



The Printer Working Group

March 8, 2019  
Working Draft

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## IPP Job Extensions v1.1 (JOBEXT)

Style Definition: IEEEStd Level 3 Header:  
Font: Arial, Indent: Left: 0"

Commented [MS1]: Decision to make: v1.1  
with lots of RECOMMENDED  
attributes/operations, or v2.0 with REQUIRED  
attributes/operations?

Status: Prototype

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

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

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-ippjobext11-20190308.docx>

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80 system providers, network connectivity vendors, and print management application  
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86 a stable, well understood, and technically competent specification that is widely used with  
87 multiple independent and interoperable implementations. Printer manufacturers and  
88 vendors of printer related software benefit from the interoperability provided by voluntary  
89 conformance to these standards.

90 For additional information regarding the Printer Working Group visit:

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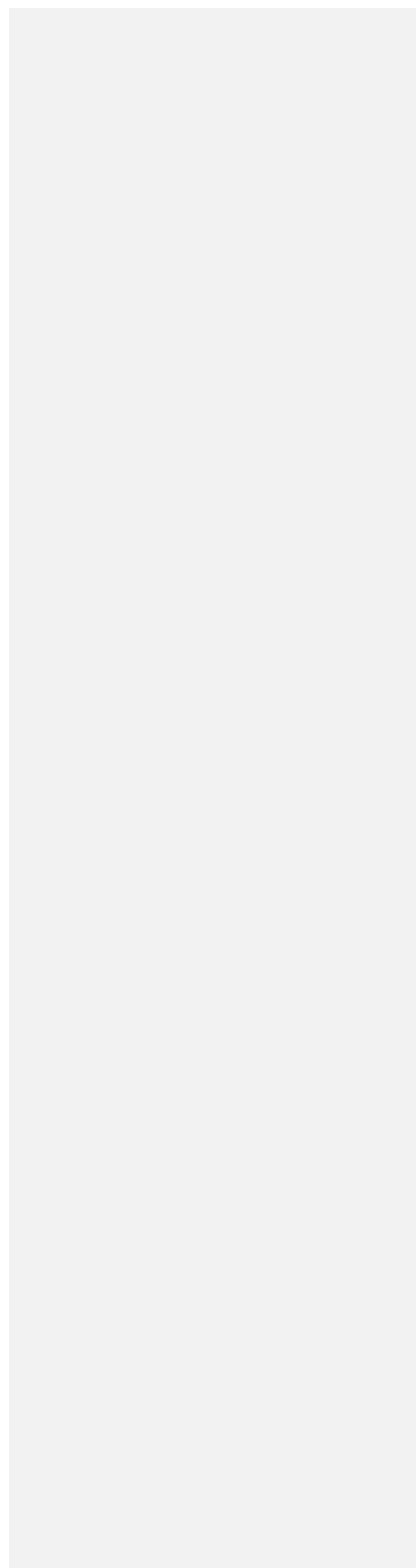
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## 258 1. Introduction

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

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

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### 264 1.1 Document Natural Language and Character Set

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

### 272 1.2 Attribute Fidelity

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

### 277 1.3 Rendering Optimizations

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

### 283 1.4 Printing on a Specific Output Device

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

### 287 1.5 Results of Job/Document Processing

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

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

## 298 **1.6 Job Scheduling and Lifecycle**

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

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

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

## 310 **1.7 Job Operations**

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

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

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

## 321 **1.8 Obsolete Attributes and Values**

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

## 325 2. Terminology

### 326 2.1 Conformance Terminology

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

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

### 335 2.2 Printing Terminology

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

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

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

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

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

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

### 348 2.3 Protocol Role Terminology

349 This document also defines the following protocol roles to specify unambiguous  
350 conformance requirements:

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

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

## 356 2.4 Other Terminology

357 *Document Creation Operation*: operations that accept Document Content. Specifically:  
358 Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are  
359 both Job Creation and Document Creation operations.

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

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

365 *Job Creation Operation*: operations that create Job objects, specifically: Print-Job, Print-URI,  
366 and Create-Job as defined in [rfc2911].

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

372 *Page*: The term "Page" used throughout this document is a synonym for PDL page.

