



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:

<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippjobext20-20190524.docx>
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293

294 **1. Introduction**

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

302 **1.1 Document Natural Language and Character Set**

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

310 **1.2 Attribute Fidelity**

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

315 **1.3 Rendering Optimizations**

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

321 **1.4 Printing on a Specific Output Device**

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

325 **1.5 Results of Job/Document Processing**

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

330 **1.6 Job Scheduling and Lifecycle**

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

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

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

342 **1.7 Job Operations**

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

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

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

353 **1.8 Obsolete Attributes and Values**

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

357 **2. Terminology**

358 **2.1 Conformance Terminology**

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

364 The term DEPRECATED is used for previously defined and approved protocol elements that
365 SHOULD NOT be used or implemented. The term OBSOLETE is used for previously defined
366 and approved protocol elements that MUST NOT be used or implemented.

367 **2.2 Printing Terminology**

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

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

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

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

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

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

380 **2.3 Protocol Role Terminology**

381 This document also defines the following protocol roles to specify unambiguous
382 conformance requirements:

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

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

388 2.4 Other Terminology

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

390 *Document Creation Operation*: operations that accept Document Content. Specifically:
391 Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are
392 both Job Creation and Document Creation operations.

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

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

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

399 2.5 Acronyms and Organizations

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

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

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

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

404 3. Requirements

405 3.1 Rationale

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

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

- 420 9. Define attributes for retaining a Job for a specified time period;
421 10. Define attributes for configuring the Job history attributes and time period;
422 11. Define attributes for automatically canceling a Job after a specified time period;
423 12. Define operations for managing one or more Jobs; and
424 13. Define values that allow a Client to monitor specific groups of Jobs.

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

427 **3.2 Use Cases**

428 **3.2.1 Print a Plain Text File**

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

432 **3.2.2 Print a Document Using a Matching Size**

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

436 **3.2.3 Force a Document to Print on a Specific Media Size**

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

440 **3.2.4 Print a Presentation with Best Quality**

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

443 **3.2.5 Print Using a Specific Output Device**

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

447 **3.2.6 Print Using Loaded Media**

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

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

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

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

459 **3.2.7 Print on a Roll**

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

462 **3.2.8 Manual Duplex Printing**

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

471 **3.2.9 Monitor Whether Jobs are Printed Correctly**

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

475 **3.2.10 Hold a Job Until a Specific Date and Time**

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

478 **3.2.11 Delay Output Until a Specific Time Period**

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

481 **3.2.12 Submit a Variable Number of Documents in a Job**

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

486 3.2.13 Cancel a Job After a Specific Time Period

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

490 3.2.14 Cancel Multiple Jobs

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

494 3.2.15 Resubmit a Job

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

499 3.2.16 Retain Jobs for a Specific Time Period

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

503 3.2.17 Keep Job History Information for a Specific Time Period

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

507 3.3 Exceptions**508 3.3.1 Too Many Jobs on a Printer**

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

511 3.3.2 Too Many Documents in a Job

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

514 3.4 Out of Scope

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

- 516 1. Definition of new file formats; and
517 2. Definition of new protocol bindings.

518 **3.5 Design Requirements**

519 The design requirements for this specification are:

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

534 4. New Operations

535 4.1 Cancel-Jobs

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

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

545 4.1.1 Cancel-Jobs Request

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

547 Group 1: Operation Attributes

548 "attributes-charset" (charset) and
549 "attributes-natural-language" (naturalLanguage):

550 The Client MUST supply and the Printer MUST support both of these
551 attributes.

552 "printer-uri" (uri):

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

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

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

558 "requesting-user-name" (name(MAX)) and
559 "requesting-user-uri" (uri):

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

561 "message" (text(127)):

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

565 **4.1.2 Cancel-Jobs Response**

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

567 Group 1: Operation Attributes

568 "attributes-charset" (charset) and
569 "attributes-natural-language" (naturalLanguage):

570 The Printer **MUST** return both of these attributes.

571 "status-message" (text(255)) and/or
572 "detailed-status-message" (text(MAX)):

573 The Printer **MAY** return one or both of these attributes.

574 Group 2: Unsupported Attributes

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

576 **4.2 Cancel-My-Jobs**

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

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

585 **4.2.1 Cancel-My-Jobs Request**

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

587 Group 1: Operation Attributes

588 "attributes-charset" (charset) and
589 "attributes-natural-language" (naturalLanguage):

590 The Client **MUST** supply and the Printer **MUST** support both of these
591 attributes.

592 "printer-uri" (uri):

593 The Client **MUST** supply and the Printer **MUST** support the "printer-uri"
594 operation attribute which is the target Printer for the operation.

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

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

598 "requesting-user-name" (name(MAX)) and
599 "requesting-user-uri" (uri):

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

601 "message" (text(127)):

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

605 **4.2.2 Cancel-My-Jobs Response**

606 The following groups of attributes are part of a Cancel-My-Jobs response.

607 Group 1: Operation Attributes

608 "attributes-charset" (charset) and
609 "attributes-natural-language" (naturalLanguage):

610 The Printer MUST return both of these attributes.

611 "status-message" (text(255)) and/or
612 "detailed-status-message" (text(MAX)):

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

614 Group 2: Unsupported Attributes

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

616 **4.3 Close-Job**

617 This REQUIRED operation allows a Client to close a Job that was created using the Create-
618 Job [STD92] operation. It is semantically similar to a Send-Document [STD92] operation
619 with the "last-document" operation attribute supplied with a 'true' value with no Document
620 data, except that the Printer MUST NOT add an additional Document object when accepting
621 a Close-Job operation.

622 A Client SHOULD check whether the Printer supports the Close-Job operation by querying
623 the values of the "operations-supported" [STD92] Printer Description attribute.

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

628 **4.3.1 Close-Job Request**

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

630 Group 1: Operation Attributes

631 "attributes-charset" (charset) and
632 "attributes-natural-language" (naturalLanguage):

633 The Client MUST supply and the Printer MUST support both of these
634 attributes.

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

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

638 "requesting-user-name" (name(MAX)) and
639 "requesting-user-uri" (uri):

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

641 **4.3.2 Close-Job Response**

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

643 Group 1: Operation Attributes

644 "attributes-charset" (charset) and
645 "attributes-natural-language" (naturalLanguage):

646 The Printer MUST return both of these attributes.

647 "status-message" (text(255)) and/or
648 "detailed-status-message" (text(MAX)):

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

650 Group 2: Unsupported Attributes

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

652 Group 3: Job Attributes

653 "job-state" (type1 enum):

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

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

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

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

660 The Printer SHOULD return the Job's RECOMMENDED "job-state-message"
661 attribute. If the Printer supports this attribute, then it MUST be returned in the
662 response. If this attribute is not returned in the response, the Client can
663 assume that the "job-state-message" attribute is not supported and will not
664 be returned in a subsequent Job query.

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

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

671 **4.4 Resubmit-Job**

672 This RECOMMENDED operation allows a Client to create a copy of a Retained Job and
673 change or add attributes for the new Job. Once accepted, a Printer MUST create a new Job
674 object and assign a unique "job-id" and "job-uri" value for the new Job, just as if the Client
675 had sent a Create-Job request. Operation and Job Template attributes from the original Job
676 are copied to the new Job unless overridden in the Resubmit-Job request. If any of the
677 Documents in the Job were passed by reference (Print-URI or Send-URI), the Printer MUST
678 re-fetch the data.

679 Printers MUST reject a Resubmit-Job request if the Job is not retained or is in the 'pending',
680 'pending-held', 'processing', or 'processing-stopped' states with the status 'client-error-not-
681 possible'. Otherwise, the Printer returns a status code as defined for the Print-Job [STD92]
682 operation.

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

687 **4.4.1 Resubmit-Job Request**

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

689 Group 1: Operation Attributes

690 "attributes-charset" (charset) and
691 "attributes-natural-language" (naturalLanguage):

692 The Client MUST supply and the Printer MUST support both of these
693 attributes.

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

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

697 "requesting-user-name" (name(MAX)) and
698 "requesting-user-uri" (uri):

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

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

701 The Client MAY supply and the Printer MUST support either of these
702 attributes.

703 Group 2: Job Template Attributes

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

707 **4.4.2 Resubmit-Job Response**

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

709 Group 1: Operation Attributes

710 "attributes-charset" (charset) and
711 "attributes-natural-language" (naturalLanguage):

712 The Printer MUST return both of these attributes.

713 "status-message" (text(255)) and/or
714 "detailed-status-message" (text(MAX)):

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

716 Group 2: Unsupported Attributes

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

718 Group 3: Job Attributes

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

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

721 "job-state" (type1 enum):

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

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

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

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

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

733 "job-uri" (uri):

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

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

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

741 5. Attributes

742 5.1 Operation Attributes

743 5.1.1 document-format-details (collection)

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

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

752 **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))

753 5.1.1.1 document-source-application-name (name(MAX))

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

759 5.1.1.2 document-source-application-version (text(127))

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

764 5.1.1.3 document-source-os-name (name(40))

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

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

774 **5.1.1.4 document-source-os-version (text(40))**

775 This member attribute identifies the version number of the operating system that created the
776 Document data. If specified, the "document-source-os-name" member attribute MUST also
777 be specified. The value MUST be all lowercase in order to facilitate matching, e.g., "10.14.4",
778 "18.04", "10 (1903)", etc.

779 **5.1.2 job-hold-until-time (dateTime)**

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

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

786 **5.1.3 job-ids (1setOf integer(1:MAX))**

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

789 **5.1.4 job-mandatory-attributes (1setOf keyword)**

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

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

801 **5.2 Document and Job Status Attributes**

802 **5.2.1 document-format-details (collection)**

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

805 **5.2.2 document-format-details-detected (collection)**

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

809 **5.2.3 errors-count (integer(0:MAX))**

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

815 **5.2.4 print-content-optimize-actual (1setOf type2 keyword)**

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

818 **5.2.5 warnings-count (integer(0:MAX))**

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

822 **5.3 Document and Job Template Attributes**

823 **5.3.1 media-col (collection)**

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

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

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

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

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

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

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

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

860 Table 2 lists the member attributes of the "media-col" collection attribute.

861 **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

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

864 **5.3.1.1 Media Selection and Full-Bleed Printing**

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

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

872 **5.3.1.2 media-back-coating (type2 keyword | name(MAX))**

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

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

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

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

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

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

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

881 5.3.1.3 media-bottom-margin (integer(0:MAX))

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

885 5.3.1.4 media-color (type2 keyword | name(MAX))

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

888 5.3.1.5 media-front-coating (type2 keyword | name(MAX))

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

892 5.3.1.6 media-grain (type2 keyword | name(MAX))

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

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

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

900 5.3.1.7 media-hole-count (integer(0:MAX))

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

903 5.3.1.8 media-info (text(255))

904 This RECOMMENDED member attribute provides a human-readable description of the
905 media.

906 5.3.1.9 media-key (type2 keyword | name(MAX))

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

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

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

914 **5.3.1.10 media-left-margin (integer(0:MAX))**

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

918 **5.3.1.11 media-order-count (integer(1:MAX))**

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

925 **5.3.1.12 media-pre-printed (type2 keyword | name(MAX))**

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

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

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

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

933 **5.3.1.13 media-recycled (type2 keyword | name(MAX))**

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

936 'none': The media is not recycled.

