



The Printer Working Group

March 15, 2019
Working Draft

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IPP Job Extensions v2.0 (JOBEXT)

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Status: Prototype

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Abstract: This specification extends the Job management, monitoring, and processing capabilities of IPP.

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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-ippjobext20-20190315.docx>

<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippjobext20-20190315.pdf>

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81 system providers, network connectivity vendors, and print management application
82 developers. The PWG is chartered to make printers and the applications and operating
83 systems supporting them work together better. All references to the PWG in this document
84 implicitly mean “The Printer Working Group, a Program of the IEEE ISTO.”

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

91 For additional information regarding the Printer Working Group visit:

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

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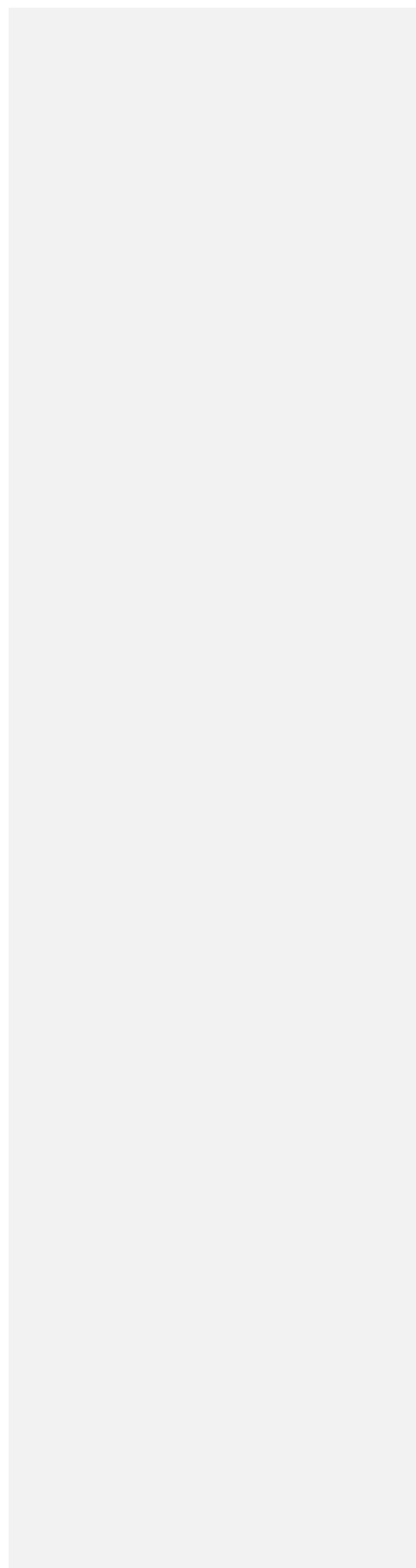
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260 1. Introduction

261 This specification [extends the Job management, monitoring, and processing capabilities of](#)
262 [IPP](#). This specification obsoletes portions of the previous version of this specification
263 [\[PWG5100.7-2003\]](#) - a list of changes can be found in section 15. [This specification also](#)
264 [incorporates the relevant portions of the obsolete IPP Job and Printer Extensions - Set 2](#)
265 [\[PWG5100.11-2010\] specification.](#)

Deleted: defines IPP attributes and values for fine-grained fidelity, Document processing, and status reporting for issues encountered during processing.¹

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266 1.1 Document Natural Language and Character Set

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

274 1.2 Attribute Fidelity

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

279 1.3 Rendering Optimizations

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

285 1.4 Printing on a Specific Output Device

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

289 1.5 Results of Job/Document Processing

290 The Internet Printing Protocol/1.1 [STD92] defines some Job Status attributes and values
291 but none of them provide information about processing issues that do not prevent a Job or

298 Document from being printed. This specification defines attributes and values for discovering
299 those processing issues.

300 **1.6 Job Scheduling and Lifecycle**

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

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

308 [In addition, this specification defines Job Template attributes to schedule when a pending](#)
309 [Job is canceled automatically, Job Template attributes to specify when a Job should](#)
310 [transition from the retained phase to the history phase, and Printer Description attributes to](#)
311 [specify how long a Job stays in the history phase.](#)

312 **1.7 Job Operations**

313 [The Internet Printing Protocol/1.1 \[STD92\] defines many operations that operate on a single](#)
314 [Job object. This specification defines new operations that:](#)

- 315 • [Cancel all Jobs on a given Printer;](#)
- 316 • [Cancel all Jobs owned by a User on a given Printer;](#)
- 317 • [Close a Job in the 'pending' state that is still open for additional Document](#)
318 [submissions; and](#)
- 319 • [Resubmit an existing Job for processing as a new Job, potentially with different Job](#)
320 [Template attributes and values.](#)

321 [This specification also extends the Get-Jobs operation to support additional values for the](#)
322 ["which-jobs" operation attribute.](#)

323 **1.8 Obsolete Attributes and Values**

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

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327 2. Terminology

328 2.1 Conformance Terminology

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

334 [The term DEPRECATED is used for previously defined and approved protocol elements that](#)
335 [SHOULD NOT be used or implemented. The term OBSOLETE is used for previously defined](#)
336 [and approved protocol elements that MUST NOT be used or implemented.](#)

337 2.2 Printing Terminology

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

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

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

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

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

348 *Physical Device*: a hardware implementation of an endpoint device, e.g., a marking engine, a
349 fax modem, etc.

350 2.3 Protocol Role Terminology

351 This document also defines the following protocol roles to specify unambiguous
352 conformance requirements:

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

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

358 **2.4 Other Terminology**

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

360 *Document Creation Operation:* operations that accept Document Content. Specifically:
361 Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are
362 both Job Creation and Document Creation operations.

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

365 Not Completed Job: a Job in the 'pending', 'pending-held', 'processing', or 'processing-
366 stopped' state.

367 Retained Job: a Completed Job whose attributes and Document data are still available to
368 the Printer.

369 **2.5 Acronyms and Organizations**

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

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

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

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

374 **3. Requirements**

375 **3.1 Rationale**

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

- 380 1. Define attributes and values that specify the Document character set and
- 381 rendering optimizations;
- 382 2. Define an attribute for doing selective fidelity enforcement;
- 383 3. Define a media size for automatically printing Documents on the correct size;
- 384 4. Define attributes and values that allow a Client to discover the results of
- 385 Document processing;
- 386 5. Define attributes for delaying the output from a Job until a specified time period;
- 387 6. Define attributes for holding a Job until a specified date and time;
- 388 7. Define attributes for retaining a Job for a specified time period;
- 389 8. Define attributes for configuring the Job history attributes and time period;

Deleted: *Finished Document:* the result that the Printer produces on Sheets after the operations of printing, folding, cutting, finishing, etc. are completed.¶

Job Attribute: an Operation attribute or a Job Template attribute that applies to the Job (object) as a whole. For example, "job-name" is an Operation attribute and "job-priority" is a Job Template attribute.¶

Deleted: as defined in

Deleted: rfc2911

Deleted: *Operation Attribute:* an attribute supplied by a client in the Operation Attribute group of a request in order to affect the behavior of the operation or an attribute returned by the Printer in the Operation Attributes group in an operation response in order to report the results of the operation. For some Operation attributes, the Printer copies the values supplied by the client to corresponding Job Description attributes.¶

Page: The term "Page" used throughout this document is a synonym for PDL page. ¶
PDL Page: A "PDL Page" is a page according to the definition of pages in the language used to express the document data. Note: If the PDL contains multiple original source pages that have been placed on a single page by the client application, then the PDL page count is one. On the other hand, if the client requests that multiple PDL Pages are placed on a single side of media, by supplying "number-up" with a value greater than 1, then the PDL page count will be more than one. [rfc2911] uses the term "print stream page" for PDL Page.¶
Sheet: A Sheet is the unit of media that a printer puts marks on. It is the most basic unit of output from a printer. A printer may mark on one side or on both sides of a sheet.¶

Deleted: Document

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432 [9. Define attributes for automatically canceling a Job after a specified time period;](#)
433 [10. Define operations for managing one or more Jobs; and](#)
434 [11. Define values that allow a Client to monitor specific groups of Jobs.](#)

435 [Rationale for the changes from the previous versions of this specification can be found in](#)
436 [section 15.](#)

437 **3.2 Use Cases**

438 **3.2.1 Print a Plain Text File**

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

442 **3.2.2 Print a Document Using a Matching Size**

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

446 **3.2.3 Force a Document to Print on a Specific Media Size**

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

450 **3.2.4 Print a Presentation with Best Quality**

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

453 **3.2.5 Print Using a Specific Output Device**

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

457 **3.2.6 Monitor Whether Jobs are Printed Correctly**

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

461 **3.2.7 Hold a Job Until a Specific Date and Time**

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

464 **3.2.8 Delay Output Until a Specific Time Period**

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

467 **3.2.9 Submit a Variable Number of Documents in a Job**

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

472 **3.2.10 Cancel a Job After a Specific Time Period**

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

476 **3.2.11 Cancel Multiple Jobs**

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

480 **3.2.12 Resubmit a Job**

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

485 **3.2.13 Retain Jobs for a Specific Time Period**

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

489 **3.2.14 Keep Job History Information for a Specific Time Period**

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

493 **3.3 Exceptions**

494 **3.3.1 Too Many Jobs on a Printer**

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

497 **3.3.2 Too Many Documents in a Job**

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

500 **3.4 Out of Scope**

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

- 502 1. Definition of new file formats; and
- 503 2. Definition of new protocol bindings.