373 *PDL Page*: A "PDL Page" is a page according to the definition of pages in the language used  
374 to express the document data. Note: If the PDL contains multiple original source pages  
375 that have been placed on a single page by the client application, then the PDL page count  
376 is one. On the other hand, if the client requests that multiple PDL Pages are placed on a  
377 single side of media, by supplying "number-up" with a value greater than 1, then the PDL  
378 page count will be more than one. [rfc2911] uses the term "print stream page" for PDL Page.

379 *Sheet*: A Sheet is the unit of media that a printer puts marks on. It is the most basic unit of  
380 output from a printer. A printer may mark on one side or on both sides of a sheet.

## 381 2.5 Acronyms and Organizations

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

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

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

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

### 386 3. Requirements

#### 387 3.1 Rationale

388 The Internet Printing Protocol/1.1 [STD92] defines many attributes and values for specifying  
389 how Jobs and Documents are processed by a Printer. Given the need for [managing Jobs](#),  
390 specifying [Job](#) processing options, and retrieving processing status information, this  
391 specification should:

Deleted: Document

- 392 1. Define attributes and values that specify the Document character set and  
393 rendering optimizations;
- 394 2. Define an attribute for doing selective fidelity enforcement;
- 395 3. Define a media size for automatically printing Documents on the correct size;
- 396 4. Define attributes and values that allow a Client to discover the results of  
397 Document processing;
- 398 5. [Define attributes for delaying the output from a Job until a specified time period;](#)
- 399 6. [Define attributes for holding a Job until a specified date and time;](#)
- 400 7. [Define attributes for retaining a Job for a specified time period;](#)
- 401 8. [Define attributes for automatically canceling a Job after a specified time period;](#)
- 402 9. [Define attributes for automatically canceling a Job after a specified time period;](#)
- 403 10. [Define operations for managing one or more Jobs; and](#)
- 404 11. [Define values that allow a Client to monitor specific groups of Jobs.](#)

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

#### 407 3.2 Use Cases

##### 408 3.2.1 Print a Plain Text File

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

##### 412 3.2.2 Print a Document Using a Matching Size

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

##### 416 3.2.3 Force a Document to Print on a Specific Media Size

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

423 **3.2.4 Print a Presentation with Best Quality**

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

426 **3.2.5 Print Using a Specific Output Device**

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

430 **3.2.6 Monitor Whether Jobs are Printed Correctly**

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

434 **[3.2.7 Hold a Job Until a Specific Date and Time](#)**

435 [John wants to withhold printing of a weekly newsletter until Monday morning. He uses his](#)  
436 [Client software to submit the print job with the correct date and time.](#)

437 **[3.2.8 Delay Output Until a Specific Time Period](#)**

438 [Bob has a large print job he would like printed overnight. He uses his Client software to](#)  
439 [submit the job for printing, specifying that output should not begin until 6pm.](#)

440 **[3.2.9 Submit a Variable Number of Documents in a Job](#)**

441 [Elizabeth has a print job that contains a variable number of documents for printing. She uses](#)  
442 [her Client software to create a new job and then add each document to the job. When she](#)  
443 [is sure she has all of the documents for the job, she uses her Client software to close the](#)  
444 [job so that the printer can begin processing the documents for printing.](#)

445 **[3.2.10 Cancel a Job After a Specific Time Period](#)**

446 [Sally operates a high-volume printer for her company. She configures the printer to](#)  
447 [automatically cancel any jobs that take longer than four hours to print so as to maintain the](#)  
448 [availability of the printer to other users.](#)

449 **[3.2.11 Cancel Multiple Jobs](#)**

450 [Bob needs to cancel a group of jobs that were incorrectly submitted to a printer. He uses his](#)  
451 [Client software to send a request to cancel a list of those jobs. The printer then cancels the](#)  
452 [jobs all at once.](#)

453 **3.2.12 Resubmit a Job**

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

458 **3.2.13 Retain Jobs for a Specific Time Period**

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

462 **3.2.14 Keep Job History Information for a Specific Time Period**

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

466 **3.3 Exceptions**

467 **3.3.1 Too Many Jobs on a Printer**

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

470 **3.3.2 Too Many Documents in a Job**

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

473 **3.4 Out of Scope**

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

- 475 1. Definition of new file formats; and  
476 2. Definition of new protocol bindings.