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

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

940 **5.3.1.14 media-right-margin (integer(0:MAX))**

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

944 **5.3.1.15 media-size (collection)**

945 This REQUIRED member attribute is a collection that explicitly specifies the numerical media
946 width and height dimensions. Clients SHOULD localize the dimensions to the size names
947 that users are familiar with, such as 'Letter' and 'A4', and/or provide the exact dimensions
948 units appropriate for the user's locale, e.g. "8.5x11in" and "210x297mm".

949 A requested media size dimension matches a supported media dimension if it is within an
950 implementation-defined tolerance. For example, PostScript [redbook] specifies a tolerance
951 of 5 points (5/72 of an inch = 1.7 mm) of a supported dimension, i.e., within 176 units of the
952 value of the dimension.

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

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

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

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

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

959 **5.3.1.16 media-size-name (type2 keyword | name(MAX))**

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

964 **5.3.1.17 media-source (type2 keyword | name(MAX))**

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

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

969 **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

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

970 **5.3.1.18 media-source-properties (collection)**

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

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

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

980 **5.3.1.18.1 media-source-feed-direction (type2 keyword)**

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

983 **5.3.1.18.2 media-source-feed-orientation (type2 enum)**

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

986 **5.3.1.19 media-thickness (integer(1:MAX))**

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

989 **5.3.1.20 media-tooth (type2 keyword | name(MAX))**

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

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

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

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

997 'coarse': Rough finish.

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

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

1000 'medium': Regular finish.

1001 'smooth': Smooth finish [JDF].

1002 'stipple': Fine pebble finish [JDF].

1003 'uncalendared': Rough, unpolished and uncoated papers [JDF].

1004 'vellum': Slightly rough surface [JDF].

1005 **5.3.1.21 media-top-margin (integer(0:MAX))**

1006 The REQUIRED "media-top-margin" member attribute defines the Printer's physical top
1007 margin in hundredths of millimeters from the top edge, without respect to the value of the
1008 "orientation-requested" Job Template attribute.

1009 **5.3.1.22 media-type (type2 keyword | name(MAX))**

1010 This REQUIRED member attribute identifies the type of media, i.e., the media instance's
1011 predominate characteristic. Depending on implementation, the Printer MAY need to behave
1012 differently or perform different validation, depending on the type of the media. For example,
1013 prohibiting stapling transparencies or selecting a different paper path for an envelope.
1014 Standard keyword values for media type are defined in the PWG Media Standardized
1015 Names v2.0 (MSN2) [PWG5101.1].

1016 **5.3.1.23 media-weight-metric (integer(0:MAX))**

1017 This RECOMMENDED member attribute indicates the weight of the desired media rounded
1018 to the nearest whole number of grams per square meter.

1019 **5.3.2 output-device (name(127))**

1020 This attribute requests a named Output Device for a Printer that fans-out to multiple devices.
1021 If omitted, the Printer selects the best Output Device for the Job in an implementation
1022 dependent manner.

1023 **5.3.3 print-content-optimize (type2 keyword)**

1024 This RECOMMENDED attribute specifies the type of content optimization to perform on the
1025 Document data. Keyword values specify the type of content to optimize, including:

1026 'graphics': Graphs and line drawings.

1027 'photo': Photographs.

1028 'text': Text.

1029 'text-and-graphics': Text and graphics.

1030 **5.4 Job Template Attributes**

1031 **5.4.1 job-account-id (name(MAX))**

1032 This RECOMMENDED attribute specifies the account associated with the Job, such as a
1033 customer name, a sequence of digits referencing an internal billing number, or even a credit
1034 card number. How the Printer uses this attribute is implementation dependent.

1035 A zero-length value indicates that there is no account name.

1036 **5.4.2 job-accounting-user-id (name(MAX))**

1037 This RECOMMENDED attribute specifies the user ID associated with the account specified
1038 by the "job-account-id" attribute (see section 5.4.1) used for this Job. These two attributes
1039 can be used for account tracking.

1040 A zero-length value indicates that there is no user accounting ID.

1041 **5.4.3 job-cancel-after (integer(0:MAX))**

1042 This RECOMMENDED attribute specifies the maximum number of seconds allowed for
1043 processing a Job. When specified, the Printer cancels the Job automatically if it cannot be
1044 completed within the specified timeframe. The completion timer does not begin until the Job
1045 enters the 'processing' state'.

1046 **5.4.4 job-delay-output-until (type2 keyword | name(MAX))**

1047 This RECOMMENDED attribute specifies a time period in the future when the Printer will
1048 produce the output for the Job. If the specified time period has not yet arrived, the Printer
1049 MUST set the Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The
1050 Printer MUST NOT produce any output until the time period arrives but MAY perform pre-
1051 processing. When the time period arrives, the Job MUST become a candidate for output,
1052 including any processing required to produce the output. The only way to alter the delay
1053 period for a Job is by using the Set-Job-Attributes [RFC3380] operation.

1054 Standard keyword values for named time periods are:

1055 'day-time': Delay output until daylight, typically 6am to 6pm.

1056 'evening': Delay output until the evening, typically from 6pm to 12am.

1057 'indefinite': Delay output indefinitely; the time period can be changed using the Set-
1058 Job-Attributes [RFC3380] operation.

1059 'night': Delay output until the night, typically from 12am to 6am.

1060 'no-delay-output': Do not delay the output.

1061 'second-shift': Delay output until the second work shift, typically from 4pm to 12am.

1062 'third-shift': Delay output until the third work shift, typically from 12am to 8am.

1063 'weekend': Delay output until the weekend.

1064 Clients MUST NOT supply both the "job-delay-output-until" and "job-delay-output-until-time"
1065 (section 5.4.5) Job Template attributes in a Job Creation request. If a Client supplies both
1066 attributes, the Printer MUST reject the request and return the 'client-error-conflicting-
1067 attributes' status code.

1068 Note: Unlike the "job-hold-until" [STD92] Job Template attribute, the "job-delay-output-until"
1069 attribute does not cause the Job to enter the 'pending-held' state.

1070 **5.4.5 job-delay-output-until-time (dateTime)**

1071 This RECOMMENDED attribute specifies a date and time when the Printer will produce the
1072 output for the Job. If the specified time period has not yet arrived, the Printer MUST set the
1073 Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The Printer MUST NOT
1074 produce any output until the time period arrives but MAY perform pre-processing. When the
1075 time period arrives, the Job MUST become a candidate for output, including any processing
1076 required to produce the output. The only way to alter the delay period for a Job is by using
1077 the Set-Job-Attributes [RFC3380] operation.

1078 Clients MUST NOT supply both the "job-delay-output-until-time" and "job-delay-output-until"
1079 (section 5.4.4) Job Template attributes in a Job Creation request. If a Client supplies both
1080 attributes, the Printer MUST reject the request and return the 'client-error-conflicting-
1081 attributes' status code.

1082 Note: Unlike the "job-hold-until-time" (section 5.4.6) Job Template attribute, the "job-delay-
1083 output-until-time" attribute does not cause the Job to enter the 'pending-held' state.

1084 **5.4.6 job-hold-until-time (dateTime)**

1085 This RECOMMENDED attribute specifies the date and time after which the Job MUST
1086 become a candidate for processing. Printers that support this attribute MUST support the
1087 "job-hold-until" [STD92] Job Template attribute.

1088 Clients MUST NOT supply both the "job-hold-until-time" and "job-hold-until" [STD92] Job
1089 Template attributes in a Job Creation request. If a Client supplies both attributes, the Printer
1090 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1091 **5.4.7 job-retain-until (type2 keyword | name(MAX))**

1092 This RECOMMENDED attribute specifies how long the Job remains in the Job Retention
1093 phase of a Job's life cycle [STD92]. Standard values include:

- 1094 'end-of-day': Retain the Job until the end of the current day.
- 1095 'end-of-month': Retain the Job until the end of the current month.
- 1096 'end-of-week': Retain the Job until the end of the current week.
- 1097 'indefinite': Retain the Job indefinitely.
- 1098 'none': Do not retain the Job.

1099 Clients MUST NOT supply the "job-retain-until", "job-retain-until-interval" (section 5.4.8),
 1100 and/or "job-retain-until-time" (section 5.4.9) Job Template attributes together in a Job
 1101 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
 1102 reject the request and return the 'client-error-conflicting-attributes' status code.

1103 **5.4.8 job-retain-until-interval (integer(0:MAX))**

1104 This RECOMMENDED attribute specifies the number of seconds the Job remains in the Job
 1105 Retention phase of a Job's life cycle [STD92].

1106 Clients MUST NOT supply the "job-retain-until" (section 5.4.7), "job-retain-until-interval",
 1107 and/or "job-retain-until-time" (section 5.4.9) Job Template attributes together in a Job
 1108 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
 1109 reject the request and return the 'client-error-conflicting-attributes' status code.

1110 **5.4.9 job-retain-until-time (dateTime)**

1111 This RECOMMENDED attribute specifies the date and time when the Job can leave the Job
 1112 Retention phase of a Job's life cycle [STD92].

1113 Clients MUST NOT supply the "job-retain-until" (section 5.4.7), "job-retain-until-interval"
 1114 (section 5.4.8), and/or "job-retain-until-time" Job Template attributes together in a Job
 1115 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
 1116 reject the request and return the 'client-error-conflicting-attributes' status code.

1117 **5.4.10 job-sheets-col (collection)**

1118 This RECOMMENDED attribute augments the "job-sheets" Job Template attribute [STD92]
 1119 and allows a Client to specify media for Job Sheets that is different than the current media
 1120 being used for the Job. Table 5 lists the member attributes.

1121 **Table 5 - "job-sheets-col" Member Attributes**

Member Attribute

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

media (type2 keyword | name(MAX))

media-col (collection)

1122 5.4.10.1 job-sheets (type2 keyword | name(MAX))

1123 This REQUIRED member attribute specifies which Job Sheets to print on the specified
1124 media. The values for this member attribute are identical to the keyword and name values
1125 for the "job-sheets" Job Template attribute [STD92] itself, including the 'none' value, and
1126 convey the same semantics.