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0.75", Tab stops: Not at 0.5"

504 **3.5 Design Requirements**

505 The design requirements for this specification are:

- 506 1. Define attributes for supported languages and character sets in Document data;
- 507 1. Define attributes and values to describe the kind of processing optimizations that
508 should be performed on Document data;
- 509 2. Define an attribute to specify fidelity requirements;
- 510 3. Define attributes to select an Output Device for printing;
- 511 4. Define attributes and values to report processing errors and warnings;
- 512 5. [Define attributes to hold Jobs until a specific date and time;](#)
- 513 6. [Define attributes to cancel Jobs after a specific time period;](#)
- 514 7. [Define attributes and values to retain Jobs for a specific time period;](#)
- 515 8. [Define an operation to close an open Job;](#)
- 516 9. [Define attributes and operations to cancel groups of Jobs;](#)
- 517 10. [Define an operation to resubmit a Job with new Job Template attributes;](#) and
- 518 11. Define sections to register all attributes, values, and operations with IANA.
- 519

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520 4. New Operations

521 4.1 Cancel-Jobs

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

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

531 4.1.1 Cancel-Jobs Request

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

533 Group 1: Operation Attributes

534 "attributes-charset" (charset) and
535 "attributes-natural-language" (naturalLanguage):

536 The Client MUST supply and the Printer MUST support both of these
537 attributes.

538 "printer-uri" (uri):

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

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

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

544 "requesting-user-name" (name(MAX)) and
545 "requesting-user-uri" (uri):

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

547 "message" (text(127)):

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

551 **4.1.2 Cancel-Jobs Response**

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

553 Group 1: Operation Attributes

554 "attributes-charset" (charset) and
555 "attributes-natural-language" (naturalLanguage):

556 The Printer MUST return both of these attributes.

557 "status-message" (text(255)) and/or
558 "detailed-status-message" (text(MAX)):

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

560 Group 2: Unsupported Attributes

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

562 **4.2 Cancel-My-Jobs**

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

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

571 **4.2.1 Cancel-My-Jobs Request**

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

573 Group 1: Operation Attributes

574 "attributes-charset" (charset) and
575 "attributes-natural-language" (naturalLanguage):

576 The Client MUST supply and the Printer MUST support both of these
577 attributes.

578 "printer-uri" (uri):

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

581 ["job-ids" \(1setOf integer\(1:MAX\)\):](#)

582 [The Client MAY supply and the Printer MUST support this operation attribute](#)
583 [which specifies the target Job\(s\) for the operation.](#)

584 ["requesting-user-name" \(name\(MAX\)\) and](#)
585 ["requesting-user-uri" \(uri\):](#)

586 [The Client SHOULD supply and the Printer MUST support these attributes.](#)

587 ["message" \(text\(127\)\):](#)

588 [The Client MAY supply and the Printer MAY support this attribute, which](#)
589 [provides a message to the Operator. How or where to display this message](#)
590 [to the Operator \(if at all\) is an implementation decision.](#)

591 **[4.2.2 Cancel-My-Jobs Response](#)**

592 [The following groups of attributes are part of a Cancel-My-Jobs response.](#)

593 [Group 1: Operation Attributes](#)

594 ["attributes-charset" \(charset\) and](#)
595 ["attributes-natural-language" \(naturalLanguage\):](#)

596 [The Printer MUST return both of these attributes.](#)

597 ["status-message" \(text\(255\)\) and/or](#)
598 ["detailed-status-message" \(text\(MAX\)\):](#)

599 [The Printer MAY return one or both of these attributes.](#)

600 [Group 2: Unsupported Attributes](#)

601 [See \[STD92\] for details on returning Unsupported Attributes.](#)

602 **[4.3 Close-Job](#)**

603 [This REQUIRED operation allows a Client to close a Job that was created using the Create-](#)
604 [Job \[STD92\] operation. It is semantically similar to a Send-Document \[STD92\] operation](#)
605 [with the "last-document" operation attribute supplied with a 'true' value with no Document](#)
606 [data, except that the Printer MUST NOT add an additional Document object when accepting](#)
607 [a Close-Job operation.](#)

608 [A Client SHOULD check whether the Printer supports the Close-Job operation by querying](#)
609 [the values of the "operations-supported" \[STD92\] Printer Description attribute.](#)

610 [Access Rights: The authenticated user \[STD92\] performing this operation must be either the](#)
611 [Job owner or an Operator or Administrator of the Printer. Otherwise, the Printer MUST reject](#)
612 [the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-](#)
613 [error-not-authorized' as appropriate.](#)

614 [4.3.1 Close-Job Request](#)

615 [The following attributes are part of a Close-Job request.](#)

616 [Group 1: Operation Attributes](#)

617 ["attributes-charset" \(charset\) and](#)
618 ["attributes-natural-language" \(naturalLanguage\):](#)

619 [The Client MUST supply and the Printer MUST support both of these](#)
620 [attributes.](#)

621 ["printer-uri" \(uri\) and "job-id" \(integer\(1:MAX\)\):](#)

622 [The Client MUST supply and the Printer MUST support the "printer-uri" and](#)
623 ["job-id" operation attributes which are the target Job for the operation.](#)

624 ["requesting-user-name" \(name\(MAX\)\) and](#)
625 ["requesting-user-uri" \(uri\):](#)

626 [The Client SHOULD supply and the Printer MUST support these attributes.](#)

627 [4.3.2 Close-Job Response](#)

628 [The following attributes are part of a Close-Job response.](#)

629 [Group 1: Operation Attributes](#)

630 ["attributes-charset" \(charset\) and](#)
631 ["attributes-natural-language" \(naturalLanguage\):](#)

632 [The Printer MUST return both of these attributes.](#)

633 ["status-message" \(text\(255\)\) and/or](#)
634 ["detailed-status-message" \(text\(MAX\)\):](#)

635 [The Printer MAY return one or both of these attributes.](#)

636 [Group 2: Unsupported Attributes](#)

637 [See \[STD92\] for details on returning Unsupported Attributes.](#)

638 [Group 3: Job Attributes](#)

639 "job-state" (type1 enum):

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

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

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

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

646 The Printer SHOULD return the Job's RECOMMENDED "job-state-message"
647 attribute. If the Printer supports this attribute, then it MUST be returned in the
648 response. If this attribute is not returned in the response, the Client can
649 assume that the "job-state-message" attribute is not supported and will not
650 be returned in a subsequent Job query.

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

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

657 **4.4 Resubmit-Job**

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

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

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

Commented [MS1]: Making this operation RECOMMENDED since a) not all printers support retained jobs and b) this doesn't seem like a core operation for this spec. But we can make it required in Enterprise Printing Extensions...

673 **4.4.1 Resubmit-Job Request**

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

675 Group 1: Operation Attributes

676 "attributes-charset" (charset) and
677 "attributes-natural-language" (naturalLanguage):

678 The Client MUST supply and the Printer MUST support both of these
679 attributes.

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

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

683 "requesting-user-name" (name(MAX)) and
684 "requesting-user-uri" (uri):

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

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

687 The Client MAY supply and the Printer MUST support either of these
688 attributes.

689 Group 2: Job Template Attributes

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

693 **4.4.2 Resubmit-Job Response**

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

695 Group 1: Operation Attributes

696 "attributes-charset" (charset) and
697 "attributes-natural-language" (naturalLanguage):

698 The Printer MUST return both of these attributes.

699 "status-message" (text(255)) and/or
700 "detailed-status-message" (text(MAX)):

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

702 [Group 2: Unsupported Attributes](#)703 [See \[STD92\] for details on returning Unsupported Attributes.](#)704 [Group 3: Job Attributes](#)705 ["job-id" \(integer\(1:MAX\)\):](#)706 [The Printer MUST return the new Job's "job-id" attribute.](#)707 ["job-state" \(type1 enum\):](#)708 [The Printer MUST return the Job's REQUIRED "job-state" attribute. The](#)
709 [value of this attribute along with the value of the "job-state-reasons" attribute](#)
710 [is a "snapshot" of the new Job's state when the Printer returns the response.](#)711 ["job-state-reasons" \(1setOf type2 keyword\):](#)712 [The Printer MUST return the Job's REQUIRED "job-state-reasons" attribute.](#)713 ["job-state-message" \(text\(MAX\)\):](#)714 [The Printer SHOULD return the Job's RECOMMENDED "job-state-message"](#)
715 [attribute. If the Printer supports this attribute, then it MUST be returned in the](#)
716 [response. If this attribute is not returned in the response, the Client can](#)
717 [assume that the "job-state-message" attribute is not supported and will not](#)
718 [be returned in a subsequent Job query.](#)719 ["job-uri" \(uri\):](#)720 [The Printer MUST return the new Job's "job-uri" attribute.](#)721 ["number-of-intervening-jobs" \(integer\(0:MAX\)\):](#)722 [The Printer SHOULD return the Job's RECOMMENDED "number-of-](#)
723 [intervening-jobs" attribute. If the Printer supports this attribute, then it MUST](#)
724 [be returned in the response. If this attribute is not returned in the response,](#)
725 [the Client can assume that the "number-of-intervening-jobs" attribute is not](#)
726 [supported and will not be returned in a subsequent Job query.](#)

727 **5. Attributes**

Deleted: New

728 **5.1 Operation Attributes**

729 **5.1.1 job-hold-until-time (dateTime)**

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

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

736 **5.1.2 job-ids (1setOf integer(1:MAX))**

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

739 **5.1.3 job-mandatory-attributes (1setOf keyword)**

740 This **REQUIRED** attribute identifies which Job Template attributes the Printer **MUST** support
741 in the Job Creation request in order to accept the Job. The values are the names of Job
742 Template attributes, for example, 'job-hold-until', 'copies', and 'media'. In order to identify a
743 member attribute of a collection attribute, the keyword names of both the collection attribute
744 and the member attribute are given separated by a period (.) character. For example, to
745 make the "media" attribute of the "cover-front" collection attribute mandatory, supply the
746 keyword value 'cover-front.media'.

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

751 **5.2 Document and Job Status Attributes**

752 **5.2.1 errors-count (integer(0:MAX))**

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

759 5.2.2 print-content-optimize-actual (1setOf type2 keyword)

760 This [RECOMMENDED](#) attribute reports the “print-content-optimize” value(s) that the Printer
761 actually used to produce the Job.

762 5.2.3 warnings-count (integer(0:MAX))

763 This [RECOMMENDED](#) attribute reports the number of warnings encountered processing
764 the Job as a whole. A warning is reported when no information is lost but the appearance
765 of the printed output might not be as expected.