477 **3.5 Design Requirements**

478 The design requirements for this specification are:

- 479 1. Define attributes for supported languages and character sets in Document data;  
480 2. Define attributes and values to describe the kind of processing optimizations that  
481 should be performed on Document data;  
482 3. Define an attribute to specify fidelity requirements;

- 483 4. Define attributes to select an Output Device for printing;
- 484 [5. Define attributes and values to report processing errors and warnings;](#)
- 485 [6. Define attributes to hold Jobs until a specific date and time;](#)
- 486 [7. Define attributes to cancel Jobs after a specific time period;](#)
- 487 [8. Define attributes and values to retain Jobs for a specific time period;](#)
- 488 [9. Define an operation to close an open Job;](#)
- 489 [10. Define attributes and operations to cancel groups of Jobs;](#)
- 490 [11. Define an operation to resubmit a Job with new Job Template attributes;](#) and
- 491 12. Define sections to register all attributes, values, and operations with IANA.
- 492



## 493 **4. New Operations**

### 494 **4.1 Cancel-Jobs**

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

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

#### 504 **4.1.1 Cancel-Jobs Request**

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

##### 506 Group 1: Operation Attributes

507 "attributes-charset" (charset) and  
508 "attributes-natural-language" (naturalLanguage):

509 The Client MUST supply and the Printer MUST support both of these  
510 attributes.

511 "printer-uri" (uri):

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

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

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

517 "requesting-user-name" (name(MAX)) and  
518 "requesting-user-uri" (uri):

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

520 "message" (text(127)):

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

**Commented [MS2]:** These operations are REQUIRED in PWG 5100.11-2010, but are new to this spec which might (depending on how you interpret Process/3.0) mean we need to make this a major version update.

Discuss: Make them RECOMMENDED so we can keep this as an errata update? IPP Everywhere already makes them required and having them recommended here avoids the process ambiguity...

524 **4.1.2 Cancel-Jobs Response**

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

526 Group 1: Operation Attributes

527 "attributes-charset" (charset) and  
528 "attributes-natural-language" (naturalLanguage):

529 The Printer MUST return both of these attributes.

530 "status-message" (text(255)) and/or  
531 "detailed-status-message" (text(MAX)):

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

533 Group 2: Unsupported Attributes

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

535 **4.2 Cancel-My-Jobs**

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

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

544 **4.2.1 Cancel-My-Jobs Request**

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

546 Group 1: Operation Attributes

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

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

551 "printer-uri" (uri):

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

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

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

557 ["requesting-user-name" \(name\(MAX\)\) and](#)  
558 ["requesting-user-uri" \(uri\):](#)

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

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

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

#### 564 **[4.2.2 Cancel-My-Jobs Response](#)**

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

##### 566 [Group 1: Operation Attributes](#)

567 ["attributes-charset" \(charset\) and](#)  
568 ["attributes-natural-language" \(naturalLanguage\):](#)

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

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

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

##### 573 [Group 2: Unsupported Attributes](#)

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

#### 575 **[4.3 Close-Job](#)**

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

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

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

#### 587 [4.3.1 Close-Job Request](#)

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

##### 589 [Group 1: Operation Attributes](#)

590 ["attributes-charset" \(charset\) and](#)  
591 ["attributes-natural-language" \(naturalLanguage\):](#)

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

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

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

597 ["requesting-user-name" \(name\(MAX\)\) and](#)  
598 ["requesting-user-uri" \(uri\):](#)

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

#### 600 [4.3.2 Close-Job Response](#)

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

##### 602 [Group 1: Operation Attributes](#)

603 ["attributes-charset" \(charset\) and](#)  
604 ["attributes-natural-language" \(naturalLanguage\):](#)

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

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

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

##### 609 [Group 2: Unsupported Attributes](#)

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

##### 611 [Group 3: Job Attributes](#)

612 ["job-state" \(type1 enum\):](#)

613 [The Printer MUST return the Job's REQUIRED "job-state" attribute. The](#)  
614 [value of this attribute along with the value of the "job-state-reasons" attribute](#)  
615 [is a "snapshot" of the new Job's state when the Printer returns the response.](#)

