PWG5100.7]
1682	job-cover-front-actual(obsolete) (collection)	[PWG5100.7]
1683	job-finishings-actual(obsolete) (1setOf type2 enum)	[PWG5100.7]
1684	job-finishings-col-actual(obsolete) (1setOf collection)	[PWG5100.7]
1685	job-mandatory-attributes(obsolete) (1setOf keyword)	[PWG5100.7]
1686	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1687	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1688	warnings-count (integer(0:MAX))	[PWG5100.7]
1689		
1690	Job Template attributes:	Reference
1691	-----	-----
1692	job-account-id (name(MAX))	[PWG5100.7]
1693	job-accounting-user-id (name(MAX))	[PWG5100.7]
1694	job-cancel-after (integer(0:MAX))	[PWG5100.7]
1695	job-copies(obsolete) (integer(1:MAX))	[PWG5100.7]
1696	job-cover-back(obsolete) (collection)	[PWG5100.7]
1697	job-cover-front(obsolete) (collection)	[PWG5100.7]
1698	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1699	job-delay-output-until-time (dateTime)	[PWG5100.7]
1700	job-hold-until-time (dateTime)	[PWG5100.7]
1701	job-finishings(obsolete) (1setOf type2 enum)	[PWG5100.7]
1702	job-finishings-col(obsolete) (1setOf collection)	[PWG5100.7]
1703	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1704	job-retain-until-interval (integer(0:MAX))	[PWG5100.7]
1705	job-retain-until-time (dateTime)	[PWG5100.7]
1706	job-sheets-col (collection)	[PWG5100.7]
1707	job-sheets (type2 keyword name(MAX))	[PWG5100.7]
1708	media (type2 keyword name(MAX))	[PWG5100.7]
1709	media-col (collection)	[PWG5100.7]
1710	media-col (collection)	[PWG5100.7]
1711	media-back-coating (type2 keyword name(MAX))	[PWG5100.7]
1712	media-bottom-margin (integer(0:MAX))	[PWG5100.7]
1713	media-color (type2 keyword name(MAX))	[PWG5100.7]
1714	media-front-coating (type2 keyword name(MAX))	[PWG5100.7]
1715	media-grain (type2 keyword name(MAX))	[PWG5100.7]
1716	media-hole-count (integer(0:MAX))	[PWG5100.7]
1717	media-info (text(255))	[PWG5100.7]
1718	media-key (type2 keyword name(MAX))	[PWG5100.7]
1719	media-left-margin (integer(0:MAX))	[PWG5100.7]
1720	media-order-count (integer(1:MAX))	[PWG5100.7]
1721	media-pre-printed (type2 keyword name(MAX))	[PWG5100.7]