1127 5.4.10.2 media (type2 keyword | name(MAX))

1128 This REQUIRED member attribute specifies which media to use for the Job Sheets. If
1129 specified, the "media-col" member attribute (section 5.4.10.3) MUST NOT be specified.

1130 5.4.10.3 media-col (collection)

1131 This REQUIRED member attribute specifies which media to use for the Job Sheets. If
1132 specified, the "media" member attribute (section 5.4.10.2) MUST NOT be specified.

1133 5.5 Printer Description Attributes**1134 5.5.1 document-charset-default (charset)**

1135 This CONDITIONALLY REQUIRED attribute specifies the default charset that the Printer
1136 will assume for charset-ambiguous Document formats when the Client omits the "document-
1137 charset" operation attribute [PWG5100.5]. Printers that support the "document-charset"
1138 operation attribute MUST support this attribute.

1139 5.5.2 document-charset-supported (1setOf charset)

1140 This CONDITIONALLY REQUIRED attribute lists the charsets that the Printer supports for
1141 charset-ambiguous Document formats. Printers that support the "document-charset"
1142 operation attribute [PWG5100.5] MUST support this attribute.

1143 5.5.3 document-format-details-supported (1setOf keyword)

1144 This DEPRECATED attribute lists the supported member attributes of the "document-
1145 format-details" operation (section 5.1.1) and Document/Job Status (section 5.2.1) attributes.

1146 5.5.4 document-natural-language-default (naturalLanguage)

1147 This CONDITIONALLY REQUIRED attribute specifies the default natural language that the
1148 Printer will assume for Document data when the Client omits the "document-natural-
1149 language" operation attribute [STD92]. Printers that support the "document-natural-
1150 language" attribute MUST support this attribute.

1151 5.5.5 document-natural-language-supported (1setOf naturalLanguage)

1152 This CONDITIONALLY REQUIRED attribute lists the natural languages supported for
1153 Printer-supported Document formats. Printers that support the "document-natural-language"
1154 attribute MUST support this attribute.

1155 5.5.6 job-account-id-default (name(MAX) | no-value)

1156 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-account-
1157 id" Job Template attribute (section 5.4.1). Printers MUST support this attribute if the "job-
1158 account-id" attribute is supported.

1159 5.5.7 job-account-id-supported (boolean)

1160 This CONDITIONALLY REQUIRED attribute specifies whether the "job-account-id" Job
1161 Template attribute (section 5.4.1) is supported. Printers MUST support this attribute if the
1162 "job-account-id" attribute is supported.

1163 5.5.8 job-accounting-user-id-default (name(MAX) | no-value)

1164 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-
1165 accounting-user-id" Job Template attribute (section 5.4.2). Printers MUST support this
1166 attribute if the "job-accounting-user-id" attribute is supported.

1167 5.5.9 job-accounting-user-id-supported (boolean)

1168 This CONDITIONALLY REQUIRED attribute specifies whether the "job-accounting-user-id"
1169 Job Template attribute (section 5.4.2) is supported. Printers MUST support this attribute if
1170 the "job-accounting-user-id" attribute is supported.

1171 5.5.10 job-cancel-after-default (integer(0:MAX) | no-value)

1172 This CONDITIONALLY REQUIRED attribute specifies the default value for the "job-cancel-
1173 after" (section 5.4.1) Job Template attribute. Printers that support the "job-cancel-after"
1174 attribute MUST support this attribute.

1175 5.5.11 job-cancel-after-supported (rangeOfInteger(0:MAX))

1176 This CONDITIONALLY REQUIRED attribute specifies the range of values supported for the
1177 "job-cancel-after" (section 5.4.1) Job Template attribute. Printers that support the "job-
1178 cancel-after" attribute MUST support this attribute.

1179 5.5.12 job-creation-attributes-supported (1setOf keyword)

1180 This REQUIRED attribute lists the names of the operation and Job Template attributes that
1181 can be sent in a Job Creation or Validate-Job request.

1182 5.5.13 job-delay-output-until-default (type2 keyword | name(MAX))

1183 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-delay-
1184 output-until" (section 5.4.4) Job Template attribute. Printers that support the "job-delay-
1185 output-until" attribute MUST support this attribute.

1186 5.5.14 job-delay-output-until-supported (1setOf (type2 keyword | name(MAX)))

1187 This CONDITIONALLY REQUIRED attribute lists the supported values of the "job-delay-
1188 output-until" (section 5.4.4) Job Template attribute. Printers that support the "job-delay-
1189 output-until" attribute MUST support this attribute.

1190 5.5.15 job-delay-output-until-time-supported (rangeOfInteger(0:MAX))

1191 This CONDITIONALLY REQUIRED attribute specifies the range of time values supported
1192 by the "job-delay-output-until-time" (section 5.4.5) Job Template attribute. Printers that
1193 support the "job-delay-output-until-time" attribute MUST support this attribute.

1194 5.5.16 job-history-attributes-configured (1setOf keyword)

1195 This REQUIRED attribute lists the Job attributes that will be retained in the history phase of
1196 each Job. IPP/1.1 [STD92] specifies that at least the "job-id", "job-printer-uri", "job-state",
1197 and "job-state-reasons" attributes MUST be retained in the history phase. Printers that
1198 support the "job-history-attributes-supported" (section N.M.P) attribute MUST support this
1199 attribute.

1200 5.5.17 job-history-attributes-supported (1setOf keyword)

1201 This REQUIRED attribute lists the Job attributes that can be retained in the history phase of
1202 each Job. Printers that support the "job-history-attributes-configured" (section N.M.P)
1203 attribute MUST support this attribute.

1204 5.5.18 job-history-interval-configured (integer(0:MAX))

1205 This REQUIRED attribute specifies the minimum number of seconds that a Job will remain
1206 in the history phase of its lifecycle [STD92]. Printers SHOULD have a default configured
1207 value of at least 60 seconds to allow Clients to discover the disposition of any Jobs that have
1208 reached a terminating state. Printers that support the "job-history-interval-supported"
1209 (section N.M.P) attribute MUST support this attribute.

1210 5.5.19 job-history-interval-supported (rangeOfInteger(0:MAX))

1211 This REQUIRED attribute specifies the range of values that are supported for the "job-
1212 history-interval-configured" Printer Description attribute. Printers that support the "job-
1213 history-interval-configured" (section N.M.P) attribute MUST support this attribute.

1214 5.5.20 job-ids-supported (boolean)

1215 This REQUIRED attribute specifies whether the "job-ids" operation attribute (section 5.1.3)
1216 is supported.

1217 5.5.21 job-mandatory-attributes-supported (boolean)

1218 This REQUIRED attribute specifies that the "job-mandatory-attributes" operation attribute
1219 (section 5.1.4) is supported. Printers MUST report a value of 'true' for this attribute.

1220 5.5.22 job-retain-until-default (type2 keyword | name(MAX))

1221 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-retain-
1222 until" (section 5.4.7) Job Template attribute. Printers that support the "job-retain-until"
1223 attribute MUST support this attribute.

1224 5.5.23 job-retain-until-interval-default (integer(0:MAX) | no-value)

1225 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-retain-
1226 until-interval" (section 5.4.8) Job Template attribute. Printers that support the "job-retain-
1227 until-interval" attribute MUST support this attribute.

1228 5.5.24 job-retain-until-interval-supported (rangeOfInteger(0:MAX))

1229 This CONDITIONALLY REQUIRED attribute specifies the supported values of the "job-
1230 retain-until-interval" (section 5.4.8) Job Template attribute. Printers that support the "job-
1231 retain-until-interval" attribute MUST support this attribute.

1232 5.5.25 job-retain-until-supported (1setOf (type2 keyword | name(MAX)))

1233 This CONDITIONALLY REQUIRED attribute lists the supported values of the "job-retain-
1234 until" (section 5.4.7) Job Template attribute. Printers that support the "job-retain-until"
1235 attribute MUST support this attribute.

1236 5.5.26 job-retain-until-time-supported (rangeOfInteger(0:MAX))

1237 This CONDITIONALLY REQUIRED attribute specifies the supported values of the "job-
1238 retain-until-time" (section 5.4.9) Job Template attribute. Printers that support the "job-retain-
1239 until-time" attribute MUST support this attribute.

1240 5.5.27 job-sheets-col-default (collection)

1241 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-sheets-
1242 col" Job Template attribute (section 5.4.10). Printers that support the "job-sheets-col"
1243 attribute MUST support this attribute.

1244 5.5.28 job-sheets-col-supported (1setOf keyword)

1245 This CONDITIONALLY REQUIRED attribute lists the supported member attributes of the
1246 "job-sheets-col" Job Template attribute (section 5.4.10). Printers that support the "job-
1247 sheets-col" attribute MUST support this attribute.

1248 5.5.29 job-spooling-supported (type2 keyword)

1249 This REQUIRED attribute specifies whether Jobs are spooled before the Document data is
1250 processed. The value of this attribute returned in a Get-Printer-Attributes response MAY
1251 depend on the "document-format" attribute supplied in the Get-Printer-Attributes request
1252 [STD92]. If the Printer does not support this attribute, then the spooling behavior is
1253 implementation dependent.

1254 Standard keyword values include:

1255 'automatic': The Printer chooses whether to process the Document data as it is
1256 received or after spooling (storage).

1257 'spool': The printer processes the Document data after it has been spooled (stored).

1258 'stream': The printer processes the Document data as it is received.

1259 5.5.30 media-back-coating-supported (1setOf (type2 keyword | name(MAX)))

1260 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-back-
1261 coating" member attribute (section 5.3.1.2). Printers that support the "media-back-coating"
1262 member attribute MUST support this attribute.

1263 5.5.31 media-bottom-margin-supported (1setOf integer(0:MAX))

1264 This REQUIRED attribute lists the supported values for the "media-bottom-margin" member
1265 attribute (section 5.3.1.3).

1266 5.5.32 media-col-database (1setOf collection)

1267 This REQUIRED attribute lists the set of pre-defined "media-col" collections available in the
1268 Printer's media database. This attribute is similar to "media-col-ready" (section 5.5.34) but
1269 returns the entire set of pre-defined "media-col" collections known by the Printer instead of
1270 just the media loaded in the Printer.

1271 Because the number and size of values of this attribute can be very large, the Printer MUST
1272 NOT return this attribute in the response to the Get-Printer-Attributes operation unless the
1273 Client explicitly requests it by including the 'media-col-database' value in the "requested-
1274 attributes" [STD92] operation attribute.