616 ["job-state-reasons" \(1setOf type2 keyword\):](#)

617 [The Printer MUST return the Job's REQUIRED "job-state-reasons" attribute.](#)

618 ["job-state-message" \(text\(MAX\)\):](#)

619 [The Printer SHOULD return the Job's RECOMMENDED "job-state-message"](#)  
620 [attribute. If the Printer supports this attribute, then it MUST be returned in the](#)  
621 [response. If this attribute is not returned in the response, the Client can](#)  
622 [assume that the "job-state-message" attribute is not supported and will not](#)  
623 [be returned in a subsequent Job query.](#)

624 ["number-of-intervening-jobs" \(integer\(0:MAX\)\):](#)

625 [The Printer SHOULD return the Job's RECOMMENDED "number-of-](#)  
626 [intervening-jobs" attribute. If the Printer supports this attribute, then it MUST](#)  
627 [be returned in the response. If this attribute is not returned in the response,](#)  
628 [the Client can assume that the "number-of-intervening-jobs" attribute is not](#)  
629 [supported and will not be returned in a subsequent Job query.](#)

#### 630 **[4.4 Resubmit-Job](#)**

631 [This REQUIRED operation allows a Client to create a copy of a Retained Job \[STD92\] and](#)  
632 [change or add attributes for the new Job. Once accepted, a Printer MUST create a new Job](#)  
633 [object and assign a unique "job-id" and "job-uri" value for the new Job, just as if the Client](#)  
634 [had sent a Create-Job request. Operation and Job Template attributes from the original Job](#)  
635 [are copied to the new Job unless overridden in the Resubmit-Job request. If any of the](#)  
636 [Documents in the Job were passed by reference \(Print-URI or Send-URI\), the Printer MUST](#)  
637 [re-fetch the data.](#)

638 [Printers MUST reject a Resubmit-Job request if the Job is not retained or is in the 'pending',](#)  
639 ['pending-held', 'processing', or 'processing-stopped' states with the status 'client-error-not-](#)  
640 [possible'. Otherwise, the Printer returns a status code as defined for the Print-Job \[STD92\]](#)  
641 [operation.](#)

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

646 **4.4.1 Resubmit-Job Request**

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

648 Group 1: Operation Attributes

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

651 The Client MUST supply and the Printer MUST support both of these  
652 attributes.

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

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

656 "requesting-user-name" (name(MAX)) and  
657 "requesting-user-uri" (uri):

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

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

660 The Client MAY supply and the Printer MUST support either of these  
661 attributes.

662 Group 2: Job Template Attributes

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

666 **4.4.2 Resubmit-Job Response**

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

668 Group 1: Operation Attributes

669 "attributes-charset" (charset) and  
670 "attributes-natural-language" (naturalLanguage):

671 The Printer MUST return both of these attributes.

672 "status-message" (text(255)) and/or  
673 "detailed-status-message" (text(MAX)):

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

675 [Group 2: Unsupported Attributes](#)

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

677 [Group 3: Job Attributes](#)

678 ["job-id" \(integer\(1:MAX\)\):](#)

679 [The Printer MUST return the new Job's "job-id" attribute.](#)

680 ["job-state" \(type1 enum\):](#)

681 [The Printer MUST return the Job's REQUIRED "job-state" attribute. The](#)  
682 [value of this attribute along with the value of the "job-state-reasons" attribute](#)  
683 [is a "snapshot" of the new Job's state when the Printer returns the response.](#)

684 ["job-state-reasons" \(1setOf type2 keyword\):](#)

685 [The Printer MUST return the Job's REQUIRED "job-state-reasons" attribute.](#)

686 ["job-state-message" \(text\(MAX\)\):](#)

687 [The Printer SHOULD return the Job's RECOMMENDED "job-state-message"](#)  
688 [attribute. If the Printer supports this attribute, then it MUST be returned in the](#)  
689 [response. If this attribute is not returned in the response, the Client can](#)  
690 [assume that the "job-state-message" attribute is not supported and will not](#)  
691 [be returned in a subsequent Job query.](#)

692 ["job-uri" \(uri\):](#)

693 [The Printer MUST return the new Job's "job-uri" attribute.](#)