1722	media-recycled (type2 keyword name(MAX))	[PWG5100.7]
1723	media-right-margin (integer(0:MAX))	[PWG5100.7]
1724	media-size (collection)	[PWG5100.7]
1725	x-dimension (integer(0:MAX))	[PWG5100.7]
1726	y-dimension (integer(0:MAX))	[PWG5100.7]
1727	media-size-name (type2 keyword name(MAX))	[PWG5100.7]
1728	media-source (type2 keyword name(MAX))	[PWG5100.7]
1729	media-thickness (integer(1:MAX))	[PWG5100.7]
1730	media-tooth (type2 keyword name(MAX))	[PWG5100.7]
1731	media-top-margin (integer(0:MAX))	[PWG5100.7]
1732	media-type (type2 keyword name(MAX))	[PWG5100.7]
1733	media-weight-metric (integer(0:MAX))	[PWG5100.7]
1734	output-device (name(127))	[PWG5100.7]
1735	print-content-optimize (type2 keyword)	[PWG5100.7]
1736		
1737	Operation attributes:	Reference
1738	-----	-----
1739	document-digital-signature(obsolete) (type2 keyword)	[PWG5100.7]
1740	document-format-details(deprecated) (collection)	[PWG5100.7]
1741	document-format (obsolete) (mimeMediaType)	[PWG5100.7]
1742	document-format-device-id(obsolete) (text(127))	[PWG5100.7]
1743	document-format-version(obsolete) (text(127))	[PWG5100.7]
1744	document-natural-language(obsolete) (1setOf naturalLanguage)	[PWG5100.7]
1745		[PWG5100.7]
1746	document-source-application-name (name(MAX))	[PWG5100.7]
1747	document-source-application-version (text(127))	[PWG5100.7]
1748	document-source-os-name (name(40))	[PWG5100.7]
1749	document-source-os-version (text(40))	[PWG5100.7]
1750	document-format-version(obsolete) (text(127))	[PWG5100.7]
1751	job-hold-until-time (dateTime)	[PWG5100.7]
1752	job-ids (1setOf integer(1:MAX))	[PWG5100.7]
1753	job-mandatory-attributes (1setOf keyword)	[PWG5100.7]
1754		
1755	Printer Description attributes:	Reference
1756	-----	-----
1757	document-charset-default (charset)	[PWG5100.7]
1758	document-charset-supported (1setOf charset)	[PWG5100.7]
1759	document-digital-signature-default(obsolete) (type2 keyword)	[PWG5100.7]
1760		[PWG5100.7]
1761	document-digital-signature-supported(obsolete) (1setOf type2 keyword)	[PWG5100.7]
1762		[PWG5100.7]
1763	document-format-details-default(obsolete) (collection)	[PWG5100.7]
1764	document-format-details-supported (1setOf keyword)	[PWG5100.7]
1765	document-format-version-default(obsolete) (text(127))	[PWG5100.7]
1766	document-format-version-supported(obsolete) (1setOf text(127))	[PWG5100.7]
1767		[PWG5100.7]
1768	document-natural-language-default (naturalLanguage)	[PWG5100.7]
1769	document-natural-language-supported (1setOf naturalLanguage)	[PWG5100.7]
1770		[PWG5100.7]
1771	job-cancel-after-default (integer(0:MAX) no-value)	[PWG5100.7]
1772	job-cancel-after-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1773	job-copies-default(obsolete) (integer(1:MAX))	[PWG5100.7]
1774	job-copies-supported(obsolete) (rangeOfInteger(1:MAX))	[PWG5100.7]
1775	job-cover-back-default(obsolete) (collection)	[PWG5100.7]
1776	job-cover-back-supported(obsolete) (1setOf keyword)	[PWG5100.7]
1777	job-cover-front-default(obsolete) (collection)	[PWG5100.7]