766 5.3 Document and Job Template Attributes**767 5.3.1 output-device (name(127))**

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

771 5.3.2 print-content-optimize (type2 keyword)

772 This [RECOMMENDED](#) attribute specifies the type of content optimization to perform on the
773 Document data. Keyword values specify the type of content to optimize, including:

774 'graphics': Graphs and line drawings.

775 'photo': Photographs.

776 'text': Text.

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

778 5.4 Job Template Attributes**779 5.4.1 job-cancel-after (integer(0:MAX))**

780 [This RECOMMENDED attribute specifies the maximum number of seconds allowed for
781 processing a Job. When specified, the Printer cancels the Job automatically if it cannot be
782 completed within the specified timeframe. The completion timer does not begin until the Job
783 enters the 'processing' state.](#)

784 5.4.2 job-delay-output-until (type2 keyword | name(MAX))

785 [This RECOMMENDED attribute specifies a time period in the future when the Printer will
786 produce the output for the Job. If the specified time period has not yet arrived, the Printer
787 MUST set the Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The
788 Printer MUST NOT produce any output until the time period arrives but MAY perform pre-](#)

789 [processing. When the time period arrives, the Job MUST become a candidate for output,](#)
790 [including any processing required to produce the output. The only way to alter the delay](#)
791 [period for a Job is by using the Set-Job-Attributes \[RFC3380\] operation.](#)

792 [Standard keyword values for named time periods are:](#)

793 ['day-time': Delay output until daylight, typically 6am to 6pm.](#)

794 ['evening': Delay output until the evening, typically from 6pm to 12am.](#)

795 ['indefinite': Delay output indefinitely; the time period can be changed using the Set-](#)
796 [Job-Attributes \[RFC3380\] operation.](#)

797 ['night': Delay output until the night, typically from 12am to 6am.](#)

798 ['no-delay-output': Do not delay the output.](#)

799 ['second-shift': Delay output until the second work shift, typically from 4pm to 12am.](#)

800 ['third-shift': Delay output until the third work shift, typically from 12am to 8am.](#)

801 ['weekend': Delay output until the weekend.](#)

802 [Clients MUST NOT supply both the "job-delay-output-until" and "job-delay-output-until-time"](#)
803 [\(section 5.4.3\) Job Template attributes in a Job Creation request. If a Client supplies both](#)
804 [attributes, the Printer MUST reject the request and return the 'client-error-conflicting-](#)
805 [attributes' status code.](#)

806 [Note: Unlike the "job-hold-until" \[STD92\] Job Template attribute, the "job-delay-output-until"](#)
807 [attribute does not cause the Job to enter the 'pending-held' state.](#)

808 **[5.4.3 job-delay-output-until-time \(dateTime\)](#)**

809 [This RECOMMENDED attribute specifies a date and time when the Printer will produce the](#)
810 [output for the Job. If the specified time period has not yet arrived, the Printer MUST set the](#)
811 [Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The Printer MUST NOT](#)
812 [produce any output until the time period arrives but MAY perform pre-processing. When the](#)
813 [time period arrives, the Job MUST become a candidate for output, including any processing](#)
814 [required to produce the output. The only way to alter the delay period for a Job is by using](#)
815 [the Set-Job-Attributes \[RFC3380\] operation.](#)

816 [Clients MUST NOT supply both the "job-delay-output-until-time" and "job-delay-output-until"](#)
817 [\(section 5.4.2\) Job Template attributes in a Job Creation request. If a Client supplies both](#)
818 [attributes, the Printer MUST reject the request and return the 'client-error-conflicting-](#)
819 [attributes' status code.](#)

820 [Note: Unlike the "job-hold-until-time" \(section 5.4.4\) Job Template attribute, the "job-delay-](#)
821 [output-until-time" attribute does not cause the Job to enter the 'pending-held' state.](#)

822 [5.4.4 job-hold-until-time \(dateTime\)](#)

823 [This RECOMMENDED attribute specifies the date and time after which the Job MUST](#)
824 [become a candidate for processing. Printers that support this attribute MUST support the](#)
825 ["job-hold-until" \[STD92\] Job Template attribute.](#)

826 [Clients MUST NOT supply both the "job-hold-until-time" and "job-hold-until" \[STD92\] Job](#)
827 [Template attributes in a Job Creation request. If a Client supplies both attributes, the Printer](#)
828 [MUST reject the request and return the 'client-error-conflicting-attributes' status code.](#)

829 [5.4.5 job-retain-until \(type2 keyword | name\(MAX\)\)](#)

830 [This RECOMMENDED attribute specifies how long the Job remains in the Job Retention](#)
831 [phase of a Job's life cycle \[STD92\]. Standard values include:](#)

832 ['end-of-day': Retain the Job until the end of the current day.](#)

833 ['end-of-month': Retain the Job until the end of the current month.](#)

834 ['end-of-week': Retain the Job until the end of the current week.](#)

835 ['indefinite': Retain the Job indefinitely.](#)

836 ['none': Do not retain the Job.](#)

837 [Clients MUST NOT supply the "job-retain-until", "job-retain-until-interval" \(section 5.4.6\),](#)
838 [and/or "job-retain-until-time" \(section 0\) Job Template attributes together in a Job Creation](#)
839 [request. If a Client supplies more than one of these attributes, the Printer MUST reject the](#)
840 [request and return the 'client-error-conflicting-attributes' status code.](#)

841 [5.4.6 job-retain-until-interval \(integer\(0:MAX\)\)](#)

842 [This RECOMMENDED attribute specifies the number of seconds the Job remains in the Job](#)
843 [Retention phase of a Job's life cycle \[STD92\].](#)

844 [Clients MUST NOT supply the "job-retain-until" \(section 5.4.5\), "job-retain-until-interval",](#)
845 [and/or "job-retain-until-time" \(section 0\) Job Template attributes together in a Job Creation](#)
846 [request. If a Client supplies more than one of these attributes, the Printer MUST reject the](#)
847 [request and return the 'client-error-conflicting-attributes' status code.](#)

848 [5.4.7 job-retain-until-time \(dateTime\)](#)

849 [This RECOMMENDED attribute specifies the date and time when the Job can leave the Job](#)
850 [Retention phase of a Job's life cycle \[STD92\].](#)

851 [Clients MUST NOT supply the "job-retain-until" \(section 5.4.5\), "job-retain-until-interval"](#)
852 [\(section 5.4.6\), and/or "job-retain-until-time" Job Template attributes together in a Job](#)

853 [Creation request. If a Client supplies more than one of these attributes, the Printer MUST](#)
854 [reject the request and return the 'client-error-conflicting-attributes' status code.](#)

855 **5.5 Printer Description Attributes**

856 **5.5.1 document-charset-default (charset)**

857 This [CONDITIONALLY REQUIRED](#) attribute specifies the default charset that the Printer
858 will assume for charset-ambiguous Document formats when the Client omits the "document-
859 charset" operation attribute [PWG5100.5]. Printers that support the "document-charset"
860 operation attribute MUST support this attribute.

861 **5.5.2 document-charset-supported (1setOf charset)**

862 This [CONDITIONALLY REQUIRED](#) attribute lists the charsets that the Printer supports for
863 charset-ambiguous Document formats. Printers that support the "document-charset"
864 operation attribute [PWG5100.5] MUST support this attribute.

865 **5.5.3 document-natural-language-default (naturalLanguage)**

866 This [CONDITIONALLY REQUIRED](#) attribute specifies the default natural language that the
867 Printer will assume for Document data when the Client omits the "document-natural-
868 language" operation attribute [STD92]. Printers that support the "document-natural-
869 language" attribute MUST support this attribute.

870 **5.5.4 document-natural-language-supported (1setOf naturalLanguage)**

871 This [CONDITIONALLY REQUIRED](#) attribute lists the natural languages supported for
872 Printer-supported Document formats. Printers that support the "document-natural-language"
873 attribute MUST support this attribute.

874 **5.5.5 job-cancel-after-default (integer(0:MAX) | no-value)**

875 [This CONDITIONALLY REQUIRED attribute specifies the default value for the "job-cancel-](#)
876 [after" \(section 5.4.1\) Job Template attribute. Printers that support the "job-cancel-after"](#)
877 [attribute MUST support this attribute.](#)

878 **5.5.6 job-cancel-after-supported (rangeOfinteger(0:MAX))**

879 [This CONDITIONALLY REQUIRED attribute specifies the range of values supported for the](#)
880 ["job-cancel-after" \(section 5.4.1\) Job Template attribute. Printers that support the "job-](#)
881 [cancel-after" attribute MUST support this attribute.](#)

882 **5.5.7 job-creation-attributes-supported (1setOf keyword)**

883 [This REQUIRED attribute lists the names of the operation and Job Template attributes that](#)
884 [can be sent in a Job Creation or Validate-Job request.](#)

885 **5.5.8 job-delay-output-until-default (type2 keyword | name(MAX))**

886 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-delay-
887 output-until" (section 5.4.2) Job Template attribute. Printers that support the "job-delay-
888 output-until" attribute MUST support this attribute.

889 **5.5.9 job-delay-output-until-supported (1setOf (type2 keyword | name(MAX)))**

890 This CONDITIONALLY REQUIRED attribute lists the supported values of the "job-delay-
891 output-until" (section 5.4.2) Job Template attribute. Printers that support the "job-delay-
892 output-until" attribute MUST support this attribute.

893 **5.5.10 job-delay-output-until-time-supported (rangeOfInteger(0:MAX))**

894 This CONDITIONALLY REQUIRED attribute specifies the range of time values supported
895 by the "job-delay-output-until-time" (section 5.4.3) Job Template attribute. Printers that
896 support the "job-delay-output-until-time" attribute MUST support this attribute.