1275 In order to limit the number and size of values of this attribute, Printers MAY exclude the
1276 "media-source" and/or "media-type" member attributes from collection values when all

1277 values of the corresponding member attribute are supported when combined with the other
1278 member attributes and values.

1279 Because a Printer may support multiple values for the "media-bottom-margin", "media-left-
1280 margin", "media-right-margin", and "media-top-margin" member attributes, a Printer MAY
1281 only enumerate the best (smallest) values of these attributes to reduce the number of
1282 collection values returned in the "media-col-database" attribute. However, if full-bleed and
1283 non-full-bleed margins have a significant performance, scaling, or quality differences, a
1284 Printer MUST enumerate both the full-bleed (all zeroes) and smallest non-zero hardware
1285 margins in the "media-col-database" attribute.

1286 For example, a Printer that supports ISO A4, ISO DL Envelope, US Letter, US Legal, and
1287 US #10 Envelope media, a single removable tray and a multi-purpose tray, and cardstock,
1288 envelopes, plain paper, labels, letterhead, and transparency media types might report the
1289 following attributes and values:

```
1290     media-size-supported={...}
1291     media-source-supported='by-pass-tray','main','manual'
1292     media-type-supported='cardstock','envelope','labels','stationery',
1293                          'stationery-letterhead','transparency'
1294     media-col-database={
1295         /* ISO A4 cardstock only from manual feed */
1296         media-size={
1297             x-dimension=21000
1298             y-dimension=29700
1299         }
1300         media-source='manual'
1301         media-type='cardstock'
1302     },{
1303         /* ISO A4 transparency only from manual feed */
1304         media-size={
1305             x-dimension=21000
1306             y-dimension=29700
1307         }
1308         media-source='manual'
1309         media-type='transparency'
1310     },{
1311         /* ISO A4 plain paper from any source */
1312         media-size={
1313             x-dimension=21000
1314             y-dimension=29700
1315         }
1316         media-type='stationery'
1317     },{
1318         /* ISO A4 letterhead from any source */
1319         media-size={
1320             x-dimension=21000
1321             y-dimension=29700
1322         }
1323         media-type='stationery-letterhead'
1324     },... /* Lots of other values */
```

1325 5.5.33 media-col-default (collection)

1326 This REQUIRED attribute specifies the default value of the "media-col" Job Template
1327 attribute (section 5.3.1). Printers that conform to this specification MUST support the "media-
1328 default" Printer Description attribute [STD92]. The "media-default" and "media-col-default"
1329 Printer attributes MUST both be configured to specify the same media instance. If the
1330 Administrator sets one of them to a value (either locally or with the Set-Printer-Attributes
1331 [RFC3380] operation), the Printer MUST set the other attribute's value to the same media
1332 instance or to the 'unknown' out-of-band value, if there isn't a corresponding value to be set
1333 for the other attribute. If a Client attempts to set both attributes, but their values specify
1334 different media instances, the Printer MUST reject the Set-Printer-Attributes operation and
1335 return the 'client-error-conflicting-attributes' status code.

1336 5.5.34 media-col-ready (1setOf collection)

1337 This REQUIRED attribute lists the "media-col" (section 5.3.1) values representing media
1338 that are available for use without human intervention, i.e., the media that are ready to be
1339 printed on without interaction. Printers that conform to this specification MUST support the
1340 "media-ready" Printer Description attribute [STD92]. The i^{th} value of the "media-col-ready"
1341 attribute corresponds to the i^{th} value of the "media-ready" attribute so that the Client can
1342 correlate the media names or keywords with the collection values and determine the
1343 characteristics of each ready media instance.

1344 5.5.35 media-col-supported (1setOf keyword)

1345 This REQUIRED attribute lists the supported member attributes of the "media-col"
1346 Job/Document Template attribute (section 5.3.1).

1347 5.5.36 media-color-supported (1setOf (type2 keyword | name(MAX)))

1348 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-color"
1349 member attribute (section 5.3.1.4). Printers that support the "media-color" member attribute
1350 MUST support this attribute.

1351 5.5.37 media-front-coating-supported (1setOf (type2 keyword | name(MAX)))

1352 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-front-
1353 coating" member attribute (section 5.3.1.5). Printers that support the "media-front-coating"
1354 member attribute MUST support this attribute.

1355 5.5.38 media-grain-supported (1setOf (type2 keyword | name(MAX)))

1356 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-grain"
1357 member attribute (section 5.3.1.6). Printers that support the "media-grain" member attribute
1358 MUST support this attribute.

1359 5.5.39 media-hole-count-supported (1setOf rangeOfInteger(0:MAX))

1360 This CONDITIONALLY REQUIRED attribute lists the supported ranges of values of the
1361 "media-hole-count" member attribute (section 5.3.1.6). Printers that support the "media-
1362 hole-count" member attribute MUST support this attribute.

1363 5.5.40 media-key-supported (1setOf (type2 keyword | name(MAX)))

1364 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-key"
1365 member attribute (section 5.3.1.9). Printers that support the "media-key" member attribute
1366 MUST support this attribute.

1367 5.5.41 media-left-margin-supported (1setOf integer(0:MAX))

1368 This REQUIRED attribute lists the supported values for the "media-left-margin" member
1369 attribute (section 5.3.1.10).

1370 5.5.42 media-order-count-supported (1setOf rangeOfInteger(1:MAX))

1371 This CONDITIONALLY REQUIRED attribute lists the ranges of supported values of the
1372 "media-order-count" member attribute (section 5.3.1.8). Printers that support the "media-
1373 order-count" member attribute MUST support this attribute.

1374 5.5.43 media-pre-printed-supported (1setOf (type2 keyword | name(MAX)))

1375 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-pre-
1376 printed" member attribute (section 5.3.1.5). Printers that support the "media-pre-printed"
1377 member attribute MUST support this attribute.

1378 5.5.44 media-recycled-supported (1setOf (type2 keyword | name(MAX)))

1379 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-
1380 recycled" member attribute (section 5.3.1.13). Printers that support the "media-recycled"
1381 member attribute MUST support this attribute and MUST include the 'none' keyword value.

1382 5.5.45 media-right-margin-supported (1setOf integer(0:MAX))

1383 This REQUIRED attribute lists the supported values for the "media-right-margin" member
1384 attribute (section 5.3.1.14).

1385 5.5.46 media-size-supported (1setOf collection)

1386 This REQUIRED attribute lists the supported values of the "media-size" member attribute
1387 (section 5.3.1.12). Unlike the "media-size" member attribute, the "x-dimension" and "y-
1388 dimension" member attributes of "media-size-supported" have a syntax of "integer(1:MAX)
1389 | rangeOfInteger(1:MAX)" to allow for arbitrary ranges of sizes for custom and roll-fed media.

1390 **5.5.47 media-source-supported (1setOf (type2 keyword | name(MAX)))**

1391 This REQUIRED attribute lists the supported values of the "media-source" member attribute
1392 (section 5.3.1.17).

1393 **5.5.48 media-thickness-supported (1setOf rangeOfInteger(1:MAX))**

1394 This CONDITIONALLY REQUIRED attribute lists the ranges of supported values for the
1395 "media-thickness" member attribute (section 5.3.1.19). Printers that support the "media-
1396 thickness" member attribute MUST support this attribute.

1397 **5.5.49 media-tooth-supported (1setOf (type2 keyword | name(MAX)))**

1398 This CONDITIONALLY REQUIRED attribute lists the supported values of the "media-tooth"
1399 member attribute (section 5.3.1.20). Printers that support the "media-tooth" member
1400 attribute MUST support this attribute.

1401 **5.5.50 media-top-margin-supported (1setOf integer(0:MAX))**

1402 This REQUIRED attribute lists the supported values for the "media-top-margin" member
1403 attribute (section 5.3.1.21).

1404 **5.5.51 media-type-supported (1setOf (type2 keyword | name(MAX)))**

1405 This REQUIRED attribute lists the supported values of the "media-type" member attribute
1406 (section 5.3.1.21).

1407 **5.5.52 media-weight-metric-supported (1setOf rangeOfInteger(1:MAX))**

1408 This CONDITIONALLY REQUIRED attribute lists the supported ranges of values of the
1409 "media-weight-metric" member attribute (section 5.3.1.23). Printers that support the "media-
1410 weight-metric" member attribute MUST support this attribute.

1411 **5.5.53 output-device-supported (1setOf name(127))**

1412 This CONDITIONALLY REQUIRED attribute lists the supported "output-device" values.
1413 Printers MUST support this attribute if the "output-device" Job Template attribute (section
1414 5.3.1) is supported.

1415 **5.5.54 print-content-optimize-default (type2 keyword)**

1416 This CONDITIONALLY REQUIRED attribute specifies the default "print-content-optimize"
1417 (section 5.3.3) value. Printers that support the "print-content-optimize" attribute MUST
1418 support this attribute.

1419 **5.5.55 print-content-optimize-supported (1setOf type2 keyword)**

1420 This CONDITIONALLY REQUIRED attribute lists the supported “print-content-optimize”
1421 (section 5.3.3) values. Printers that support the "print-content-optimize" attribute MUST
1422 support this attribute.

1423 **5.5.56 which-jobs-supported (1setOf type2 keyword)**

1424 This REQUIRED attribute lists the supported values for the "which-jobs" operation attribute
1425 [STD92] that is used with the Get-Jobs operation [STD92].

1426 **5.6 Printer Status Attributes**

1427 **5.6.1 printer-detailed-status-messages (1setOf text(MAX))**

1428 This attribute specifies additional detailed and technical information about the Printer,
1429 including information such as fault and warning messages, in the same way that the “job-
1430 detailed-status-messages” [STD92] Job Status attribute provides additional information
1431 about a Job. Because the messages are human-readable text, Clients MUST NOT attempt
1432 to parse the value(s) of this attribute.

1433 **6. Additional Semantics for Existing Operations**

1434 **6.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-
1435 attributes**

1436 This specification extends the Create-Job, Print-Job, Print-URI, and Validate-Job operations
1437 to support the "job-mandatory-attributes" operation attribute (section 5.1.4) in the request
1438 sent by the Client, which specifies a list of Job Template attributes that MUST be supported
1439 by the Printer for the request to be accepted.

1440 The Client MAY supply and the Printer MUST accept the “job-mandatory-attributes”
1441 operation attribute in any Job Creation or Validate-Job request.

1442 The Printer MUST reject the Job Creation request if the Client supplies an unsupported Job
1443 Template attribute or value in the request that is included in this list of "job-mandatory-
1444 attributes" values.