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1778     job-cover-front-supported(obsolete) (1setOf keyword)           [PWG5100.7]
1779     job-creation-attributes-supported (1setOf keyword)           [PWG5100.7]
1780     job-delay-output-until-default (type2 keyword | name(MAX))    [PWG5100.7]
1781     job-delay-output-until-interval-supported (rangeOfInteger(0:MAX))
1782                                         [PWG5100.7]
1783     job-delay-output-until-supported (1setOf (type2 keyword | name(MAX)))
1784                                         [PWG5100.7]
1785     job-delay-output-until-time-supported (rangeOfInteger(0:MAX))
1786                                         [PWG5100.7]
1787     job-finishings-col-default(obsolete) (1setOf collection)      [PWG5100.7]
1788     job-finishings-col-ready(obsolete) (1setOf collection)       [PWG5100.7]
1789     job-finishings-col-supported(obsolete) (1setOf keyword)      [PWG5100.7]
1790     job-finishings-default(obsolete) (1setOf type2 enum)        [PWG5100.7]
1791     job-finishings-ready(obsolete) (1setOf type2 enum)          [PWG5100.7]
1792     job-finishings-supported(obsolete) (1setOf type2 enum)       [PWG5100.7]
1793     job-history-attributes-configured (1setOf keyword)           [PWG5100.7]
1794     job-history-attributes-supported (1setOf keyword)            [PWG5100.7]
1795     job-history-interval-configured (integer(0:MAX))             [PWG5100.7]
1796     job-history-interval-supported (rangeOfInteger(0:MAX))       [PWG5100.7]
1797     job-ids-supported (boolean)                                   [PWG5100.7]
1798     job-mandatory-attributes-supported (boolean)                 [PWG5100.7]
1799     job-retain-until-default (type2 keyword | name(MAX))         [PWG5100.7]
1800     job-retain-until-interval-supported (rangeOfInteger(0:MAX))  [PWG5100.7]
1801     job-retain-until-supported (1setOf (type2 keyword | name(MAX)))
1802                                         [PWG5100.7]
1803     job-retain-until-time-supported (rangeOfInteger(0:MAX))      [PWG5100.7]
1804     job-spooling-supported (type2 keyword)                       [PWG5100.7]
1805     media-back-coating-supported (1setOf (type2 keyword | name(MAX)))
1806                                         [PWG5100.7]
1807     media-bottom-margin-supported (1setOf integer(0:MAX))        [PWG5100.7]
1808     media-col-database (1setOf collection)                       [PWG5100.7]
1809     <Any "media-col" member attribute>                            [PWG5100.7]
1810     media-source-properties (collection)                         [PWG5100.7]
1811     media-source-feed-direction (type2 keyword)                 [PWG5100.7]
1812     media-source-feed-orientation (type2 enum)                  [PWG5100.7]
1813     media-col-default (collection)                               [PWG5100.7]
1814     <Any "media-col" member attribute>                            [PWG5100.7]
1815     media-col-ready (1setOf collection)                          [PWG5100.7]
1816     <Any "media-col" member attribute>                            [PWG5100.7]
1817     media-source-properties (collection)                         [PWG5100.7]
1818     media-source-feed-direction (type2 keyword)                 [PWG5100.7]
1819     media-source-feed-orientation (type2 enum)                  [PWG5100.7]
1820     media-col-supported (1setOf keyword)                         [PWG5100.3]
1821     media-color-supported (1setOf (type2 keyword | name(MAX)))  [PWG5100.7]
1822     media-front-coating-supported (1setOf (type2 keyword | name(MAX)))
1823                                         [PWG5100.7]
1824     media-grain-supported (1setOf (type2 keyword | name(MAX)))  [PWG5100.7]
1825     media-hole-count-supported (1setOf rangeOfInteger(0:MAX))    [PWG5100.7]
1826     media-key-supported (1setOf (type2 keyword | name(MAX)))    [PWG5100.7]
1827     media-info-supported(obsolete) (boolean)                     [PWG5100.7]
1828     media-left-margin-supported (1setOf integer(0:MAX))         [PWG5100.7]
1829     media-order-count-supported (1setOf rangeOfInteger(1:MAX))  [PWG5100.7]
1830     media-pre-printed-supported (1setOf (type2 keyword | name(MAX)))
1831                                         [PWG5100.7]
1832     media-recycled-supported (1setOf (type2 keyword | name(MAX)))
1833                                         [PWG5100.7]

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1834	media-right-margin-supported (1setOf integer(0:MAX))	[PWG5100.7]
1835	media-size-supported (1setOf collection)	[PWG5100.7]
1836	x-dimension (integer(1:MAX) rangeOfInteger(1:MAX))	[PWG5100.7]
1837	y-dimension (integer(1:MAX) rangeOfInteger(1:MAX))	[PWG5100.7]
1838	media-source-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1839		[PWG5100.7]
1840	media-thickness-supported (1setOf rangeOfInteger(1:MAX))	[PWG5100.7]
1841	media-tooth-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1842	media-top-margin-supported (1setOf integer(0:MAX))	[PWG5100.7]
1843	media-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1844	media-weight-metric-supported (1setOf rangeOfInteger(1:MAX))	[PWG5100.7]
1845		[PWG5100.7]
1846	output-device-supported (1setOf name(127))	[PWG5100.7]
1847	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1848	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1849	which-jobs-supported (1setOf type2 keyword)	[PWG5100.7]
1850		
1851	Printer Status attributes:	Reference
1852	-----	-----
1853	printer-detailed-status-messages (1setOf text(MAX))	[PWG5100.7]

1854 14.2 Type2 keyword Value Registrations

1855 The keyword values defined in this specification will be published by IANA according to the
 1856 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1857 <http://www.iana.org/assignments/ipp-registrations>