897 **5.5.11 job-history-attributes-configured (1setOf keyword)**

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

903 **5.5.12 job-history-attributes-supported (1setOf keyword)**

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

907 **5.5.13 job-history-interval-configured (integer(0:MAX))**

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

913 **5.5.14 job-history-interval-supported (rangeOfInteger(0:MAX))**

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

917 **5.5.15 job-ids-supported (boolean)**

918 This REQUIRED attribute specifies whether the "job-ids" operation attribute (section 5.1.2)
 919 is supported.

920 **5.5.16 job-mandatory-attributes-supported (boolean)**

921 This REQUIRED attribute specifies ~~that~~ the "job-mandatory-attributes" operation attribute
 922 (section 5.1.3) is supported. Printers MUST report a value of 'true' for this attribute.

Deleted: whether

Deleted: Printers that support the "job-mandatory-attributes" operation attribute SHOULD support this attribute.

923 **5.5.17 job-retain-until-default (type2 keyword | name(MAX))**

924 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-retain-
 925 until" (section 5.4.5) Job Template attribute. Printers that support the "job-retain-until"
 926 attribute MUST support this attribute.

927 **5.5.18 job-retain-until-interval-default (integer(0:MAX) | no-value)**

928 This CONDITIONALLY REQUIRED attribute specifies the default value of the "job-retain-
 929 until-interval" (section 5.4.6) Job Template attribute. Printers that support the "job-retain-
 930 until-interval" attribute MUST support this attribute.

931 **5.5.19 job-retain-until-interval-supported (rangeOfInteger(0:MAX))**

932 This CONDITIONALLY REQUIRED attribute specifies the supported values of the "job-
 933 retain-until-interval" (section 5.4.6) Job Template attribute. Printers that support the "job-
 934 retain-until-interval" attribute MUST support this attribute.

935 **5.5.20 job-retain-until-supported (1setOf (type2 keyword | name(MAX)))**

936 This CONDITIONALLY REQUIRED attribute lists the supported values of the "job-retain-
 937 until" (section 5.4.5) Job Template attribute. Printers that support the "job-retain-until"
 938 attribute MUST support this attribute.

939 **5.5.21 job-retain-until-time-supported (rangeOfInteger(0:MAX))**

940 This CONDITIONALLY REQUIRED attribute specifies the supported values of the "job-
 941 retain-until-time" (section 5.4.7) Job Template attribute. Printers that support the "job-retain-
 942 until-time" attribute MUST support this attribute.

943 **5.5.22 job-spooling-supported (type2 keyword)**

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

953 [Standard keyword values include:](#)

954 ['automatic': The Printer chooses whether to process the Document data as it is](#)
 955 [received or after spooling \(storage\).](#)

956 ['spool': The printer processes the Document data after it has been spooled \(stored\).](#)

957 ['stream': The printer processes the Document data as it is received.](#)

958 [5.5.23 media-col-database \(1setOf collection\)](#)

959 [This REQUIRED attribute lists the set of pre-defined "media-col" collections available in the](#)
 960 [Printer's media database. This attribute is similar to "media-col-ready" \[PWG5100.3\] but](#)
 961 [returns the entire set of pre-defined "media-col" collections known by the Printer instead of](#)
 962 [just the media loaded in the Printer. If this attribute is supported, the members of the](#)
 963 [collections correspond to the supported members of the "media-col" \[PWG5100.3\]](#)
 964 [Job/Document Template attribute.](#)

965 [Because the number and size of values of this attribute can be very large, the Printer MUST](#)
 966 [NOT return this attribute in the response to the Get-Printer-Attributes operation unless the](#)
 967 [Client explicitly requests it by including the 'media-col-database' value in the "requested-](#)
 968 [attributes" \[STD92\] operation attribute.](#)

969 [In order to limit the number and size of values of this attribute, Printers MAY exclude the](#)
 970 ["media-source" and/or "media-type" member attributes from collection values when all](#)
 971 [values of the corresponding member attribute are supported when combined with the other](#)
 972 [member attributes and values.](#)

973 [For example, a Printer that supports ISO A4, ISO DL Envelope, US Letter, US Legal, and](#)
 974 [US #10 Envelope media, a single removable tray and a multi-purpose tray, and cardstock,](#)
 975 [envelopes, plain paper, labels, letterhead, and transparency media types might report the](#)
 976 [following attributes and values:](#)

```

977     media-size-supported={...}
978     media-source-supported='by-pass-tray','main','manual'
979     media-type-supported='cardstock','envelope','labels','stationery',
980                          'stationery-letterhead','transparency'
981     media-col-database={
982       /* ISO A4 cardstock only from manual feed */
983       media-size={
984         x-dimension=21000
985         y-dimension=29700
986       }
987       media-source='manual'
988       media-type='cardstock'
989     },{
990       /* ISO A4 transparency only from manual feed */
991       media-size={
992         x-dimension=21000
993         y-dimension=29700

```

```

994     }
995     media-source='manual'
996     media-type='transparency'
997   }r{
998     /* ISO A4 plain paper from any source */
999     media-size={
1000       x-dimension=21000
1001       y-dimension=29700
1002     }
1003     media-type='stationery'
1004   }r{
1005     /* ISO A4 letterhead from any source */
1006     media-size={
1007       x-dimension=21000
1008       y-dimension=29700
1009     }
1010     media-type='stationery-letterhead'
1011   },... /* Lots of other values */

```

1012 **5.5.24 output-device-supported (1setOf name(127))**

1013 This [CONDITIONALLY REQUIRED](#) attribute lists the supported “output-device” values.
 1014 Printers MUST support this attribute if the “output-device” Job Template attribute (section
 1015 5.3.1) is supported.

1016 **5.5.25 print-content-optimize-default (type2 keyword)**

1017 This [CONDITIONALLY REQUIRED](#) attribute specifies the default “print-content-optimize”
 1018 (section 5.3.2) value. Printers that support the “print-content-optimize” attribute MUST
 1019 support this attribute.

1020 **5.5.26 print-content-optimize-supported (1setOf type2 keyword)**

1021 This [CONDITIONALLY REQUIRED](#) attribute lists the supported “print-content-optimize”
 1022 (section 5.3.2) values. Printers that support the “print-content-optimize” attribute MUST
 1023 support this attribute.

1024 **5.5.27 which-jobs-supported (1setOf type2 keyword)**

1025 [This REQUIRED attribute lists the supported values for the “which-jobs” operation attribute](#)
 1026 [\[STD92\] that is used with the Get-Jobs operation \[STD92\].](#)

1027 **5.6 Printer Status Attributes**

1028 **5.6.1 printer-detailed-status-messages (1setOf text(MAX))**

1029 [This attribute specifies additional detailed and technical information about the Printer,](#)
 1030 [including information such as fault and warning messages, in the same way that the “job-](#)
 1031 [detailed-status-messages” \[STD92\] Job Status attribute provides additional information](#)

1032 [about a Job. Because the messages are human-readable text, Clients MUST NOT attempt](#)
 1033 [to parse the value\(s\) of this attribute.](#)

1034 [6. Additional Semantics for Existing Operations](#)

1035 [6.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-](#) 1036 [attributes](#)

1037 [This specification extends the Create-Job, Print-Job, Print-URI, and Validate-Job operations](#)
 1038 [to support the "job-mandatory-attributes" operation attribute \(section 5.1.3\) in the request](#)
 1039 [sent by the Client, which specifies a list of Job Template attributes that MUST be supported](#)
 1040 [by the Printer for the request to be accepted.](#)

1041 [The Client MAY supply and the Printer MUST accept the "job-mandatory-attributes"](#)
 1042 [operation attribute in any Job Creation or Validate-Job request.](#)

1043 [The Printer MUST reject the Job Creation request if the Client supplies an unsupported Job](#)
 1044 [Template attribute or value in the request that is included in this list of "job-mandatory-](#)
 1045 [attributes" values.](#)

1046 [If the Client supplies both the "job-mandatory-attributes" and "ipp-attribute-fidelity" operation](#)
 1047 [attributes, the Printer MUST ignore the "job-mandatory-attributes" attribute.](#)

1048 [6.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status](#) 1049 [Code](#)

1050 [This specification extends the Job Creation operations to return the 'server-error-too-many-](#)
 1051 [jobs' status code value when the Printer is currently unable to create a new Job object.](#)

1052 [6.3 Get-Jobs Operation: "job-ids \(1setOf integer\(1:MAX\)\)"](#)

1053 [The "job-ids" \(section 5.1.2\) operation attribute, if supplied, specifies a list of target Jobs to](#)
 1054 [be returned in the response to a Get-Jobs \[STD92\] request. Printers MUST support it in Get-](#)
 1055 [Jobs requests to limit the list of Jobs that are returned.](#)

1056 [If the Client supplies the "job-ids" operation attribute in a Get-Jobs request, the Client MUST](#)
 1057 [NOT also supply any of the following operation attributes in the same request: "limit", "my-](#)
 1058 [jobs", or "which-jobs". If the Client does supply prohibited operation attributes, the Printer](#)
 1059 [MUST reject the request and return the 'client-error-conflicting-attributes' status code.](#)

1060 [6.4 Hold-Job Operation: "job-hold-until-time \(dateTime\)"](#)

1061 [The "job-hold-until-time" \(section 5.1.1\) operation attribute can be provided to specify a date](#)
 1062 [and time when the Job will become a candidate for processing. Printers that support the](#)

Moved (insertion) [1]

Deleted: If the "job-mandatory-attributes" operation attribute is supported, the

1065 ["job-hold-until-time" attribute and Hold-Job operation MUST support its use with the Hold-](#)
1066 [Job operation. If accepted, the "job-hold-until-time" operation attribute is copied to the Job,](#)
1067 [replacing any existing "job-hold-until" \[STD92\] or "job-hold-until-time" attribute.](#)

1068 [Clients MUST NOT send both the "job-hold-until" \[STD92\] and "job-hold-until-time" operation](#)
1069 [attributes in a Hold-Job request. If both attributes are sent, Printers MUST reject the request](#)
1070 [and return the 'client-error-conflicting-attributes' status code.](#)

1071 [6.5 Print-Job, Print-URI, Send-Document, Send-URI: server-error-too-](#) 1072 [many-documents Status Code](#)

1073 [This specification extends the Document Creation operations to return the 'server-error-too-](#)
1074 [many-documents' status code value when the Printer is currently unable to create a new](#)
1075 [Document object.](#)

1076 [6.6 Set-Job-Attributes Operation: "job-hold-until-time \(dateTime\)"](#)

1077 [The "job-hold-until-time" \(section 5.4.4\) Job Template attribute can be provided to specify a](#)
1078 [date and time when the Job will become a candidate for processing. Printers that support](#)
1079 [the "job-hold-until-time" attribute and Set-Job-Attributes operation MUST support its use with](#)
1080 [the Set-Job-Attributes operation. If accepted, the "job-hold-until-time" operation attribute is](#)
1081 [copied to the Job, replacing any existing "job-hold-until" \[STD92\] or "job-hold-until-time"](#)
1082 [attribute.](#)

1083 [Clients MUST NOT send both the "job-hold-until" \[STD92\] and "job-hold-until-time" Job](#)
1084 [Template attributes in a Set-Job-Attributes request. If both attributes are sent, Printers](#)
1085 [MUST reject the request and return the 'client-error-conflicting-attributes' status code.](#)

1086 [7. Additional Values for Existing Attributes](#)

Deleted: New

1087 [7.1 job-state-reasons \(1setOf type2 keyword\)](#)

1088 This specification adds the following new keyword values for the "job-state-reasons" Job
1089 Status attribute [STD92]:

1090 'digital-signature-did-not-verify': One or more documents in the Job contains a
1091 digital signature that could not be verified by the Printer.