694 ["number-of-intervening-jobs" \(integer\(0:MAX\)\):](#)

695 [The Printer SHOULD return the Job's RECOMMENDED "number-of-](#)  
696 [intervening-jobs" attribute. If the Printer supports this attribute, then it MUST](#)  
697 [be returned in the response. If this attribute is not returned in the response,](#)  
698 [the Client can assume that the "number-of-intervening-jobs" attribute is not](#)  
699 [supported and will not be returned in a subsequent Job query.](#)

## 700 **5. Attributes**

Deleted: New

### 701 **5.1 Operation Attributes**

#### 702 **5.1.1 job-hold-until-time (dateTime)**

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

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

#### 709 **5.1.2 job-ids (1setOf integer(1:MAX))**

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

Commented [MS3]: Could be conditionally required depending on whether we make the operations required.

#### 712 **5.1.3 job-mandatory-attributes (1setOf keyword)**

713 This **RECOMMENDED** attribute identifies which Job Template attributes the Printer **MUST**  
714 support in the Job Creation request in order to accept the Job. The values are the names of  
715 Job Template attributes, for example, 'job-hold-until', 'copies', and 'media'. In order to  
716 identify a member attribute of a collection attribute, the keyword names of both the collection  
717 attribute and the member attribute are given separated by a period (.) character. For  
718 example, to make the "media" attribute of the "cover-front" collection attribute mandatory,  
719 supply the keyword value 'cover-front.media'.

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

### 724 **5.2 Document and Job Status Attributes**

#### 725 **5.2.1 errors-count (integer(0:MAX))**

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



732 **5.2.2 print-content-optimize-actual (1setOf type2 keyword)**

733 This attribute reports the “print-content-optimize” value(s) that the Printer actually used to  
734 produce the Job.

735 **5.2.3 warnings-count (integer(0:MAX))**

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

739 **5.3 Document and Job Template Attributes**

740 **5.3.1 output-device (name(127))**

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

744 **5.3.2 print-content-optimize (type2 keyword)**

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

747 'graphics': Graphs and line drawings.

748 'photo': Photographs.

749 'text': Text.

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

751 **5.4 Job Template Attributes**

752 **5.4.1 job-cancel-after (integer(0:MAX))**

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

757 **5.4.2 job-delay-output-until (type2 keyword | name(MAX))**

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

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

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

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

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

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

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

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

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

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

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

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

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

#### 781 [5.4.3 job-delay-output-until-time \(dateTime\)](#)

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

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

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

**795 [5.4.4 job-hold-until-time \(dateTime\)](#)**

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

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

**802 [5.4.5 job-retain-until \(type2 keyword | name\(MAX\)\)](#)**

803 [This RECOMMENDED attribute specifies how long the Job remains in the Job Retention](#)  
804 [phase. Standard values include:](#)

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

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

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

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

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

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

**814 [5.4.6 job-retain-until-interval \(integer\(0:MAX\)\)](#)**

815 [This RECOMMENDED attribute specifies the number of seconds the Job remains in the Job](#)  
816 [Retention phase.](#)

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

**821 [5.4.7 job-retain-until-time \(dateTime\)](#)**

822 [This RECOMMENDED attribute specifies the date and time when the Job can leave the Job](#)  
823 [Retention phase.](#)

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

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

## 828 **5.5 Printer Description Attributes**

### 829 **5.5.1 document-charset-default (charset)**

830 This [RECOMMENDED](#) attribute specifies the default charset that the Printer will assume for  
831 charset-ambiguous Document formats when the Client omits the "document-charset"  
832 operation attribute [PWG5100.5]. Printers that support the "document-charset" operation  
833 attribute MUST support this attribute.

### 834 **5.5.2 document-charset-supported (1setOf charset)**

835 This [RECOMMENDED](#) attribute lists the charsets that the Printer supports for charset-  
836 ambiguous Document formats. Printers that support the "document-charset" operation  
837 attribute [PWG5100.5] MUST support this attribute.

### 838 **5.5.3 document-natural-language-default (naturalLanguage)**

839 This [RECOMMENDED](#) attribute specifies the default natural language that the Printer will  
840 assume for Document data when the Client omits the "document-natural-language"  
841 operation attribute [STD92]. Printers that support the "document-natural-language" attribute  
842 MUST support this attribute.