1858 The registry entries will contain the following information:

1859	Attributes (attribute syntax)	
1860	Keyword Attribute Value	Reference
1861	-----	-----
1862	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1863	day-time	[PWG5100.7]
1864	evening	[PWG5100.7]
1865	indefinite	[PWG5100.7]
1866	night	[PWG5100.7]
1867	no-delay-output	[PWG5100.7]
1868	second-shift	[PWG5100.7]
1869	third-shift	[PWG5100.7]
1870	weekend	[PWG5100.7]
1871	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1872	<Any "job-delay-output-until" value>	[PWG5100.7]
1873	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1874		[PWG5100.7]
1875	<Any "job-delay-output-until" value>	[PWG5100.7]
1876		
1877	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1878	end-of-day	[PWG5100.7]
1879	end-of-month	[PWG5100.7]
1880	end-of-week	[PWG5100.7]
1881	indefinite	[PWG5100.7]
1882	none	[PWG5100.7]

1883	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1884	<Any "job-retain-until" value>	[PWG5100.7]
1885	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	
1886		[PWG5100.7]
1887	<Any "job-retain-until" value>	[PWG5100.7]
1888		
1889	job-sheets (type2 keyword)	[STD92]
1890	first-print-stream-page	[PWG5100.7]
1891	job-both-sheets	[PWG5100.7]
1892	job-end-sheet	[PWG5100.7]
1893	job-start-sheet	[PWG5100.7]
1894		
1895	job-state-reasons (1setOf type2 keyword)	[STD92]
1896	digital-signature-did-not-verify	[PWG5100.7]
1897	digital-signature-type-not-supported(obsolete)	[PWG5100.7]
1898	errors-detected	[PWG5100.7]
1899	job-delay-output-until-specified	[PWG5100.7]
1900	job-digital-signature-wait(obsolete)	[PWG5100.7]
1901	warnings-detected	[PWG5100.7]
1902		
1903	media (type2 keyword name(MAX))	[STD92]
1904	choice_iso_a4_210x297mm_na_letter_8.5x11in	[PWG5100.7]
1905		
1906	media-back-coating (type2 keyword name(MAX))	[PWG5100.7]
1907	media-back-coating-supported (1setOf (type2 keyword name(MAX)))	
1908		[PWG5100.7]
1909	<Any "media-back-coating" value>	[PWG5100.7]
1910		
1911	media-color (type2 keyword name(MAX))	[PWG5100.7]
1912	media-color-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1913	<Any "media-color" value>	[PWG5100.7]
1914		
1915	media-front-coating (type2 keyword name(MAX))	[PWG5100.7]
1916	<Any "media-back-coating" value>	[PWG5100.7]
1917	media-front-coating-supported (1setOf (type2 keyword name(MAX)))	
1918		[PWG5100.7]
1919	<Any "media-front-coating" value>	[PWG5100.7]
1920		
1921	media-pre-printed (type2 keyword name(MAX))	[PWG5100.7]
1922	blank	[PWG5100.7]
1923	letter-head	[PWG5100.7]
1924	pre-printed	[PWG5100.7]
1925	media-pre-printed-supported (1setOf (type2 keyword name(MAX)))	
1926		[PWG5100.7]
1927	<Any "media-pre-printed" value>	[PWG5100.7]
1928		
1929	media-recycled (type2 keyword name(MAX))	[PWG5100.7]
1930	none	[PWG5100.7]
1931	standard	[PWG5100.7]
1932	media-recycled-supported (1setOf (type2 keyword name(MAX)))	
1933		[PWG5100.7]
1934	<Any "media-recycled" value>	[PWG5100.7]
1935		
1936	media-source-feed-direction (type2 keyword)	[PWG5100.7]
1937	long-edge-first	[PWG5100.7]
1938	short-edge-first	[PWG5100.7]