1445 If the Client supplies both the “job-mandatory-attributes” and "ipp-attribute-fidelity” operation
1446 attributes, the Printer MUST ignore the “job-mandatory-attributes” attribute.

1447 **6.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status**
1448 **Code**

1449 This specification extends the Job Creation operations to return the 'server-error-too-many-
1450 jobs' status code value when the Printer is currently unable to create a new Job object.

1451 **6.3 Get-Jobs Operation: "job-ids (1setOf integer(1:MAX))"**

1452 The "job-ids" (section 5.1.3) operation attribute, if supplied, specifies a list of target Jobs to
1453 be returned in the response to a Get-Jobs [STD92] request. Printers MUST support it in Get-
1454 Jobs requests to limit the list of Jobs that are returned.

1455 If the Client supplies the "job-ids" operation attribute in a Get-Jobs request, the Client MUST
1456 NOT also supply any of the following operation attributes in the same request: "limit", "my-
1457 jobs", or "which-jobs". If the Client does supply prohibited operation attributes, the Printer
1458 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1459 **6.4 Hold-Job Operation: "job-hold-until-time (dateTime)"**

1460 The "job-hold-until-time" (section 5.1.1) operation attribute can be provided to specify a date
1461 and time when the Job will become a candidate for processing. Printers that support the
1462 "job-hold-until-time" attribute and Hold-Job operation MUST support its use with the Hold-
1463 Job operation. If accepted, the "job-hold-until-time" operation attribute is copied to the Job,
1464 replacing any existing "job-hold-until" [STD92] or "job-hold-until-time" attribute.

1465 Clients MUST NOT send both the "job-hold-until" [STD92] and "job-hold-until-time" operation
1466 attributes in a Hold-Job request. If both attributes are sent, Printers MUST reject the request
1467 and return the 'client-error-conflicting-attributes' status code.

1468 **6.5 Print-Job, Print-URI, Send-Document, Send-URI: server-error-too-**
1469 **many-documents Status Code**

1470 This specification extends the Document Creation operations to return the 'server-error-too-
1471 many-documents' status code value when the Printer is currently unable to create a new
1472 Document object.

1473 **6.6 Set-Job-Attributes Operation: "job-hold-until-time (dateTime)"**

1474 The "job-hold-until-time" (section 5.4.6) Job Template attribute can be provided to specify a
1475 date and time when the Job will become a candidate for processing. Printers that support
1476 the "job-hold-until-time" attribute and Set-Job-Attributes operation MUST support its use with
1477 the Set-Job-Attributes operation. If accepted, the "job-hold-until-time" operation attribute is
1478 copied to the Job, replacing any existing "job-hold-until" [STD92] or "job-hold-until-time"
1479 attribute.

1480 Clients MUST NOT send both the "job-hold-until" [STD92] and "job-hold-until-time" Job
1481 Template attributes in a Set-Job-Attributes request. If both attributes are sent, Printers
1482 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1483 **7. Additional Values for Existing Attributes**

1484 **7.1 job-sheets (type2 keyword | name(MAX))**

1485 The following additional values are defined for the "job-sheets" Job Template attribute
1486 [STD92]:

1487 'job-start-sheet': A Job Sheet is printed to indicate the start of the Job.

1488 'job-end-sheet': A Job Sheet is printed to indicate the end of the Job.

1489 'job-both-sheets': Job Sheets is printed to indicate the start and end of all the output
1490 associated with the Job.

1491 'first-print-stream-page': The first Input Page in the Document Data is printed as the
1492 Job Sheet and the Printer's standard Job Sheet is suppressed.

1493 **7.2 job-state-reasons (1setOf type2 keyword)**

1494 This specification adds the following new keyword values for the "job-state-reasons" Job
1495 Status attribute [STD92]:

1496 'digital-signature-did-not-verify': One or more documents in the Job contains a
1497 digital signature that could not be verified by the Printer.

1498 'errors-detected': The Printer has detected one or more errors during processing of
1499 the Job.

1500 'job-delay-until-specified': The Job's output is delayed because the "job-delay-
1501 output-until" or "job-delay-output-until-time" Job Template attribute was specified.

1502 'warnings-detected': The Printer has detected one or more warnings during
1503 processing of the Job.

1504 **7.3 media (type2 keyword | name(MAX))**

1505 This specification adds the following new keyword value for the "media" Job Template
1506 attribute [STD92]:

1507 'choice_iso_a4_210x297mm_na_letter_8.5x11in': Print using US Letter or ISO A4
1508 media (whichever is available).

1509 Note: The semantics of the 'choice' prefix are documented in the PWG Media Standardized
1510 Names v2.0 (MSN2) specification [PWG5101.1].

1511 **7.4 pdl-override-supported (type2 keyword)**

1512 This specification defines a new 'guaranteed' value for the "pdl-override-supported" [STD92]
1513 Printer Description attribute. This value indicates that the Printer guarantees that:

- 1514 1. Document and/or Job Template attribute values take precedence over instructions of
1515 any form embedded anywhere in the Document data;
- 1516 2. Document and/or Job Template attributes that have only a single supported value
1517 take precedence over instructions of any form embedded anywhere in the Document
1518 data, even if the attribute is not included in the Job or Document Creation request;
1519 and
- 1520 3. No PDL instruction is performed that does not correspond to a current value in the
1521 corresponding "xxx-supported" Printer Description attribute.

1522 If a Printer cannot honor the advertised "pdl-override-supported" value for a Job, it can abort
1523 the Job, stop the Printer, hold the Job, or substitute a supported value. This choice can be
1524 fixed by the implementation or configurable by the Administrator and can depend on the
1525 Document and/or Job Template attribute.

1526 **7.5 which-jobs (type2 keyword)**

1527 This specification adds the following new keyword values for the "which-jobs" operation
1528 attribute [STD92]:

- 1529 'aborted': Any Job in the 'aborted' state.
- 1530 'all': All Jobs regardless of state.
- 1531 'canceled': Any Job in the 'canceled' state.
- 1532 'pending': Any Job in the 'pending' state.
- 1533 'pending-held': Any Job in the 'pending-held' state.
- 1534 'processing': Any Job in the 'processing' state.
- 1535 'processing-stopped': Any Job in the 'processing-stopped' state.

1536 **8. New Status Codes**

1537 This section defines additional status code values.

1538 **8.1 server-error-too-many-jobs (0x050B)**

1539 The Client has attempted to create a Job using any of the Job Creation operations which
1540 would exceed the capacity of the Printer. The Client can retry the unmodified request.

1541 **8.2 server-error-too-many-documents (0x050C)**

1542 The Client has attempted to create a Document using any of the Document Creation
1543 operations which would exceed the capacity of the Printer for this Job. The Client can retry
1544 the unmodified request.

1545

1546 **9. Obsolete Attributes**1547 **9.1 Obsolete Operation Attributes**

1548 Table 6 lists the operation attributes from the previous version of this specification
1549 [PWG5100.7-2003] which are now OBSOLETE.

1550 **Table 6 - OBSOLETE Operation Attributes**

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

1551 **9.2 Obsolete Member Attributes**

1552 Table 7 lists the member attributes of the "document-format-details" operation attribute
1553 (section) which are now OBSOLETE.

1554 **Table 7 - OBSOLETE "document-format-details" Member Attributes**

Member Attribute	Notes
document-format (mimeMediaType)	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, nfoot used

1555 **9.3 Obsolete Job Status Attributes**

1556 Table 8 lists the Job Status attributes from the previous version of this specification
1557 [PWG5100.7-2003] which are now OBSOLETE.

1558 **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 (mimeMediaType)	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

1559 9.4 Obsolete Job Template Attributes

1560 Table 9 lists the Job Templates attributes from the previous version of this specification
1561 [PWG5100.7-2003] which are now OBSOLETE.

1562 **Table 9 - OBSOLETE Job Template Attributes**

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

1563 9.5 Obsolete Printer Description Attributes

1564 The following Printer Description attributes from the previous version of this specification
1565 [PWG5100.7-2003] which are now OBSOLETE.

1566 **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

1567 10. Obsolete Values

1568 10.1 Obsolete "job-state-reasons" Values

1569 The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' keyword values
 1570 from the previous version of this specification [PWG5100.7-2003] are now OBSOLETE
 1571 because the corresponding Job Template attribute is OBSOLETE.

1572 11. Conformance Requirements

1573 11.1 Printer Conformance Requirements

1574 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1575 1. The new operations defined in section 4;
- 1576 2. The operation attributes defined in 5.1;
- 1577 3. The Job Status attributes defined in section 5.2 that correspond to any
 1578 supported Job Template attributes defined in section 5.3;
- 1579 4. The Document Status attributes defined in section 5.2 that correspond to any
 1580 supported Document Template attributes defined in section 5.3;
- 1581 5. The Printer Description attributes defined in section 5.5 that correspond to any
 1582 supported Document/Job Template attributes defined in section 5.3;
- 1583 6. The additional semantics defined in section 6;
- 1584 7. The additional values defined in section 7;
- 1585 8. The internationalization considerations defined in section 12; and
- 1586 9. The security considerations defined in section 13.

1587 11.2 Client Conformance Requirements

1588 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1589 1. The internationalization considerations defined in section 12; and
- 1590 2. The security considerations defined in section 13.

1591 **12. Internationalization Considerations**

1592 For interoperability and basic support for multiple languages, conforming implementations
1593 MUST support:

- 1594 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
1595 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1596 2. The Unicode Format for Network Interchange [RFC5198] which requires
1597 transmission of well-formed UTF-8 strings and recommends transmission of
1598 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1599 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1600 characters and combining marks) followed by Canonical Composition (into canonical
1601 composed characters wherever Unicode has assigned them).

1602 WARNING – Performing normalization on UTF-8 strings received from Clients and
1603 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client
1604 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now
1605 'hidden').

1606 Implementations of this specification SHOULD conform to the following standards on
1607 processing of human-readable Unicode text strings, see:

1608 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1609 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1610 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1611 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1612 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1613 Unicode Collation Algorithm [UTS10] – sorting

1614 Unicode Locale Data Markup Language [UTS35] – locale databases

1615 Implementations of this specification are advised to also review the following informational
1616 documents on processing of human-readable Unicode text strings:

1617 Unicode Character Encoding Model [UTR17] – multi-layer character model

1618 Unicode Character Property Model [UTR23] – character properties

1619 Unicode Conformance Model [UTR33] – Unicode conformance basis

1620 13. Security Considerations

1621 The IPP extensions defined in this document require the same security considerations as
1622 defined in the Internet Printing Protocol/1.1 [STD92].