### 843 **5.5.4 document-natural-language-supported (1setOf naturalLanguage)**

844 This [RECOMMENDED](#) attribute lists the natural languages supported for Printer-supported  
845 Document formats. Printers that support the "document-natural-language" attribute MUST  
846 support this attribute.

### 847 **5.5.5 job-cancel-after-default (integer(0:MAX) | no-value)**

848 [This RECOMMENDED attribute specifies the default value for the "job-cancel-after" \(section](#)  
849 [5.4.1\) Job Template attribute. Printers that support the "job-cancel-after" attribute MUST](#)  
850 [support this attribute.](#)

### 851 **5.5.6 job-cancel-after-supported (rangeOfInteger(0:MAX))**

852 [This RECOMMENDED attribute specifies the range of values supported for the "job-cancel-](#)  
853 [after" \(section 5.4.1\) Job Template attribute. Printers that support the "job-cancel-after"](#)  
854 [attribute MUST support this attribute.](#)

### 855 **5.5.7 job-creation-attributes-supported (1setOf keyword)**

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

858 **[5.5.8 job-delay-output-until-default \(type2 keyword | name\(MAX\)\)](#)**

859 [This RECOMMENDED attribute specifies the default value of the "job-delay-output-until"](#)  
860 [\(section 5.4.2\) Job Template attribute. Printers that support the "job-delay-output-until"](#)  
861 [attribute MUST support this attribute.](#)

862 **[5.5.9 job-delay-output-until-supported \(1setOf \(type2 keyword | name\(MAX\)\)\)](#)**

863 [This RECOMMENDED attribute lists the supported values of the "job-delay-output-until"](#)  
864 [\(section 5.4.2\) Job Template attribute. Printers that support the "job-delay-output-until"](#)  
865 [attribute MUST support this attribute.](#)

866 **[5.5.10 job-delay-output-until-time-supported \(rangeOfInteger\(0:MAX\)\)](#)**

867 [This RECOMMENDED attribute specifies the range of time values supported by the "job-](#)  
868 [delay-output-until-time" \(section 5.4.3\) Job Template attribute. Printers that support the "job-](#)  
869 [delay-output-until-time" attribute MUST support this attribute.](#)

870 **[5.5.11 job-history-attributes-configured \(1setOf keyword\)](#)**

871 [This RECOMMENDED attribute lists the Job attributes that will be retained in the history](#)  
872 [phase of each Job. IPP/1.1 \[STD92\] specifies that at least the "job-id", "job-printer-uri", "job-](#)  
873 [state", and "job-state-reasons" attributes MUST be retained in the history phase. Printers](#)  
874 [that support the "job-history-attributes-supported" \(section N.M.P\) attribute MUST support](#)  
875 [this attribute.](#)

876 **[5.5.12 job-history-attributes-supported \(1setOf keyword\)](#)**

877 [This RECOMMENDED attribute lists the Job attributes that can be retained in the history](#)  
878 [phase of each Job. Printers that support the "job-history-attributes-configured" \(section](#)  
879 [N.M.P\) attribute MUST support this attribute.](#)

880 **[5.5.13 job-history-interval-configured \(integer\(0:MAX\)\)](#)**

881 [This RECOMMENDED attribute specifies the minimum number of seconds that a Job will](#)  
882 [remain in the history phase of its lifecycle \[STD92\]. Printers SHOULD have a default](#)  
883 [configured value of at least 60 seconds to allow Clients to discover the disposition of any](#)  
884 [Jobs that have reached a terminating state. Printers that support the "job-history-interval-](#)  
885 [supported" \(section N.M.P\) attribute MUST support this attribute.](#)

886 **[5.5.14 job-history-interval-supported \(rangeOfInteger\(0:MAX\)\)](#)**

887 [This RECOMMENDED attribute specifies the range of values that are supported for the "job-](#)  
888 [history-interval-configured" Printer Description attribute. Printers that support the "job-](#)  
889 [history-interval-configured" \(section N.M.P\) attribute MUST support this attribute.](#)

890 **5.5.15 job-ids-supported (boolean)**

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

Commented [MS4]: Could be conditionally required depending on whether we make the operations required

893 **5.5.16 job-mandatory-attributes-supported (boolean)**

894 This attribute specifies whether the "job-mandatory-attributes" operation attribute (section  
895 5.1.3) is supported. Printers that support the "job-mandatory-attributes" operation attribute  
896 SHOULD support this attribute.