1939		
1940	media-source (type2 keyword name(MAX))	[PWG5100.7]
1941	alternate	[PWG5100.7]
1942	alternate-roll	[PWG5100.7]
1943	auto	[PWG5100.7]
1944	bottom	[PWG5100.7]
1945	by-pass-tray	[PWG5100.7]
1946	center	[PWG5100.7]
1947	disc	[PWG5100.7]
1948	envelope	[PWG5100.7]
1949	hagaki	[PWG5100.7]
1950	large-capacity	[PWG5100.7]
1951	left	[PWG5100.7]
1952	main	[PWG5100.7]
1953	main-roll	[PWG5100.7]
1954	manual	[PWG5100.7]
1955	middle	[PWG5100.7]
1956	photo	[PWG5100.7]
1957	rear	[PWG5100.7]
1958	right	[PWG5100.7]
1959	roll-1	[PWG5100.7]
1960	roll-10	[PWG5100.7]
1961	roll-2	[PWG5100.7]
1962	roll-3	[PWG5100.7]
1963	roll-4	[PWG5100.7]
1964	roll-5	[PWG5100.7]
1965	roll-6	[PWG5100.7]
1966	roll-7	[PWG5100.7]
1967	roll-8	[PWG5100.7]
1968	roll-9	[PWG5100.7]
1969	side	[PWG5100.7]
1970	top	[PWG5100.7]
1971	tray-1	[PWG5100.7]
1972	tray-10	[PWG5100.7]
1973	tray-11	[PWG5100.7]
1974	tray-12	[PWG5100.7]
1975	tray-13	[PWG5100.7]
1976	tray-14	[PWG5100.7]
1977	tray-15	[PWG5100.7]
1978	tray-16	[PWG5100.7]
1979	tray-17	[PWG5100.7]
1980	tray-18	[PWG5100.7]
1981	tray-19	[PWG5100.7]
1982	tray-2	[PWG5100.7]
1983	tray-20	[PWG5100.7]
1984	tray-3	[PWG5100.7]
1985	tray-4	[PWG5100.7]
1986	tray-5	[PWG5100.7]
1987	tray-6	[PWG5100.7]
1988	tray-7	[PWG5100.7]
1989	tray-8	[PWG5100.7]
1990	tray-9	[PWG5100.7]
1991	media-source-supported (1setOf (type2 keyword name(MAX))	
1992		[PWG5100.7]
1993	<Any "media-source" value>	[PWG5100.7]
1994		

1995	media-tooth (type2 keyword name(MAX))	[PWG5100.7]
1996	media-tooth-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1997	<Any "media-tooth" value>	[PWG5100.7]
1998		
1999	media-type (type2 keyword name(MAX))	[PWG5100.7]
2000	media-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
2001	<Any "media-type" value>	[PWG5100.7]
2002		
2003	pdl-override-supported (type2 keyword)	[STD92]
2004	guaranteed	[PWG5100.7]
2005		
2006	print-content-optimize (type2 keyword)	[PWG5100.7]
2007	graphics	[PWG5100.7]
2008	photo	[PWG5100.7]
2009	text	[PWG5100.7]
2010	text-and-graphics	[PWG5100.7]
2011	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
2012	<Any "print-content-optimize" value>	[PWG5100.7]
2013	print-content-optimize-default (type2 keyword)	[PWG5100.7]
2014	<Any "print-content-optimize" value>	[PWG5100.7]
2015	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
2016	<Any "print-content-optimize" value>	[PWG5100.7]
2017		
2018	which-jobs (type2 keyword)	[STD92]
2019	aborted	[PWG5100.7]
2020	all	[PWG5100.7]
2021	canceled	[PWG5100.7]
2022	pending	[PWG5100.7]
2023	pending-held	[PWG5100.7]
2024	processing	[PWG5100.7]
2025	processing-stopped	[PWG5100.7]

2026 14.3 Type2 enum Registrations

2027 The attributes defined in this specification will be published by IANA according to the
2028 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

2029 <http://www.iana.org/assignments/ipp-registrations>

2030 The registry entries will contain the following information:

2031	Attributes (attribute syntax)	
2032	Enum Value Enum Symbolic Name	Reference
2033	-----	-----
2034	media-source-feed-orientation (type2 enum)	[PWG5100.7]
2035	<Any "orientation-requested" value>	[PWG5100.7]
2036		
2037	operations-supported (1setOf type2 enum)	[STD92]
2038	0x0038 Cancel-Jobs	[PWG5100.7]
2039	0x0039 Cancel-My-Jobs	[PWG5100.7]
2040	0x003A Close-Job	[PWG5100.7]
2041	0x003B Resubmit-Job	[PWG5100.7]