1623 Implementations of this specification SHOULD conform to the following standard on
1624 processing of human-readable Unicode text strings, see:

1625 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1626 Implementations of this specification are advised to also review the following informational
1627 document on processing of human-readable Unicode text strings:

1628 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

1629 14. IANA Considerations

1630 14.1 Attribute Registrations

1631 The attributes defined in this specification will be published by IANA according to the
1632 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1633 <http://www.iana.org/assignments/ipp-registrations>

1634 The registry entries will contain the following information:

1635	Document Status attributes:	Reference
1636	-----	-----
1637	document-format-details(deprecated) (collection)	[PWG5100.7]
1638	document-format-details-detected(deprecated) (collection)	[PWG5100.7]
1639	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1640	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1641	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1642	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1643	errors-count (integer(0:MAX))	[PWG5100.7]
1644	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1645	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1646	warnings-count (integer(0:MAX))	[PWG5100.7]
1647		
1648	Document Template attributes:	Reference
1649	-----	-----
1650	media-col (collection)	[PWG5100.7]
1651	<Any "media-col" member attribute>	[PWG5100.7]
1652	output-device (name(127))	[PWG5100.7]
1653	print-content-optimize (type2 keyword)	[PWG5100.7]
1654		
1655	Job Status attributes:	Reference
1656	-----	-----
1657	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1658	document-charset-supplied(obsolete) (charset)	[PWG5100.7]

1659	document-digital-signature-supplied(obsolete) (type2 keyword)	
1660		[PWG5100.7]
1661	document-format-details(deprecated) (collection)	[PWG5100.7]
1662	document-format-details-detected(deprecated) (collection)	[PWG5100.7]
1663	document-format-details-supplied(obsolete) (1setOf collection)	
1664		[PWG5100.7]
1665	document-format-supplied(obsolete) (mimeType)	[PWG5100.7]
1666	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1667	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1668	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1669	document-natural-language-supplied(obsolete) (naturalLanguage)	
1670		[PWG5100.7]
1671	errors-count (integer(0:MAX))	[PWG5100.7]
1672	ipp-attribute-fidelity(obsolete) (boolean)	[PWG5100.7]
1673	job-copies-actual(obsolete) (integer(1:MAX))	[PWG5100.7]
1674	job-cover-back-actual(obsolete) (collection)	[PWG5100.7]
1675	job-cover-front-actual(obsolete) (collection)	[PWG5100.7]
1676	job-finishings-actual(obsolete) (1setOf type2 enum)	[PWG5100.7]
1677	job-finishings-col-actual(obsolete) (1setOf collection)	[PWG5100.7]
1678	job-mandatory-attributes(obsolete) (1setOf keyword)	[PWG5100.7]
1679	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1680	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1681	warnings-count (integer(0:MAX))	[PWG5100.7]
1682		
1683	Job Template attributes:	Reference
1684	-----	-----
1685	job-account-id (name(MAX))	[PWG5100.7]
1686	job-accounting-user-id (name(MAX))	[PWG5100.7]
1687	job-cancel-after (integer(0:MAX))	[PWG5100.7]
1688	job-copies(obsolete) (integer(1:MAX))	[PWG5100.7]
1689	job-cover-back(obsolete) (collection)	[PWG5100.7]
1690	job-cover-front(obsolete) (collection)	[PWG5100.7]
1691	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1692	job-delay-output-until-time (dateTime)	[PWG5100.7]
1693	job-hold-until-time (dateTime)	[PWG5100.7]
1694	job-finishings(obsolete) (1setOf type2 enum)	[PWG5100.7]
1695	job-finishings-col(obsolete) (1setOf collection)	[PWG5100.7]
1696	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1697	job-retain-until-interval (integer(0:MAX))	[PWG5100.7]
1698	job-retain-until-time (dateTime)	[PWG5100.7]
1699	job-sheets-col (collection)	[PWG5100.7]
1700	job-sheets (type2 keyword name(MAX))	[PWG5100.7]
1701	media (type2 keyword name(MAX))	[PWG5100.7]
1702	media-col (collection)	[PWG5100.7]
1703	media-col (collection)	[PWG5100.7]
1704	media-back-coating (type2 keyword name(MAX))	[PWG5100.7]
1705	media-bottom-margin (integer(0:MAX))	[PWG5100.7]
1706	media-color (type2 keyword name(MAX))	[PWG5100.7]
1707	media-front-coating (type2 keyword name(MAX))	[PWG5100.7]
1708	media-grain (type2 keyword name(MAX))	[PWG5100.7]
1709	media-hole-count (integer(0:MAX))	[PWG5100.7]
1710	media-info (text(255))	[PWG5100.7]
1711	media-key (type2 keyword name(MAX))	[PWG5100.7]
1712	media-left-margin (integer(0:MAX))	[PWG5100.7]
1713	media-order-count (integer(1:MAX))	[PWG5100.7]
1714	media-pre-printed (type2 keyword name(MAX))	[PWG5100.7]

1715	media-recycled (type2 keyword name(MAX))	[PWG5100.7]
1716	media-right-margin (integer(0:MAX))	[PWG5100.7]
1717	media-size (collection)	[PWG5100.7]
1718	x-dimension (integer(0:MAX))	[PWG5100.7]
1719	y-dimension (integer(0:MAX))	[PWG5100.7]
1720	media-size-name (type2 keyword name(MAX))	[PWG5100.7]
1721	media-source (type2 keyword name(MAX))	[PWG5100.7]
1722	media-thickness (integer(1:MAX))	[PWG5100.7]
1723	media-tooth (type2 keyword name(MAX))	[PWG5100.7]
1724	media-top-margin (integer(0:MAX))	[PWG5100.7]
1725	media-type (type2 keyword name(MAX))	[PWG5100.7]
1726	media-weight-metric (integer(0:MAX))	[PWG5100.7]
1727	output-device (name(127))	[PWG5100.7]
1728	print-content-optimize (type2 keyword)	[PWG5100.7]
1729		
1730	Operation attributes:	Reference
1731	-----	-----
1732	document-digital-signature(obsolete) (type2 keyword)	[PWG5100.7]
1733	document-format-details(deprecated) (collection)	[PWG5100.7]
1734	document-format(obsolete) (mimeMediaType)	[PWG5100.7]
1735	document-format-device-id(obsolete) (text(127))	[PWG5100.7]
1736	document-format-version(obsolete) (text(127))	[PWG5100.7]
1737	document-natural-language(obsolete) (1setOf naturalLanguage)	[PWG5100.7]
1738		[PWG5100.7]
1739	document-source-application-name (name(MAX))	[PWG5100.7]
1740	document-source-application-version (text(127))	[PWG5100.7]
1741	document-source-os-name (name(40))	[PWG5100.7]
1742	document-source-os-version (text(40))	[PWG5100.7]
1743	document-format-version(obsolete) (text(127))	[PWG5100.7]
1744	job-hold-until-time (dateTime)	[PWG5100.7]
1745	job-ids (1setOf integer(1:MAX))	[PWG5100.7]
1746	job-mandatory-attributes (1setOf keyword)	[PWG5100.7]
1747		
1748	Printer Description attributes:	Reference
1749	-----	-----
1750	document-charset-default (charset)	[PWG5100.7]
1751	document-charset-supported (1setOf charset)	[PWG5100.7]
1752	document-digital-signature-default(obsolete) (type2 keyword)	[PWG5100.7]
1753		[PWG5100.7]
1754	document-digital-signature-supported(obsolete) (1setOf type2 keyword)	[PWG5100.7]
1755		[PWG5100.7]
1756	document-format-details-default(obsolete) (collection)	[PWG5100.7]
1757	document-format-details-supported (1setOf keyword)	[PWG5100.7]
1758	document-format-version-default(obsolete) (text(127))	[PWG5100.7]
1759	document-format-version-supported(obsolete) (1setOf text(127))	[PWG5100.7]
1760		[PWG5100.7]
1761	document-natural-language-default (naturalLanguage)	[PWG5100.7]
1762	document-natural-language-supported (1setOf naturalLanguage)	[PWG5100.7]
1763		[PWG5100.7]
1764	job-cancel-after-default (integer(0:MAX) no-value)	[PWG5100.7]
1765	job-cancel-after-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1766	job-copies-default(obsolete) (integer(1:MAX))	[PWG5100.7]
1767	job-copies-supported(obsolete) (rangeOfInteger(1:MAX))	[PWG5100.7]
1768	job-cover-back-default(obsolete) (collection)	[PWG5100.7]
1769	job-cover-back-supported(obsolete) (1setOf keyword)	[PWG5100.7]
1770	job-cover-front-default(obsolete) (collection)	[PWG5100.7]

1771	job-cover-front-supported(obsolete) (1setOf keyword)	[PWG5100.7]
1772	job-creation-attributes-supported (1setOf keyword)	[PWG5100.7]
1773	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1774	job-delay-output-until-interval-supported (rangeOfInteger(0:MAX))	
1775		[PWG5100.7]
1776	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	
1777		[PWG5100.7]
1778	job-delay-output-until-time-supported (rangeOfInteger(0:MAX))	
1779		[PWG5100.7]
1780	job-finishings-col-default(obsolete) (1setOf collection)	[PWG5100.7]
1781	job-finishings-col-ready(obsolete) (1setOf collection)	[PWG5100.7]
1782	job-finishings-col-supported(obsolete) (1setOf keyword)	[PWG5100.7]
1783	job-finishings-default(obsolete) (1setOf type2 enum)	[PWG5100.7]
1784	job-finishings-ready(obsolete) (1setOf type2 enum)	[PWG5100.7]
1785	job-finishings-supported(obsolete) (1setOf type2 enum)	[PWG5100.7]
1786	job-history-attributes-configured (1setOf keyword)	[PWG5100.7]
1787	job-history-attributes-supported (1setOf keyword)	[PWG5100.7]
1788	job-history-interval-configured (integer(0:MAX))	[PWG5100.7]
1789	job-history-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1790	job-ids-supported (boolean)	[PWG5100.7]
1791	job-mandatory-attributes-supported (boolean)	[PWG5100.7]
1792	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1793	job-retain-until-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1794	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	
1795		[PWG5100.7]
1796	job-retain-until-time-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1797	job-spooling-supported (type2 keyword)	[PWG5100.7]
1798	media-back-coating-supported (1setOf (type2 keyword name(MAX)))	
1799		[PWG5100.7]
1800	media-bottom-margin-supported (1setOf integer(0:MAX))	[PWG5100.7]
1801	media-col-database (1setOf collection)	[PWG5100.7]
1802	<Any "media-col" member attribute>	[PWG5100.7]
1803	media-source-properties (collection)	[PWG5100.7]
1804	media-source-feed-direction (type2 keyword)	[PWG5100.7]
1805	media-source-feed-orientation (type2 enum)	[PWG5100.7]
1806	media-col-default (collection)	[PWG5100.7]
1807	<Any "media-col" member attribute>	[PWG5100.7]
1808	media-col-ready (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-supported (1setOf keyword)	[PWG5100.3]
1814	media-color-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1815	media-front-coating-supported (1setOf (type2 keyword name(MAX)))	
1816		[PWG5100.7]
1817	media-grain-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1818	media-hole-count-supported (1setOf rangeOfInteger(0:MAX))	[PWG5100.7]
1819	media-key-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1820	media-info-supported(obsolete) (boolean)	[PWG5100.7]
1821	media-left-margin-supported (1setOf integer(0:MAX))	[PWG5100.7]
1822	media-order-count-supported (1setOf rangeOfInteger(1:MAX))	[PWG5100.7]
1823	media-pre-printed-supported (1setOf (type2 keyword name(MAX)))	
1824		[PWG5100.7]
1825	media-recycled-supported (1setOf (type2 keyword name(MAX)))	
1826		[PWG5100.7]