Deleted: ¶

897 **5.5.17 job-retain-until-default (type2 keyword | name(MAX))**

898 This RECOMMENDED attribute specifies the default value of the "job-retain-until" (section  
899 5.4.5) Job Template attribute. Printers that support the "job-retain-until" attribute MUST  
900 support this attribute.

Commented [MS5]: Make REQUIRED if we decide to make this a v2.0 document.

901 **5.5.18 job-retain-until-interval-default (integer(0:MAX) | no-value)**

902 This RECOMMENDED attribute specifies the default value of the "job-retain-until-interval"  
903 (section 5.4.6) Job Template attribute. Printers that support the "job-retain-until-interval"  
904 attribute MUST support this attribute.

905 **5.5.19 job-retain-until-interval-supported (rangeOfInteger(0:MAX))**

906 This RECOMMENDED attribute specifies the supported values of the "job-retain-until-  
907 interval" (section 5.4.6) Job Template attribute. Printers that support the "job-retain-until-  
908 interval" attribute MUST support this attribute.

909 **5.5.20 job-retain-until-supported (1setOf (type2 keyword | name(MAX)))**

910 This RECOMMENDED attribute lists the supported values of the "job-retain-until" (section  
911 5.4.5) Job Template attribute. Printers that support the "job-retain-until" attribute MUST  
912 support this attribute.

913 **5.5.21 job-retain-until-time-supported (rangeOfInteger(0:MAX))**

914 This RECOMMENDED attribute specifies the supported values of the "job-retain-until-time"  
915 (section 5.4.7) Job Template attribute. Printers that support the "job-retain-until-time"  
916 attribute MUST support this attribute.

917 **5.5.22 job-spooling-supported (type2 keyword)**

918 This RECOMMENDED attribute specifies whether Jobs are spooled before the Document  
919 data is processed. The value of this attribute returned in a Get-Printer-Attributes response  
920 MAY depend on the "document-format" attribute supplied in the Get-Printer-Attributes  
921 request [STD92]. If the Printer does not support this attribute, then the spooling behavior is  
922 implementation dependent.

924 [Standard keyword values include:](#)

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

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

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

### 929 [5.5.23 media-col-database \(1setOf collection\)](#)

930 [This RECOMMENDED attribute lists the set of pre-defined "media-col" collections available](#)  
931 [in the Printer's media database. This attribute is similar to "media-col-ready" \[PWG5100.3\]](#)  
932 [but returns the entire set of pre-defined "media-col" collections known by the Printer instead](#)  
933 [of just the media loaded in the Printer. If this attribute is supported, the members of the](#)  
934 [collections correspond to the supported members of the "media-col" \[PWG5100.3\]](#)  
935 [Job/Document Template attribute.](#)

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

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

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

```
948     media-size-supported={...}
949     media-source-supported='by-pass-tray','main','manual'
950     media-type-supported='cardstock','envelope','labels','stationery',
951                          'stationery-letterhead','transparency'
952     media-col-database={
953         /* ISO A4 cardstock only from manual feed */
954         media-size={
955             x-dimension=21000
956             y-dimension=29700
957         }
958         media-source='manual'
959         media-type='cardstock'
960     },{
961         /* ISO A4 transparency only from manual feed */
962         media-size={
963             x-dimension=21000
964             y-dimension=29700
```

```

965     }
966     media-source='manual'
967     media-type='transparency'
968   }r{
969     /* ISO A4 plain paper from any source */
970     media-size={
971       x-dimension=21000
972       y-dimension=29700
973     }
974     media-type='stationery'
975   }r{
976     /* ISO A4 letterhead from any source */
977     media-size={
978       x-dimension=21000
979       y-dimension=29700
980     }
981     media-type='stationery-letterhead'
982   }... /* Lots of other values */

```

#### 983 **5.5.24 output-device-supported (1setOf name(127))**

984 This attribute lists the supported “output-device” values. Printers MUST support this attribute  
 985 if the “output-device” Job Template attribute (section 5.3.1) is supported.