2042 **14.4 Operation Registrations**

2043 The operations defined in this specification will be published by IANA according to the
 2044 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

2045 <http://www.iana.org/assignments/ipp-registrations>

2046 The registry entries will contain the following information:

2047	Operation Name	Reference
2048	-----	-----
2049	Cancel-Jobs	[PWG5100.7]
2050	Cancel-My-Jobs	[PWG5100.7]
2051	Close-Job	[PWG5100.7]
2052	Create-Job (Extension)	[PWG5100.7]
2053	Hold-Job (Extension)	[PWG5100.7]
2054	Print-Job (Extension)	[PWG5100.7]
2055	Print-URI (Extension)	[PWG5100.7]
2056	Resubmit-Job	[PWG5100.7]
2057	Send-Document (Extension)	[PWG5100.7]
2058	Send-URI (Extension)	[PWG5100.7]
2059	Set-Job-Attributes (Extension)	[PWG5100.7]
2060	Validate-Job (Extension)	[PWG5100.7]

2061 **14.5 Status Code Registrations**

2062 The status codes defined in this specification will be published by IANA according to the
 2063 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

2064 <http://www.iana.org/assignments/ipp-registrations>

2065 The registry entries will contain the following information:

2066	Value	Status Code Name	Reference
2067	-----	-----	-----
2068	0x0500:0x05FF	- Server Error:	
2069	0x050B	server-error-too-many-jobs	[PWG5100.7]
2070	0x050C	server-error-too-many-documents	[PWG5100.7]

2071

2072 15. Overview of Changes

2073 15.1 IPP Job Extensions v2.0

2074 The following changes were made to the previous version of this specification [PWG5100.7-
2075 2003]:

- 2076 • A rationale section was added, including use cases, exceptions, and requirements;
- 2077 • References now point to the current versions of dependent documents and
2078 specifications at the time of publication;
- 2079 • Read-only attributes are now defined and registered as status attributes;
- 2080 • A REQUIRED "job-mandatory-attributes-supported" Printer Description attribute has
2081 been added to indicate support for the "job-mandatory-attributes" Job Template
2082 attribute;
- 2083 • The RECOMMENDED "job-hold-until-time" and REQUIRED "job-ids" operation
2084 attributes were moved from the OBSOLETE IPP Job and Printer Extensions - Set 2
2085 [PWG5100.11-2010] specification;
- 2086 • The RECOMMENDED "job-delay-output-until", "job-delay-output-until-time", and
2087 "job-hold-until-time" Job Template attributes were moved from the OBSOLETE IPP
2088 Job and Printer Extensions - Set 2 [PWG5100.11-2010] specification;
- 2089 • The REQUIRED "job-creation-attributes-supported", "job-spooling-supported",
2090 "media-col-database", "printer-detailed-status-messages", and "which-jobs-
2091 supported" Printer attributes were moved from the OBSOLETE IPP Job and Printer
2092 Extensions - Set 2 [PWG5100.11-2010] specification;
- 2093 • The RECOMMENDED "job-account-id" and "job-accounting-user-id" Job Template
2094 and related Printer Description attributes were moved from the IPP Production
2095 Printing Attributes - Set 1 [PWG5100.3-2001] specification;
- 2096 • The RECOMMENDED "job-sheets-col" Job Template and related Printer Description
2097 attributes were moved from the IPP Production Printing Attributes - Set 1
2098 [PWG5100.3-2001] specification;
- 2099 • The additional values for the "job-sheets" Job Template attribute were moved from
2100 the IPP Production Printing Attributes - Set 1 [PWG5100.3-2001] specification;
- 2101 • The REQUIRED "media-col" Document/Job Template attribute and related Printer
2102 Description attributes were moved from the original IPP Production Printing Attributes
2103 - Set 1 [PWG5100.3-2001], OBSOLETE IPP Job and Printer Extensions - Set 2