1092 'errors-detected': The Printer has detected one or more errors during processing of
1093 the Job.

1094 ["job-delay-until-specified": The Job's output is delayed because the "job-delay-](#)
1095 [output-until" or "job-delay-output-until-time" Job Template attribute was specified.](#)

1097 'warnings-detected': The Printer has detected one or more warnings during
1098 processing of the Job.

1099 **7.2 media (type2 keyword | name(MAX))**

1100 This specification adds the following new keyword value for the "media" Job Template
1101 attribute [STD92]:

1102 'choice_iso_a4_210x297mm_na_letter_8.5x11in': Print using US Letter or ISO A4
1103 media (whichever is available).

1104 Note: The semantics of the 'choice' prefix are documented in the PWG Media Standardized
1105 Names v2.0 (MSN2) specification [PWG5101.1].

1106 **7.3 media-col (collection)**

1107 This specification adds the "media-grain", "media-thickness", and "media-tooth" member
1108 attributes to the "media-col" Job/Document Template attribute.

1109 **7.3.1 media-grain (type2 keyword | name(MAX))**

1110 This member attribute specifies the desired grain of the media being specified [ISO10175].
1111 Grain affects the curl and the folding of the media. Some marking engines are sensitive to
1112 the resulting curl. Standard keyword values for "media-grain" include:

1113 'x-direction': The direction of the paper fibers is in the cross-feed direction of the
1114 media.

1115 'y-direction': The direction of the paper fibers is in the feed direction of the media.

1116 **7.3.2 media-thickness (integer(1:MAX))**

1117 This member attribute specifies the thickness of the media [JDF] in hundreds of millimeters
1118 (1/2540th of an inch).

1119 **7.3.3 media-tooth (type2 keyword | name(MAX))**

1120 This member attribute specifies the tooth (or roughness) of the media [ISO10175]. The tooth
1121 is particularly important for marking engines that use pens (e.g. plotters) to mark the media
1122 - the type of pen used matches the tooth of the media for best resolution.

1123 Standard keyword values for "media-tooth" include:

1124 'antique': Rougher than 'vellum' [JDF].

1125 'calendared': Extra smooth or polished, uncoated paper [JDF].

- 1126 ['coarse': Rough finish.](#)
- 1127 ['fine': Smoother finish than 'smooth'.](#)
- 1128 ['linen': Finish like coarse woven cloth \[JDF\].](#)
- 1129 ['medium': Regular finish.](#)
- 1130 ['smooth': Smooth finish \[JDF\].](#)
- 1131 ['stipple': Fine pebble finish \[JDF\].](#)
- 1132 ['uncalendared': Rough, unpolished and uncoated papers \[JDF\].](#)
- 1133 ['vellum': Slightly rough surface \[JDF\].](#)

1134 **7.4 pdl-override-supported (type2 keyword)**

1135 [This **specification** defines a new 'guaranteed' value for the "pdl-override-supported" \[STD92\]](#)
1136 [Printer Description attribute. This value indicates that the Printer guarantees that:](#)

- 1137 [1. Document and/or Job Template attribute values take precedence over instructions of](#)
1138 [any form embedded anywhere in the Document data;](#)
- 1139 [2. Document and/or Job Template attributes that have only a single supported value](#)
1140 [take precedence over instructions of any form embedded anywhere in the Document](#)
1141 [data, even if the attribute is not included in the Job or Document Creation request;](#)
1142 [and](#)
- 1143 [3. No PDL instruction is performed that does not correspond to a current value in the](#)
1144 [corresponding "xxx-supported" Printer Description attribute.](#)

1145 [If a Printer cannot honor the advertised "pdl-override-supported" value for a Job, it can abort](#)
1146 [the Job, stop the Printer, hold the Job, or substitute a supported value. This choice can be](#)
1147 [fixed by the implementation or configurable by the Administrator and can depend on the](#)
1148 [Document and/or Job Template attribute.](#)

1149 **7.5 which-jobs (type2 keyword)**

1150 [This specification adds the following new keyword values for the "which-jobs" operation](#)
1151 [attribute \[STD92\]:](#)

- 1152 ['aborted': Any Job in the 'aborted' state.](#)
- 1153 ['all': All Jobs regardless of state.](#)
- 1154 ['canceled': Any Job in the 'canceled' state.](#)

Commented [MS2]: I've greatly simplified the original text from 5100.11 - I believe the simplified text honors the original semantics...

1155 ['pending': Any Job in the 'pending' state.](#)

1156 ['pending-held': Any Job in the 'pending-held' state.](#)

1157 ['processing': Any Job in the 'processing' state.](#)

1158 ['processing-stopped': Any Job in the 'processing-stopped' state.](#)

1159 **8. New Status Codes**

1160 This section defines additional status code values.

1161 **8.1 server-error-too-many-jobs (0x050B)**

1162 The Client has attempted to create a Job using any of the Job Creation operations which
1163 would exceed the capacity of the Printer. The Client can retry the unmodified request.

1164 **8.2 server-error-too-many-documents (0x050C)**

1165 The Client has attempted to create a Document using any of the Document Creation
1166 operations which would exceed the capacity of the Printer for this Job. The Client can retry
1167 the unmodified request.

1168

1169 **9. Obsolete Attributes**

1170 **9.1 Obsolete Operation Attributes**

1171 [Table 1](#) lists the operation attributes from the previous version of this specification
 1172 [PWG5100.7-2003] which are now obsolete.

1173 **Table 1 - Obsolete Operation Attributes**

Attribute	Notes
document-digital-signature (type2 keyword)	Not usable
document-format-details (1setOf collection)	Interoperability issues and privacy concerns
document-format-version (text(127))	Interoperability issues

1174 **9.2 Obsolete Job Status Attributes**

1175 [Table 2](#) lists the Job Status attributes from the previous version of this specification
 1176 [PWG5100.7-2003] which are now obsolete.

1177 **Table 2 - 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-details-supported (1setOf collection)	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
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

Deleted: The
 Deleted: following
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Deleted: ¶
 "document-digital-signature" (type2 keyword): This attribute only identifies the type of signature that is present in the Document data, but that information can be determined by examining the Document data.¶
 "document-format-details" (1setOf collection): The member attributes and values cause serious interoperability and privacy issues.¶
 "document-format-version" (text(127)): Free form text values cause serious interoperability issues when used as identifiers for processing data.¶
 Deleted: The following
 Deleted: :

1196 **9.3 Obsolete Job Template Attributes**

1197 [Table 3](#) lists the Job Templates attributes from the previous version of this specification
 1198 [PWG5100.7-2003] which are now obsolete.

1199 **Table 3 - 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

1200 **9.4 Obsolete Printer Description Attributes**

1201 The following Printer Description attributes from the previous version of this specification
 1202 [PWG5100.7-2003] which are now obsolete.

1203 **Table 4 - 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)	Obsolete parent attribute
document-format-details-supported (1setOf keyword)	Obsolete parent attribute
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
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

Deleted: ¶
 "compression-supplied" (type2 keyword): Data compression is used over the HTTP transport during the submission of Document data. Auditing of Printer bandwidth usage requires additional information such as the size of the IPP request and attached compressed document data. ¶
 "document-charset-supplied" (charset): This attribute has been superseded by the "document-charset" Document Status attribute. ¶
 "document-digital-signature-supplied" (type2 keyword): The corresponding Job Template attribute is obsolete. ¶
 "document-format-details-supplied" (1setOf collection): The corresponding Job Template attribute is obsolete. ¶
 "document-format-supplied" (mimeType): This attribute has been superseded by the "document-format" Document Status attribute [PWG5100.5]. ¶
 "document-format-version-supplied" (text(127)): The corresponding Job Template attribute is obsolete. ¶
 "document-message-supplied" (text(MAX)): This attribute has been superseded by the "document-message" Document Status attribute [PWG5100.5]. ¶
 "document-name-supplied" (name(MAX)): This attribute has been superseded by the "document-name" Document Status attribute [PWG5100.5]. ¶
 "document-natural-language-supplied" (naturalLanguage): This attribute has been superseded by the "document-natural-language" Document Status attribute [PWG5100.5]. ¶
 "ipp-attribute-fidelity" (boolean): This attribute is only used at time of Job creation. The "xxx-actual" Job Status attributes provide a receipt of attributes and values that were used when processing a Job and thus provide the necessary auditing information. ¶
 "job-copies-actual" (integer(1:MAX)): The corresponding Job Template attribute is obsolete. ¶
 "job-cover-back-actual" (collection): The corresponding Job Template attribute is obsolete. ¶
 ... [1]

Deleted: The following

Deleted: :

Deleted: ¶
 "job-copies" (integer(1:MAX)): This attribute has poor interoperability with the "copies" Job Template attribute [STD92]. ¶
 "job-cover-back" (collection): This attribute has poor interoperability with the "cover-back" Job Template attribute [PWG5100.3]. ¶
 "job-cover-front" (collection): This attribute has poor interoperability with the "cover-front" Job Template attribute [PWG5100.3]. ¶
 "job-finishings" (1setOf type2 enum): This attribute has poor interoperability with the "finishings" Job Template attribute [STD92]. ¶ [2]

Deleted: :

1353 **10. Obsolete Values**

1354 **10.1 Obsolete "job-state-reasons" Values**

1355 The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' keyword values
1356 from the previous version of this specification [PWG5100.7-2003] are now obsolete because
1357 the corresponding Job Template attribute is obsolete.