1827	media-right-margin-supported (1setOf integer(0:MAX))	[PWG5100.7]
1828	media-size-supported (1setOf collection)	[PWG5100.7]
1829	x-dimension (integer(1:MAX) rangeOfInteger(1:MAX))	[PWG5100.7]
1830	y-dimension (integer(1:MAX) rangeOfInteger(1:MAX))	[PWG5100.7]
1831	media-source-supported (1setOf (type2 keyword name(MAX)))	
1832		[PWG5100.7]
1833	media-thickness-supported (1setOf rangeOfInteger(1:MAX))	[PWG5100.7]
1834	media-tooth-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1835	media-top-margin-supported (1setOf integer(0:MAX))	[PWG5100.7]
1836	media-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1837	media-weight-metric-supported (1setOf rangeOfInteger(1:MAX))	
1838		[PWG5100.7]
1839	output-device-supported (1setOf name(127))	[PWG5100.7]
1840	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1841	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1842	which-jobs-supported (1setOf type2 keyword)	[PWG5100.7]
1843		
1844	Printer Status attributes:	Reference
1845	-----	-----
1846	printer-detailed-status-messages (1setOf text(MAX))	[PWG5100.7]

1847 14.2 Type2 keyword Value Registrations

1848 The keyword values defined in this specification will be published by IANA according to the
1849 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1850 <http://www.iana.org/assignments/ipp-registrations>

1851 The registry entries will contain the following information:

1852	Attributes (attribute syntax)	
1853	Keyword Attribute Value	Reference
1854	-----	-----
1855	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1856	day-time	[PWG5100.7]
1857	evening	[PWG5100.7]
1858	indefinite	[PWG5100.7]
1859	night	[PWG5100.7]
1860	no-delay-output	[PWG5100.7]
1861	second-shift	[PWG5100.7]
1862	third-shift	[PWG5100.7]
1863	weekend	[PWG5100.7]
1864	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1865	<Any "job-delay-output-until" value>	[PWG5100.7]
1866	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	
1867		[PWG5100.7]
1868	<Any "job-delay-output-until" value>	[PWG5100.7]
1869		
1870	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1871	end-of-day	[PWG5100.7]
1872	end-of-month	[PWG5100.7]
1873	end-of-week	[PWG5100.7]
1874	indefinite	[PWG5100.7]
1875	none	[PWG5100.7]

1876	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1877	<Any "job-retain-until" value>	[PWG5100.7]
1878	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	
1879		[PWG5100.7]
1880	<Any "job-retain-until" value>	[PWG5100.7]
1881		
1882	job-sheets (type2 keyword)	[STD92]
1883	first-print-stream-page	[PWG5100.7]
1884	job-both-sheets	[PWG5100.7]
1885	job-end-sheet	[PWG5100.7]
1886	job-start-sheet	[PWG5100.7]
1887		
1888	job-state-reasons (1setOf type2 keyword)	[STD92]
1889	digital-signature-did-not-verify	[PWG5100.7]
1890	digital-signature-type-not-supported(obsolete)	[PWG5100.7]
1891	errors-detected	[PWG5100.7]
1892	job-delay-output-until-specified	[PWG5100.7]
1893	job-digital-signature-wait(obsolete)	[PWG5100.7]
1894	warnings-detected	[PWG5100.7]
1895		
1896	media (type2 keyword name(MAX))	[STD92]
1897	choice_iso_a4_210x297mm_na_letter_8.5x11in	[PWG5100.7]
1898		
1899	media-back-coating (type2 keyword name(MAX))	[PWG5100.7]
1900	media-back-coating-supported (1setOf (type2 keyword name(MAX)))	
1901		[PWG5100.7]
1902	<Any "media-back-coating" value>	[PWG5100.7]
1903		
1904	media-color (type2 keyword name(MAX))	[PWG5100.7]
1905	media-color-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1906	<Any "media-color" value>	[PWG5100.7]
1907		
1908	media-front-coating (type2 keyword name(MAX))	[PWG5100.7]
1909	<Any "media-back-coating" value>	[PWG5100.7]
1910	media-front-coating-supported (1setOf (type2 keyword name(MAX)))	
1911		[PWG5100.7]
1912	<Any "media-front-coating" value>	[PWG5100.7]
1913		
1914	media-pre-printed (type2 keyword name(MAX))	[PWG5100.7]
1915	blank	[PWG5100.7]
1916	letter-head	[PWG5100.7]
1917	pre-printed	[PWG5100.7]
1918	media-pre-printed-supported (1setOf (type2 keyword name(MAX)))	
1919		[PWG5100.7]
1920	<Any "media-pre-printed" value>	[PWG5100.7]
1921		
1922	media-recycled (type2 keyword name(MAX))	[PWG5100.7]
1923	none	[PWG5100.7]
1924	standard	[PWG5100.7]
1925	media-recycled-supported (1setOf (type2 keyword name(MAX)))	
1926		[PWG5100.7]
1927	<Any "media-recycled" value>	[PWG5100.7]
1928		
1929	media-source-feed-direction (type2 keyword)	[PWG5100.7]
1930	long-edge-first	[PWG5100.7]
1931	short-edge-first	[PWG5100.7]

1932		
1933	media-source (type2 keyword name(MAX))	[PWG5100.7]
1934	alternate	[PWG5100.7]
1935	alternate-roll	[PWG5100.7]
1936	auto	[PWG5100.7]
1937	bottom	[PWG5100.7]
1938	by-pass-tray	[PWG5100.7]
1939	center	[PWG5100.7]
1940	disc	[PWG5100.7]
1941	envelope	[PWG5100.7]
1942	hagaki	[PWG5100.7]
1943	large-capacity	[PWG5100.7]
1944	left	[PWG5100.7]
1945	main	[PWG5100.7]
1946	main-roll	[PWG5100.7]
1947	manual	[PWG5100.7]
1948	middle	[PWG5100.7]
1949	photo	[PWG5100.7]
1950	rear	[PWG5100.7]
1951	right	[PWG5100.7]
1952	roll-1	[PWG5100.7]
1953	roll-10	[PWG5100.7]
1954	roll-2	[PWG5100.7]
1955	roll-3	[PWG5100.7]
1956	roll-4	[PWG5100.7]
1957	roll-5	[PWG5100.7]
1958	roll-6	[PWG5100.7]
1959	roll-7	[PWG5100.7]
1960	roll-8	[PWG5100.7]
1961	roll-9	[PWG5100.7]
1962	side	[PWG5100.7]
1963	top	[PWG5100.7]
1964	tray-1	[PWG5100.7]
1965	tray-10	[PWG5100.7]
1966	tray-11	[PWG5100.7]
1967	tray-12	[PWG5100.7]
1968	tray-13	[PWG5100.7]
1969	tray-14	[PWG5100.7]
1970	tray-15	[PWG5100.7]
1971	tray-16	[PWG5100.7]
1972	tray-17	[PWG5100.7]
1973	tray-18	[PWG5100.7]
1974	tray-19	[PWG5100.7]
1975	tray-2	[PWG5100.7]
1976	tray-20	[PWG5100.7]
1977	tray-3	[PWG5100.7]
1978	tray-4	[PWG5100.7]
1979	tray-5	[PWG5100.7]
1980	tray-6	[PWG5100.7]
1981	tray-7	[PWG5100.7]
1982	tray-8	[PWG5100.7]
1983	tray-9	[PWG5100.7]
1984	media-source-supported (1setOf (type2 keyword name(MAX))	
1985		[PWG5100.7]
1986	<Any "media-source" value>	[PWG5100.7]
1987		

1988	media-tooth (type2 keyword name(MAX))	[PWG5100.7]
1989	media-tooth-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1990	<Any "media-tooth" value>	[PWG5100.7]
1991		
1992	media-type (type2 keyword name(MAX))	[PWG5100.7]
1993	media-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1994	<Any "media-type" value>	[PWG5100.7]
1995		
1996	pdl-override-supported (type2 keyword)	[STD92]
1997	guaranteed	[PWG5100.7]
1998		
1999	print-content-optimize (type2 keyword)	[PWG5100.7]
2000	graphics	[PWG5100.7]
2001	photo	[PWG5100.7]
2002	text	[PWG5100.7]
2003	text-and-graphics	[PWG5100.7]
2004	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
2005	<Any "print-content-optimize" value>	[PWG5100.7]
2006	print-content-optimize-default (type2 keyword)	[PWG5100.7]
2007	<Any "print-content-optimize" value>	[PWG5100.7]
2008	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
2009	<Any "print-content-optimize" value>	[PWG5100.7]
2010		
2011	which-jobs (type2 keyword)	[STD92]
2012	aborted	[PWG5100.7]
2013	all	[PWG5100.7]
2014	canceled	[PWG5100.7]
2015	pending	[PWG5100.7]
2016	pending-held	[PWG5100.7]
2017	processing	[PWG5100.7]
2018	processing-stopped	[PWG5100.7]

2019 14.3 Type2 enum Registrations

2020 The attributes defined in this specification will be published by IANA according to the
 2021 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

2022 <http://www.iana.org/assignments/ipp-registrations>

2023 The registry entries will contain the following information:

2024	Attributes (attribute syntax)	
2025	Enum Value Enum Symbolic Name	Reference
2026	-----	-----
2027	media-source-feed-orientation (type2 enum)	[PWG5100.7]
2028	<Any "orientation-requested" value>	[PWG5100.7]
2029		
2030	operations-supported (1setOf type2 enum)	[STD92]
2031	0x0038 Cancel-Jobs	[PWG5100.7]
2032	0x0039 Cancel-My-Jobs	[PWG5100.7]
2033	0x003A Close-Job	[PWG5100.7]
2034	0x003B Resubmit-Job	[PWG5100.7]