- 2104 [PWG5100.11-2010], and IPP Job and Printer Extensions - Set 3 [PWG5100.13-
2105 2012] specifications;
- 2106 • The RECOMMENDED "job-retain-until", "job-retain-until-interval", and "job-retain-
2107 until-time" Job Template attributes were added to control the Job Retention phase of
2108 a Job's lifecycle;
 - 2109 • The REQUIRED "job-history-attributes-configured", "job-history-attributes-
2110 supported", "job-history-interval-configured", and "job-history-interval-supported"
2111 Printer Description attributes were added to control the Job History phase of a Job's
2112 lifecycle;
 - 2113 • The "document-charset" operation attribute and corresponding operation semantics
2114 are now defined in PWG 5100.5: IPP Document Object v1.1;
 - 2115 • The "document-digital-signature" operation attribute and corresponding Document
2116 Status, Job Status, and Printer Description attributes have been made OBSOLETE
2117 because of interoperability issues;
 - 2118 • The "document-format-details" operation attribute and corresponding Document
2119 Status, Job Status, and Printer Description attributes have been made
2120 DEPRECATED because of interoperability issues and privacy concerns;
 - 2121 • The "document-format", "document-format-version", and "document-natural-
2122 language" member attributes of "document-format-details" have been made
2123 OBSOLETE because the attributes are redundant;
 - 2124 • The "document-format-device-id" member attribute of "document-format-details"
2125 have been made OBSOLETE because the attribute syntax is too short to be useful;
 - 2126 • The "document-format-version" operation attribute and corresponding Document
2127 Status, Job Status, and Printer Description attributes have been made OBSOLETE
2128 because of interoperability issues;
 - 2129 • The "job-copies" Job Template attribute and corresponding Job Status and Printer
2130 Description attributes have been made OBSOLETE because of interoperability
2131 issues;
 - 2132 • The "job-cover-back" Job Template attribute and corresponding Job Status and
2133 Printer Description attributes have been made OBSOLETE because of
2134 interoperability issues;
 - 2135 • The "job-cover-front" Job Template attribute and corresponding Job Status and
2136 Printer Description attributes have been made OBSOLETE because of
2137 interoperability issues;

- 2138 • The "job-finishings" Job Template attribute and corresponding Job Status and Printer
2139 Description attributes have been made OBSOLETE because of interoperability
2140 issues;
- 2141 • The "job-finishings-col" Job Template attribute and corresponding Job Status and
2142 Printer Description attributes have been made OBSOLETE because of
2143 interoperability issues; and
- 2144 • The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' values for
2145 the "job-state-reasons" attribute have been made OBSOLETE because of
2146 interoperability issues.

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2232 To subscribe, see the PWG web page:

2233 <http://www.pwg.org/>

2234 Implementers of this specification document are encouraged to join the IPP Mailing List in
2235 order to participate in any discussions of clarification issues and review of registration
2236 proposals for additional attributes and values.

2237 The editors would like to especially thank the following individuals who also contributed
2238 significantly to the development of this document:

2239 Tom Hastings (author of v1.0)
2240 Peter Zehler (author of v1.0)

2241

2242 18. Change History

2243 18.1 July 18, 2019

- 2244 • Fixed typos seen during LCRC review in section 5.3.1.15 (media-size)

2245 18.118.2 June 24, 2019

- 2246 • AS1: Fixed typo in section 4.4.2 (Resubmit-Job response, not Close-Job...)
- 2247 • AS2: Clarified references in section 5.5.3
- 2248 • AS3: Fixed references in sections 5.5.10 and 5.5.11
- 2249 • AS4: Fixed references in sections 5.5.16 to 5.5.19
- 2250 • AS5: Fixed typo and reference in section 5.5.39
- 2251 • AS6: Fixed reference in section 5.5.43
- 2252 • AS7: Fixed reference in section 5.5.46
- 2253 • AS8: Fixed reference in section 5.5.51
- 2254 • AS9: Fixed reference in section 5.5.53
- 2255 • AS10: Fixed reference in section 6.4
- 2256 • SK1: Cleaned up list in section 3.1
- 2257 • SK2: Cleaned up list in section 3.5
- 2258 • SK4: Added MUST NOT for OBSOLETE stuff
- 2259 • WW1: Reworded text in section 1.3
- 2260 • WW2: Use a colon after "for example" in section 5.1.4
- 2261 • WW3: Removed bogus PostScript Red Book reference in section 5.3.1.15
- 2262 • WW4: Reworded with a list of example values in section 5.3.1.22
- 2263 • WW5: Reworded example constraints in section 5.3.1.22
- 2264 • WW6: Fixed typo in table 7