1358 **11. Conformance Requirements**

1359 **11.1 Printer Conformance Requirements**

1360 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1361 1. The new operations defined in section 4;
- 1362 2. The operation attributes defined in 5.1;
- 1363 3. The Job Status attributes defined in section 5.2 that correspond to any
- 1364 supported Job Template attributes defined in section 5.3;
- 1365 4. The Document Status attributes defined in section 5.2 that correspond to any
- 1366 supported Document Template attributes defined in section 5.3;
- 1367 5. The Printer Description attributes defined in section 5.5 that correspond to any
- 1368 supported Document/Job Template attributes defined in section 5.3;
- 1369 6. The additional semantics defined in section 6;
- 1370 7. The additional values defined in section 7;
- 1371 8. The internationalization considerations defined in section 12; and
- 1372 9. The security considerations defined in section 13.

1373 **11.2 Client Conformance Requirements**

1374 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1375 1. The internationalization considerations defined in section 12; and
- 1376 2. The security considerations defined in section 13.

1377 **12. Internationalization Considerations**

1378 For interoperability and basic support for multiple languages, conforming implementations
1379 MUST support:

- 1380 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
- 1381 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1382 1. The Unicode Format for Network Interchange [RFC5198] which requires
- 1383 transmission of well-formed UTF-8 strings and recommends transmission of
- 1384 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

Deleted: ¶
 "document-digital-signature-default" (type2 keyword): The corresponding Job Template attribute is obsolete. ¶
 "document-digital-signature-supported" (1setOf type2 keyword): The corresponding Job Template attribute is obsolete. ¶
 "document-format-details-default" (collection): The corresponding operation attribute is obsolete. ¶
 "document-format-details-supported" (1setOf keyword): The corresponding operation attribute is obsolete. ¶
 "document-format-version-default" (text(127)): The corresponding operation attribute is obsolete. ¶
 "document-format-version-supported" (1setOf text(127)): The corresponding operation attribute is obsolete. ¶
 "job-copies-default" (integer(1:MAX)): The corresponding Job Template attribute is obsolete. ¶
 "job-copies-supported" (rangeOfInteger(1:MAX)): The corresponding Job Template attribute is obsolete. ¶
 "job-cover-back-default" (collection): The corresponding Job Template attribute is obsolete. ¶ ... [3]

Deleted: following

Deleted: :
Deleted: 'digital-signature-type-not-supported': This value is obsolete because the corresponding "document-digital-signature" Job Template attribute is obsolete. ¶
'job-digital-signature-wait': This value is obsolete because the corresponding ... [4]

Moved up [1]: Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-attributes ¶
This specification extends the Create-Job, Print-Job, Print-URI, and Validate-Job operations to support the "job-mandatory-

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Deleted: Printers that support the "job-mandatory-attributes" operation attribute (section 4.1.1) MUST also support the additional semantics defined in section 9.1. ¶

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1537 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1538 characters and combining marks) followed by Canonical Composition (into canonical
1539 composed characters wherever Unicode has assigned them).

1540 WARNING – Performing normalization on UTF-8 strings received from Clients and
1541 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client
1542 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now
1543 'hidden').

1544 Implementations of this specification SHOULD conform to the following standards on
1545 processing of human-readable Unicode text strings, see:

1546 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1547 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1548 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1549 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1550 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1551 Unicode Collation Algorithm [UTS10] – sorting

1552 Unicode Locale Data Markup Language [UTS35] – locale databases

1553 Implementations of this specification are advised to also review the following informational
1554 documents on processing of human-readable Unicode text strings:

1555 Unicode Character Encoding Model [UTR17] – multi-layer character model

1556 Unicode Character Property Model [UTR23] – character properties

1557 Unicode Conformance Model [UTR33] – Unicode conformance basis

1558 **13. Security Considerations**

1559 The IPP extensions defined in this document require the same security considerations as
1560 defined in the Internet Printing Protocol/1.1 [STD92].

1561 Implementations of this specification SHOULD conform to the following standard on
1562 processing of human-readable Unicode text strings, see:

1563 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1564 Implementations of this specification are advised to also review the following informational
1565 document on processing of human-readable Unicode text strings:

1566 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

1567 14. IANA Considerations

1568 14.1 Attribute Registrations

1569 The attributes defined in this specification will be published by IANA according to the
1570 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1571 <http://www.iana.org/assignments/ipp-registrations>

1572 The registry entries will contain the following information:

1573	Document Status attributes:	Reference
1574	-----	-----
1575	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1576	document-charset-supplied(obsolete) (charset)	[PWG5100.7]
1577	document-digital-signature-supplied(obsolete) (type2 keyword)	
1578		[PWG5100.7]
1579	document-format-details-supplied(obsolete) (1setOf collection)	
1580		[PWG5100.7]
1581	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1582	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1583	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1584	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1585	document-natural-language-supplied(obsolete) (naturalLanguage)	
1586		[PWG5100.7]
1587	errors-count (integer(0:MAX))	[PWG5100.7]
1588	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1589	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1590	warnings-count (integer(0:MAX))	[PWG5100.7]
1591		
1592	Document Template attributes:	Reference
1593	-----	-----
1594	output-device (name(127))	[PWG5100.7]
1595	print-content-optimize (type2 keyword)	[PWG5100.7]
1596		
1597	Job Status attributes:	Reference
1598	-----	-----
1599	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1600	document-charset-supplied(obsolete) (charset)	[PWG5100.7]
1601	document-digital-signature-supplied(obsolete) (type2 keyword)	
1602		[PWG5100.7]
1603	document-format-details-supplied(obsolete) (1setOf collection)	
1604		[PWG5100.7]
1605	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1606	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1607	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1608	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1609	document-natural-language-supplied(obsolete) (naturalLanguage)	
1610		[PWG5100.7]
1611	errors-count (integer(0:MAX))	[PWG5100.7]
1612	ipp-attribute-fidelity(obsolete) (boolean)	[PWG5100.7]

1613	job-copies-actual(obsolete) (integer(1:MAX))	[PWG5100.7]
1614	job-cover-back-actual(obsolete) (collection)	[PWG5100.7]
1615	job-cover-front-actual(obsolete) (collection)	[PWG5100.7]
1616	job-finishings-actual(obsolete) (1setOf type2 enum)	[PWG5100.7]
1617	job-finishings-col-actual(obsolete) (1setOf collection)	[PWG5100.7]
1618	job-mandatory-attributes(obsolete) (1setOf keyword)	[PWG5100.7]
1619	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1620	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1621	warnings-count (integer(0:MAX))	[PWG5100.7]
1622		
1623	Job Template attributes:	Reference
1624	-----	-----
1625	job-cancel-after (integer(0:MAX))	[PWG5100.7]
1626	job-copies(obsolete) (integer(1:MAX))	[PWG5100.7]
1627	job-cover-back(obsolete) (collection)	[PWG5100.7]
1628	job-cover-front(obsolete) (collection)	[PWG5100.7]
1629	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1630	job-delay-output-until-time (dateTime)	[PWG5100.7]
1631	job-hold-until-time (dateTime)	[PWG5100.7]
1632	job-finishings(obsolete) (1setOf type2 enum)	[PWG5100.7]
1633	job-finishings-col(obsolete) (1setOf collection)	[PWG5100.7]
1634	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1635	job-retain-until-interval (integer(0:MAX))	[PWG5100.7]
1636	job-retain-until-time (dateTime)	[PWG5100.7]
1637	output-device (name(127))	[PWG5100.7]
1638	print-content-optimize (type2 keyword)	[PWG5100.7]
1639		
1640	Operation attributes:	Reference
1641	-----	-----
1642	document-digital-signature(obsolete) (type2 keyword)	[PWG5100.7]
1643	document-format-details(obsolete) (1setOf collection)	[PWG5100.7]
1644	document-format-version(obsolete) (text(127))	[PWG5100.7]
1645	job-hold-until-time (dateTime)	[PWG5100.7]
1646	job-ids (1setOf integer(1:MAX))	[PWG5100.7]
1647	job-mandatory-attributes (1setOf keyword)	[PWG5100.7]
1648		
1649	Printer Description attributes:	Reference
1650	-----	-----
1651	document-charset-default (charset)	[PWG5100.7]
1652	document-charset-supported (1setOf charset)	[PWG5100.7]
1653	document-digital-signature-default(obsolete) (type2 keyword)	[PWG5100.7]
1654	document-digital-signature-supported(obsolete) (1setOf type2 keyword)	[PWG5100.7]
1655	document-format-details-default(obsolete) (collection)	[PWG5100.7]
1656	document-format-details-supported(obsolete) (1setOf keyword)	[PWG5100.7]
1657	document-format-version-default(obsolete) (text(127))	[PWG5100.7]
1658	document-format-version-supported(obsolete) (1setOf text(127))	[PWG5100.7]
1659	document-natural-language-default (naturalLanguage)	[PWG5100.7]
1660	document-natural-language-supported (1setOf naturalLanguage)	[PWG5100.7]
1661	job-cancel-after-default (integer(0:MAX) no-value)	[PWG5100.7]
1662	job-cancel-after-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1663	job-copies-default(obsolete) (integer(1:MAX))	[PWG5100.7]
1664		
1665		
1666		
1667		
1668		