2035 14.4 Operation Registrations

2036 The operations defined in this specification will be published by IANA according to the
2037 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

2038 <http://www.iana.org/assignments/ipp-registrations>

2039 The registry entries will contain the following information:

2040	Operation Name	Reference
2041	-----	-----
2042	Cancel-Jobs	[PWG5100.7]
2043	Cancel-My-Jobs	[PWG5100.7]
2044	Close-Job	[PWG5100.7]
2045	Create-Job (Extension)	[PWG5100.7]
2046	Hold-Job (Extension)	[PWG5100.7]
2047	Print-Job (Extension)	[PWG5100.7]
2048	Print-URI (Extension)	[PWG5100.7]
2049	Resubmit-Job	[PWG5100.7]
2050	Send-Document (Extension)	[PWG5100.7]
2051	Send-URI (Extension)	[PWG5100.7]
2052	Set-Job-Attributes (Extension)	[PWG5100.7]
2053	Validate-Job (Extension)	[PWG5100.7]

2054 14.5 Status Code Registrations

2055 The status codes defined in this specification will be published by IANA according to the
2056 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

2057 <http://www.iana.org/assignments/ipp-registrations>

2058 The registry entries will contain the following information:

2059	Value	Status Code Name	Reference
2060	-----	-----	-----
2061	0x0500:0x05FF	- Server Error:	
2062	0x050B	server-error-too-many-jobs	[PWG5100.7]
2063	0x050C	server-error-too-many-documents	[PWG5100.7]
2064			

2065 **15. Overview of Changes**

2066 **15.1 IPP Job Extensions v2.0**

2067 The following changes were made to the previous version of this specification [PWG5100.7-
2068 2003]:

- 2069 • A rationale section was added, including use cases, exceptions, and requirements;
- 2070 • References now point to the current versions of dependent documents and
2071 specifications at the time of publication;
- 2072 • Read-only attributes are now defined and registered as status attributes;
- 2073 • A REQUIRED "job-mandatory-attributes-supported" Printer Description attribute has
2074 been added to indicate support for the "job-mandatory-attributes" Job Template
2075 attribute;
- 2076 • The RECOMMENDED "job-hold-until-time" and REQUIRED "job-ids" operation
2077 attributes were moved from the OBSOLETE IPP Job and Printer Extensions - Set 2
2078 [PWG5100.11-2010] specification;
- 2079 • The RECOMMENDED "job-delay-output-until", "job-delay-output-until-time", and
2080 "job-hold-until-time" Job Template attributes were moved from the OBSOLETE IPP
2081 Job and Printer Extensions - Set 2 [PWG5100.11-2010] specification;
- 2082 • The REQUIRED "job-creation-attributes-supported", "job-spooling-supported",
2083 "media-col-database", "printer-detailed-status-messages", and "which-jobs-
2084 supported" Printer attributes were moved from the OBSOLETE IPP Job and Printer
2085 Extensions - Set 2 [PWG5100.11-2010] specification;
- 2086 • The RECOMMENDED "job-account-id" and "job-accounting-user-id" Job Template
2087 and related Printer Description attributes were moved from the IPP Production
2088 Printing Attributes - Set 1 [PWG5100.3-2001] specification;
- 2089 • The RECOMMENDED "job-sheets-col" Job Template and related Printer Description
2090 attributes were moved from the IPP Production Printing Attributes - Set 1
2091 [PWG5100.3-2001] specification;
- 2092 • The additional values for the "job-sheets" Job Template attribute were moved from
2093 the IPP Production Printing Attributes - Set 1 [PWG5100.3-2001] specification;
- 2094 • The REQUIRED "media-col" Document/Job Template attribute and related Printer
2095 Description attributes were moved from the original IPP Production Printing Attributes
2096 - Set 1 [PWG5100.3-2001], OBSOLETE IPP Job and Printer Extensions - Set 2

- 2097 [PWG5100.11-2010], and IPP Job and Printer Extensions - Set 3 [PWG5100.13-
2098 2012] specifications;
- 2099 • The RECOMMENDED "job-retain-until", "job-retain-until-interval", and "job-retain-
2100 until-time" Job Template attributes were added to control the Job Retention phase of
2101 a Job's lifecycle;
 - 2102 • The REQUIRED "job-history-attributes-configured", "job-history-attributes-
2103 supported", "job-history-interval-configured", and "job-history-interval-supported"
2104 Printer Description attributes were added to control the Job History phase of a Job's
2105 lifecycle;
 - 2106 • The "document-charset" operation attribute and corresponding operation semantics
2107 are now defined in PWG 5100.5: IPP Document Object v1.1;
 - 2108 • The "document-digital-signature" operation attribute and corresponding Document
2109 Status, Job Status, and Printer Description attributes have been made OBSOLETE
2110 because of interoperability issues;
 - 2111 • The "document-format-details" operation attribute and corresponding Document
2112 Status, Job Status, and Printer Description attributes have been made
2113 DEPRECATED because of interoperability issues and privacy concerns;
 - 2114 • The "document-format", "document-format-version", and "document-natural-
2115 language" member attributes of "document-format-details" have been made
2116 OBSOLETE because the attributes are redundant;
 - 2117 • The "document-format-device-id" member attribute of "document-format-details"
2118 have been made OBSOLETE because the attribute syntax is too short to be useful;
 - 2119 • The "document-format-version" operation attribute and corresponding Document
2120 Status, Job Status, and Printer Description attributes have been made OBSOLETE
2121 because of interoperability issues;
 - 2122 • The "job-copies" Job Template attribute and corresponding Job Status and Printer
2123 Description attributes have been made OBSOLETE because of interoperability
2124 issues;
 - 2125 • The "job-cover-back" Job Template attribute and corresponding Job Status and
2126 Printer Description attributes have been made OBSOLETE because of
2127 interoperability issues;
 - 2128 • The "job-cover-front" Job Template attribute and corresponding Job Status and
2129 Printer Description attributes have been made OBSOLETE because of
2130 interoperability issues;

- 2131 • The "job-finishings" Job Template attribute and corresponding Job Status and Printer
2132 Description attributes have been made OBSOLETE because of interoperability
2133 issues;
- 2134 • The "job-finishings-col" Job Template attribute and corresponding Job Status and
2135 Printer Description attributes have been made OBSOLETE because of
2136 interoperability issues; and
- 2137 • The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' values for
2138 the "job-state-reasons" attribute have been made OBSOLETE because of
2139 interoperability issues.

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2226 <http://www.pwg.org/>

2227 Implementers of this specification document are encouraged to join the IPP Mailing List in
2228 order to participate in any discussions of clarification issues and review of registration
2229 proposals for additional attributes and values.

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2231 significantly to the development of this document:

2232 Tom Hastings (author of v1.0)

2233 Peter Zehler (author of v1.0)

2234

2235 **18. Change History**

2236 **18.1 May 24, 2019**

- 2237 • Section 1: Clarify as "original" version of production printing
- 2238 • Section 5.3.1: All optional member attributes are now recommended
- 2239 • Sections 5.4.1 and 5.4.2: The job-account-id and job-accounting-user-id attributes
2240 are now recommended
- 2241 • Section 5.5.x: Make all xxx-default and xxx-supported attributes of recommended xxx
2242 attributes conditionally required
- 2243 • Section 15.1: Updated with conformance of new attributes
- 2244 • Global: fixed broken references

2245 **18.2 May 10, 2019**

- 2246 • Copied media-col and related attributes and extensions from PWG 5100.3 and
2247 5100.13 (JPS3)
- 2248 • Copied job-account-id, job-accounting-user-id, and related attributes from PWG
2249 5100.3
- 2250 • Section 15.1: Updated discussion of media-col, add reference to 5100.13
- 2251 • Section 16.1: Moved 5100.3 reference to section 16.2
- 2252 • Section 16.2: Added 5100.13 reference

2253 **18.3 April 18, 2019**

- 2254 • Status: stable
- 2255 • Make document-format-details DEPRECATED, only obsolete redundant member
2256 attributes per April 2019 F2F
- 2257 • Use OBSOLETE and DEPRECATED (uppercase) in text

2258 **18.4 March 15, 2019**

- 2259 • Version: 2.0

- 2260 • Section 2.1: OBSOLETE -> OBSOLETE
- 2261 • Section 2.4: Cleaned out unused terms, added definitions of Completed Job, Not
2262 Completed Job, and Retained Job
- 2263 • Sections 5 and 6: Updated conformance requirements

- 2264 **18.5 March 8, 2019**
- 2265 • Status: Prototype
- 2266 • Abstract: Reworded for updated scope
- 2267 • Section 1: Reworded for updated scope, added discussion of obsolete JPS2 bits
2268 moving here
- 2269 • Section 2.1: Added definitions of OBSOLETE and DEPRECATED
- 2270 • Section 3: Added rationale, use cases, and design requirements for attributes and
2271 operations from JPS2.
- 2272 • New section 4 for operations from JPS2
- 2273 • Section 5: Made most attributes RECOMMENDED, added job-creation-attributes-
2274 supported, job-delay-output-until-xxx, job-history-xxx, job-hold-until-time, job-ids, job-
2275 spooling-supported, media-col-database, printer-detail-status-messages from JPS2
- 2276 • Section 5: Added new job-history-xxx and job-retain-until-xxx attributes
- 2277 • New section 6 for additional semantics (imported from JPS2)
- 2278 • Section 7: Added pdl-override-supported, which-jobs values, media-col member
2279 attributes.

- 2280 **18.6 October 23, 2018**
- 2281 • Status: Interim
- 2282 • Updated references to the first version of 5100.7 to include year and exclude the full
2283 name.
- 2284 • Abstract and intro: Clarified that this specification is defining attributes and values.
- 2285 • Editorial changes
- 2286 • Added reference to the MSN2 spec.

2287 18.7 September 26, 2018

- 2288 • Brought back the job-mandatory-attributes operation attribute, which is still needed.
- 2289 • Added a rationale, use case, and design requirement for selective fidelity/job-
2290 mandatory-attributes.
- 2291 • Added Additional Semantics and Operation Registrations sections for using job-
2292 mandatory-attributes with job creation/validation operations.
- 2293 • Added Additional Semantics and Operation Registrations sections for returning the
2294 too-many-jobs/documents status codes.

2295 18.8 September 25, 2018

2296 Initial revision.