- 2265
 - WW7: Fixed typo in table 9
- 2266 **18.218.3 May 24, 2019**
- 2267
 - Section 1: Clarify as "original" version of production printing
- 2268
 - Section 5.3.1: All optional member attributes are now recommended
- 2269
 - Sections 5.4.1 and 5.4.2: The job-account-id and job-accounting-user-id attributes are now recommended
- 2270
- 2271
 - Section 5.5.x: Make all xxx-default and xxx-supported attributes of recommended xxx attributes conditionally required
- 2272
- 2273
 - Section 15.1: Updated with conformance of new attributes
- 2274
 - Global: fixed broken references
- 2275 **18.318.4 May 10, 2019**
- 2276
 - Copied media-col and related attributes and extensions from PWG 5100.3 and 5100.13 (JPS3)
- 2277
- 2278
 - Copied job-account-id, job-accounting-user-id, and related attributes from PWG 5100.3
- 2279
- 2280
 - Section 15.1: Updated discussion of media-col, add reference to 5100.13
- 2281
 - Section 16.1: Moved 5100.3 reference to section 16.2
- 2282
 - Section 16.2: Added 5100.13 reference
- 2283 **18.418.5 April 18, 2019**
- 2284
 - Status: stable
- 2285
 - Make document-format-details DEPRECATED, only obsolete redundant member attributes per April 2019 F2F
- 2286
- 2287
 - Use OBSOLETE and DEPRECATED (uppercase) in text
- 2288 **18.518.6 March 15, 2019**
- 2289
 - Version: 2.0

- 2290
 - Section 2.1: OBSOLETE -> OBSOLETE
- 2291
 - Section 2.4: Cleaned out unused terms, added definitions of Completed Job, Not Completed Job, and Retained Job
- 2292
- 2293
 - Sections 5 and 6: Updated conformance requirements
- 2294 **18.618.7 March 8, 2019**
- 2295
 - Status: Prototype
- 2296
 - Abstract: Reworded for updated scope
- 2297
 - Section 1: Reworded for updated scope, added discussion of obsolete JPS2 bits moving here
- 2298
- 2299
 - Section 2.1: Added definitions of OBSOLETE and DEPRECATED
- 2300
 - Section 3: Added rationale, use cases, and design requirements for attributes and operations from JPS2.
- 2301
- 2302
 - New section 4 for operations from JPS2
- 2303
 - Section 5: Made most attributes RECOMMENDED, added job-creation-attributes-supported, job-delay-output-until-xxx, job-history-xxx, job-hold-until-time, job-ids, job-pooling-supported, media-col-database, printer-detail-status-messages from JPS2
- 2304
- 2305
- 2306
 - Section 5: Added new job-history-xxx and job-retain-until-xxx attributes
- 2307
 - New section 6 for additional semantics (imported from JPS2)
- 2308
 - Section 7: Added pdl-override-supported, which-jobs values, media-col member attributes.
- 2309
- 2310 **18.718.8 October 23, 2018**
- 2311
 - Status: Interim
- 2312
 - Updated references to the first version of 5100.7 to include year and exclude the full name.
- 2313
- 2314
 - Abstract and intro: Clarified that this specification is defining attributes and values.
- 2315
 - Editorial changes
- 2316
 - Added reference to the MSN2 spec.

2317 **18.818.9 September 26, 2018**

- 2318 • Brought back the job-mandatory-attributes operation attribute, which is still needed.
- 2319 • Added a rationale, use case, and design requirement for selective fidelity/job-
2320 mandatory-attributes.
- 2321 • Added Additional Semantics and Operation Registrations sections for using job-
2322 mandatory-attributes with job creation/validation operations.
- 2323 • Added Additional Semantics and Operation Registrations sections for returning the
2324 too-many-jobs/documents status codes.

2325 **18.918.10 September 25, 2018**

2326 Initial revision.