1669	job-copies-supported (obsolete) (rangeOfInteger(1:MAX))	[PWG5100.7]
1670	job-cover-back-default (obsolete) (collection)	[PWG5100.7]
1671	job-cover-back-supported (obsolete) (1setOf keyword)	[PWG5100.7]
1672	job-cover-front-default (obsolete) (collection)	[PWG5100.7]
1673	job-cover-front-supported (obsolete) (1setOf keyword)	[PWG5100.7]
1674	job-creation-attributes-supported (1setOf keyword)	[PWG5100.7]
1675	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1676	job-delay-output-until-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1677	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1678	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1679	job-delay-output-until-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1680	job-delay-output-until-time-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1681	job-delay-output-until-time-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1682	job-finishings-col-default (obsolete) (1setOf collection)	[PWG5100.7]
1683	job-finishings-col-ready (obsolete) (1setOf collection)	[PWG5100.7]
1684	job-finishings-col-supported (obsolete) (1setOf keyword)	[PWG5100.7]
1685	job-finishings-default (obsolete) (1setOf type2 enum)	[PWG5100.7]
1686	job-finishings-ready (obsolete) (1setOf type2 enum)	[PWG5100.7]
1687	job-finishings-supported (obsolete) (1setOf type2 enum)	[PWG5100.7]
1688	job-history-attributes-configured (1setOf keyword)	[PWG5100.7]
1689	job-history-attributes-supported (1setOf keyword)	[PWG5100.7]
1690	job-history-interval-configured (integer(0:MAX))	[PWG5100.7]
1691	job-history-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1692	job-ids-supported (boolean)	[PWG5100.7]
1693	job-mandatory-attributes-supported (boolean)	[PWG5100.7]
1694	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1695	job-retain-until-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1696	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1697	job-retain-until-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1698	job-retain-until-time-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1699	job-spooling-supported (type2 keyword)	[PWG5100.7]
1700	media-col-database (1setOf collection)	[PWG5100.7]
1701	output-device-supported (1setOf name(127))	[PWG5100.7]
1702	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1703	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1704	which-jobs-supported (1setOf type2 keyword)	[PWG5100.7]
1705		
1706	Printer Status attributes:	Reference
1707	-----	-----
1708	printer-detailed-status-messages (1setOf text(MAX))	[PWG5100.7]

1709 14.2 Attribute [Keyword](#) Value Registrations

1710 The keyword values defined in this specification will be published by IANA according to the
1711 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1712 <http://www.iana.org/assignments/ipp-registrations>

1713 The registry entries will contain the following information:

1714	Attributes (attribute syntax)	
1715	Keyword Attribute Value	Reference
1716	-----	-----
1717	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]

1718	day-time	[PWG5100.7]
1719	evening	[PWG5100.7]
1720	indefinite	[PWG5100.7]
1721	night	[PWG5100.7]
1722	no-delay-output	[PWG5100.7]
1723	second-shift	[PWG5100.7]
1724	third-shift	[PWG5100.7]
1725	weekend	[PWG5100.7]
1726	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1727	<Any "job-delay-output-until" value>	[PWG5100.7]
1728	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1729	<Any "job-delay-output-until" value>	[PWG5100.7]
1730	<Any "job-delay-output-until" value>	[PWG5100.7]
1731		
1732	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1733	end-of-day	[PWG5100.7]
1734	end-of-month	[PWG5100.7]
1735	end-of-week	[PWG5100.7]
1736	indefinite	[PWG5100.7]
1737	none	[PWG5100.7]
1738	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1739	<Any "job-retain-until" value>	[PWG5100.7]
1740	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1741	<Any "job-retain-until" value>	[PWG5100.7]
1742	<Any "job-retain-until" value>	[PWG5100.7]
1743		
1744	job-state-reasons (1setOf type2 keyword)	[RFC8011]
1745	digital-signature-did-not-verify	[PWG5100.7]
1746	digital-signature-type-not-supported (obsolete)	[PWG5100.7]
1747	errors-detected	[PWG5100.7]
1748	job-delay-output-until-specified	[PWG5100.7]
1749	job-digital-signature-wait (obsolete)	[PWG5100.7]
1750	warnings-detected	[PWG5100.7]
1751		
1752	media (type2 keyword name(MAX))	[RFC8011]
1753	choice_iso_a4_210x297mm_na_letter_8.5x11in	[PWG5100.7]
1754		
1755	pdl-override-supported (type2 keyword)	[RFC8011]
1756	guaranteed	[PWG5100.7]
1757		
1758	print-content-optimize (type2 keyword)	[PWG5100.7]
1759	graphics	[PWG5100.7]
1760	photo	[PWG5100.7]
1761	text	[PWG5100.7]
1762	text-and-graphics	[PWG5100.7]
1763	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1764	<Any "print-content-optimize" value>	[PWG5100.7]
1765	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1766	<Any "print-content-optimize" value>	[PWG5100.7]
1767	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1768	<Any "print-content-optimize" value>	[PWG5100.7]
1769		
1770	which-jobs (type2 keyword)	[RFC8011]
1771	aborted	[PWG5100.7]
1772	all	[PWG5100.7]
1773	canceled	[PWG5100.7]

1774	pending	[PWG5100.7]
1775	pending-held	[PWG5100.7]
1776	processing	[PWG5100.7]
1777	processing-stopped	[PWG5100.7]

1778 **14.3 Type2 enum Registrations**

1779 [The attributes defined in this specification will be published by IANA according to the](#)
 1780 [procedures in the Internet Printing Protocol/1.1 \[STD92\] in the following file:](#)

1781 <http://www.iana.org/assignments/ipp-registrations>

1782 [The registry entries will contain the following information:](#)

1783	Attributes (attribute syntax)		
1784	Enum Value	Enum Symbolic Name	Reference
1785	-----	-----	-----
1786	operations-supported (1setOf type2 enum)		[RFC8011]
1787	0x0038	Cancel-Jobs	[PWG5100.7]
1788	0x0039	Cancel-My-Jobs	[PWG5100.7]
1789	0x003A	Close-Job	[PWG5100.7]
1790	0x003B	Resubmit-Job	[PWG5100.7]

1791 **14.4 Operation Registrations**

1792 The operations defined in this specification will be published by IANA according to the
 1793 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1794 <http://www.iana.org/assignments/ipp-registrations>

1795 The registry entries will contain the following information:

1796	Operation Name	Reference
1797	-----	-----
1798	Cancel-Jobs	[PWG5100.7]
1799	Cancel-My-Jobs	[PWG5100.7]
1800	Close-Job	[PWG5100.7]
1801	Create-Job (Extension)	[PWG5100.7]
1802	Hold-Job (Extension)	[PWG5100.7]
1803	Print-Job (Extension)	[PWG5100.7]
1804	Print-URI (Extension)	[PWG5100.7]
1805	Resubmit-Job	[PWG5100.7]
1806	Send-Document (Extension)	[PWG5100.7]
1807	Send-URI (Extension)	[PWG5100.7]
1808	Set-Job-Attributes (Extension)	[PWG5100.7]
1809	Validate-Job (Extension)	[PWG5100.7]

1810 **14.5 Status Code Registrations**

1811 The status codes defined in this specification will be published by IANA according to the
1812 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1813 <http://www.iana.org/assignments/ipp-registrations>

1814 The registry entries will contain the following information:

1815	Value	Status Code Name	Reference
1816	-----	-----	-----
1817	0x0500:0x05FF	- Server Error:	
1818	0x050B	server-error-too-many-jobs	[PWG5100.7]
1819	0x050C	server-error-too-many-documents	[PWG5100.7]

1820

1821 **15. Overview of Changes**1822 **15.1 IPP Job Extensions v2.0**

1823 The following changes were made to the previous version of this specification [PWG5100.7-
1824 2003]:

- 1825 • A rationale section was added, including use cases, exceptions, and requirements;
- 1826 • References now point to the current versions of dependent documents and
1827 specifications at the time of publication;
- 1828 • Read-only attributes are now defined and registered as status attributes;
- 1829 • A **REQUIRED** "job-mandatory-attributes-supported" Printer Description attribute has
1830 been added [to indicate support for the "job-mandatory-attributes" Job Template](#)
1831 [attribute](#);
- 1832 • [The "job-hold-until-time" and "job-ids" operation attributes were moved from the](#)
1833 [OBSOLETE IPP Job and Printer Extensions - Set 3 \[PWG5100.11-2010\]](#)
1834 [specification](#);
- 1835 • [The "job-delay-output-until", "job-delay-output-until-time", and "job-hold-until-time"](#)
1836 [Job Template attributes were moved from the OBSOLETE IPP Job and Printer](#)
1837 [Extensions - Set 3 \[PWG5100.11-2010\] specification](#);
- 1838 • [The "job-creation-attributes-supported", "job-spooling-supported", "media-col-](#)
1839 [database", "printer-detailed-status-messages", and "which-jobs-supported" Printer](#)
1840 [attributes were moved from the OBSOLETE IPP Job and Printer Extensions - Set 3](#)
1841 [\[PWG5100.11-2010\] specification](#);
- 1842 • [The "media-grain", "media-thickness", and "media-tooth" member attributes of the](#)
1843 ["media-col" Document/Job Template attribute were moved from the OBSOLETE IPP](#)
1844 [Job and Printer Extensions - Set 3 \[PWG5100.11-2010\] specification](#);
- 1845 • **RECOMMENDED** "job-retain-until", "job-retain-until-interval", and "job-retain-until-
1846 [time" Job Template attributes were added to control the Job Retention phase of a](#)
1847 [Job's lifecycle](#);
- 1848 • **REQUIRED** "job-history-attributes-configured", "job-history-attributes-supported",
1849 ["job-history-interval-configured", and "job-history-interval-supported" Printer](#)
1850 [Description attributes were added to control the Job History phase of a Job's lifecycle](#);
- 1851 • The "document-charset" operation attribute and corresponding operation semantics
1852 are now defined in PWG 5100.5: IPP Document Object v1.1;

Deleted: 1.1

Deleted: RECOMMENDED

- 1855 • The "document-digital-signature" operation attribute and corresponding Document
1856 Status, Job Status, and Printer Description attributes have been made obsolete
1857 [because of interoperability issues](#);
- 1858 • The "document-format-details" operation attribute and corresponding Document
1859 Status, Job Status, and Printer Description attributes have been made obsolete
1860 [because of interoperability issues and privacy concerns](#);
- 1861 • The "document-format-version" operation attribute and corresponding Document
1862 Status, Job Status, and Printer Description attributes have been made obsolete
1863 [because of interoperability issues](#);
- 1864 • The "job-copies" Job Template attribute and corresponding Job Status and Printer
1865 Description attributes have been made obsolete [because of interoperability issues](#);
- 1866 • The "job-cover-back" Job Template attribute and corresponding Job Status and
1867 Printer Description attributes have been made obsolete [because of interoperability](#)
1868 [issues](#);
- 1869 • The "job-cover-front" Job Template attribute and corresponding Job Status and
1870 Printer Description attributes have been made obsolete [because of interoperability](#)
1871 [issues](#);
- 1872 • The "job-finishings" Job Template attribute and corresponding Job Status and Printer
1873 Description attributes have been made obsolete [because of interoperability issues](#);
- 1874 • The "job-finishings-col" Job Template attribute and corresponding Job Status and
1875 Printer Description attributes have been made obsolete [because of interoperability](#)
1876 [issues](#); and
- 1877 • The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' values for
1878 the "job-state-reasons" attribute have been made obsolete [because of interoperability](#)
1879 [issues](#).

1880 16. References

1881 16.1 Normative References

- 1882 [BCP14] S. Bradner, "Key words for use in RFCs to Indicate Requirement
1883 Levels", RFC 2119/BCP 14, March 1997,
1884 <https://tools.ietf.org/html/bcp14>
- 1885 [ISO10646] "Information technology -- Universal Coded Character Set (UCS)",
1886 ISO/IEC 10646:2011

- 1887 [PWG5100.3] K. Ocke, T. Hastings, "Internet Printing Protocol (IPP): Production
1888 Printing Attributes – Set 1", PWG 5100.3-2001, February 2001,
1889 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippdoprint10-20010212-
1890 5100.3.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippdoprint10-20010212-5100.3.pdf)
- 1891 [PWG5100.5] M. Sweet, "IPP Document Object v1.1", PWG 5100.5-YYYY, Month
1892 YYYY, [https://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject11-
1893 YYYYMMDD-5100.5.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject11-YYYYMMDD-5100.5.pdf)
- 1894 [PWG5101.1] M. Sweet, R. Bergman, T. Hastings, "PWG Media Standardized
1895 Names 2.0 (MSN2)", PWG 5101.1-2013, March 2013,
1896 [https://ftp.pwg.org/pub/pwg/candidates/cs-pwgmsn20-20130328-
1897 5101.1.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-pwgmsn20-20130328-5101.1.pdf)
- 1898 [RFC3380] T. Hastings, R. Herriot, C. Kugler, H. Lewis, "Internet Printing Protocol
1899 (IPP): Job and Printer Set Operations", RFC 3380, September 2002,
1900 <https://tools.ietf.org/html/rfc3380>
- 1901 [RFC5198] J. Klensin, M. Padlipsky, "Unicode Format for Network Interchange",
1902 RFC 5198, March 2008, <https://tools.ietf.org/html/rfc5198>
- 1903 [RFC7230] R. Fielding, J. Reschke, "Hypertext Transfer Protocol (HTTP/1.1):
1904 Message Syntax and Routing", RFC 7230, June 2014,
1905 <https://tools.ietf.org/html/rfc7230>
- 1906 [STD63] F. Yergeau, "UTF-8, a transformation format of ISO 10646", RFC
1907 3629/STD 63, November 2003, <https://tools.ietf.org/html/std63>
- 1908 [STD92] M. Sweet, I. McDonald, "Internet Printing Protocol/1.1", STD 92, June
1909 2018, <https://tools.ietf.org/html/std92>
- 1910 [UAX9] Unicode Consortium, "Unicode Bidirectional Algorithm", UAX#9, May
1911 2018, <https://www.unicode.org/reports/tr9>
- 1912 [UAX14] Unicode Consortium, "Unicode Line Breaking Algorithm", UAX#14,
1913 May 2018, <https://www.unicode.org/reports/tr14>
- 1914 [UAX15] M. Davis, M. Duerst, "Unicode Normalization Forms", Unicode
1915 Standard Annex 15, May 2018, <https://www.unicode.org/reports/tr15>
- 1916 [UAX29] Unicode Consortium, "Unicode Text Segmentation", UAX#29, May
1917 2018, <https://www.unicode.org/reports/tr29>
- 1918 [UAX31] Unicode Consortium, "Unicode Identifier and Pattern Syntax",
1919 UAX#31, June 2018, <https://www.unicode.org/reports/tr31>
- 1920 [UNICODE] Unicode Consortium, "Unicode Standard", Version 11.0.0, June 2018,
1921 <https://www.unicode.org/versions/Unicode11.0.0/>

- 1922 [UTS10] Unicode Consortium, “Unicode Collation Algorithm”, UTS#10, May
1923 2018, <https://www.unicode.org/reports/tr10>
- 1924 [UTS35] Unicode Consortium, “Unicode Locale Data Markup Language”,
1925 UTS#35, March 2018, <https://www.unicode.org/reports/tr35>
- 1926 [UTS39] Unicode Consortium, “Unicode Security Mechanisms”, UTS#39, May
1927 2018, <https://www.unicode.org/reports/tr39>
- 1928 **16.2 Informative References**
- 1929 [\[ISO10175\]](#) “Document Printing Application (DPA)”. ISO/IEC 10175. June 1996
- 1930 [\[JDF\]](#) CIP4, “Job Definition Format (JDF) Specification Release 1.5”,
1931 December 2013, <https://www.cip4.org>
- 1932 [PWG5100.7-2003] T. Hastings, P. Zehler, “Standard for the Internet Printing Protocol
1933 (IPP): Job Extensions”, PWG 5100.7-2003, October 2003,
1934 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobext10-
1935 5100.7.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobext10-20031031-5100.7.pdf)
- 1936 [\[PWG5100.11-2010\]](#)
1937 T. Hastings, “Internet Printing Protocol (IPP): Job and Printer
1938 Extensions - Set 2 (JPS2)”, PWG 5100.11-2010, October 2010,
1939 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-
1940 20101030-5100.11.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-20101030-5100.11.pdf)
- 1941 [UTR17] Unicode Consortium “Unicode Character Encoding Model”, UTR#17,
1942 November 2008, <https://www.unicode.org/reports/tr17>
- 1943 [UTR23] Unicode Consortium “Unicode Character Property Model”, UTR#23,
1944 May 2015, <https://www.unicode.org/reports/tr23>
- 1945 [UTR33] Unicode Consortium “Unicode Conformance Model”, UTR#33,
1946 November 2008, <https://www.unicode.org/reports/tr33>
- 1947 [UNISECFAQ] Unicode Consortium “Unicode Security FAQ”, November 2013,
1948 <https://www.unicode.org/faq/security.html>
1949

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1962 Implementers of this specification document are encouraged to join the IPP Mailing List in
1963 order to participate in any discussions of clarification issues and review of registration
1964 proposals for additional attributes and values.

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1967 Tom Hastings (author of v1.0)
1968 Peter Zehler (author of v1.0)
1969

1970 **18. Change History**

1971 **[18.1 March 15, 2019](#)**

- 1972 • [Version: 2.0](#)
- 1973 • [Section 2.1: OBSOLETE -> OBSOLETE](#)
- 1974 • [Section 2.4: Cleaned out unused terms, added definitions of Completed Job, Not](#)
1975 [Completed Job, and Retained Job](#)
- 1976 • [Sections 5 and 6: Updated conformance requirements](#)

1977 **[18.2 March 8, 2019](#)**

- 1978 • [Status: Prototype](#)
- 1979 • [Abstract: Reworded for updated scope](#)
- 1980 • [Section 1: Reworded for updated scope, added discussion of obsolete JPS2 bits](#)
1981 [moving here](#)
- 1982 • [Section 2.1: Added definitions of OBSOLETE and DEPRECATED](#)
- 1983 • [Section 3: Added rationale, use cases, and design requirements for attributes and](#)
1984 [operations from JPS2.](#)
- 1985 • [New section 4 for operations from JPS2](#)
- 1986 • [Section 5: Made most attributes RECOMMENDED, added job-creation-attributes-](#)
1987 [supported, job-delay-output-until-xxx, job-history-xxx, job-hold-until-time, job-ids, job-](#)
1988 [spooling-supported, media-col-database, printer-detail-status-messages from JPS2](#)
- 1989 • [Section 5: Added new job-history-xxx and job-retain-until-xxx attributes](#)
- 1990 • [New section 6 for additional semantics \(imported from JPS2\)](#)
- 1991 • [Section 7: Added pdl-override-supported, which-jobs values, media-col member](#)
1992 [attributes.](#)

1993 **18.3 October 23, 2018**

- 1994 • Status: Interim

- 1995 • Updated references to the first version of 5100.7 to include year and exclude the full
- 1996 name.
- 1997 • Abstract and intro: Clarified that this specification is defining attributes and values.
- 1998 • Editorial changes
- 1999 • Added reference to the MSN2 spec.

- 2000 **18.4 September 26, 2018**
- 2001 • Brought back the job-mandatory-attributes operation attribute, which is still needed.
- 2002 • Added a rationale, use case, and design requirement for selective fidelity/job-
- 2003 mandatory-attributes.
- 2004 • Added Additional Semantics and Operation Registrations sections for using job-
- 2005 mandatory-attributes with job creation/validation operations.
- 2006 • Added Additional Semantics and Operation Registrations sections for returning the
- 2007 too-many-jobs/documents status codes.

- 2008 **18.5 September 25, 2018**
- 2009 Initial revision.

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