#### 986 **5.5.25 print-content-optimize-default (type2 keyword)**

987 This [RECOMMENDED](#) attribute specifies the default “print-content-optimize” (section 5.3.2)  
 988 value. Printers that support the “print-content-optimize” attribute MUST support this attribute.

#### 989 **5.5.26 print-content-optimize-supported (1setOf type2 keyword)**

990 This [RECOMMENDED](#) attribute lists the supported “print-content-optimize” (section 5.3.2)  
 991 values. Printers that support the “print-content-optimize” attribute MUST support this  
 992 attribute.

#### 993 **5.5.27 which-jobs-supported (1setOf type2 keyword)**

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

## 996 **5.6 Printer Status Attributes**

### 997 **5.6.1 printer-detailed-status-messages (1setOf text(MAX))**

998 [This OPTIONAL attribute specifies additional detailed and technical information about the](#)  
 999 [Printer, including information such as fault and warning messages, in the same way that the](#)  
 1000 [“job-detailed-status-messages” \[STD92\] Job Status attribute provides additional information](#)  
 1001 [about a Job. Because the messages are human-readable text, Clients MUST NOT attempt](#)  
 1002 [to parse the value\(s\) of this attribute.](#)



## 1003 6. Additional Semantics for Existing Operations

### 1004 6.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory- 1005 attributes

Moved (insertion) [1]

1006 This specification extends the Create-Job, Print-Job, Print-URI, and Validate-Job operations  
1007 to support the "job-mandatory-attributes" operation attribute (section 5.1.3) in the request  
1008 sent by the Client, which specifies a list of Job Template attributes that MUST be supported  
1009 by the Printer for the request to be accepted.

1010 If the "job-mandatory-attributes" operation attribute is supported, the Client MAY supply and  
1011 the Printer MUST accept the "job-mandatory-attributes" operation attribute in any Job  
1012 Creation or Validate-Job request.

1013 The Printer MUST reject the Job Creation request if the Client supplies an unsupported Job  
1014 Template attribute or value in the request that is included in this list of "job-mandatory-  
1015 attributes" values.

1016 If the Client supplies both the "job-mandatory-attributes" and "ipp-attribute-fidelity" operation  
1017 attributes, the Printer MUST ignore the "job-mandatory-attributes" attribute.

### 1018 6.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status 1019 Code

1020 This specification extends the Job Creation operations to return the 'server-error-too-many-  
1021 jobs' status code value when the Printer is currently unable to create a new Job object.

### 1022 6.3 Get-Jobs Operation: "job-ids (1setOf integer(1:MAX))"

1023 The "job-ids" (section 5.1.2) operation attribute, if supplied, specifies a list of target Jobs to  
1024 be returned in the response to a Get-Jobs [STD92] request. Printers that support the "job-  
1025 ids" operation attribute MUST support it in Get-Jobs requests to limit the list of Jobs that are  
1026 returned.

1027 If the Client supplies the "job-ids" operation attribute in a Get-Jobs request, the Client MUST  
1028 NOT also supply any of the following operation attributes in the same request: "limit", "my-  
1029 jobs", or "which-jobs". If the Client does supply prohibited operation attributes, the Printer  
1030 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

### 1031 6.4 Hold-Job Operation: "job-hold-until-time (dateTime)"

1032 The "job-hold-until-time" (section 5.1.1) operation attribute can be provided to specify a date  
1033 and time when the Job will become a candidate for processing. Printers that support the  
1034 "job-hold-until-time" attribute and Hold-Job operation MUST support its use with the Hold-

1035 [Job operation. If accepted, the "job-hold-until-time" operation attribute is copied to the Job,](#)  
1036 [replacing any existing "job-hold-until" \[STD92\] or "job-hold-until-time" attribute.](#)

1037 [Clients MUST NOT send both the "job-hold-until" \[STD92\] and "job-hold-until-time" operation](#)  
1038 [attributes in a Hold-Job request. If both attributes are sent, Printers MUST reject the request](#)  
1039 [and return the 'client-error-conflicting-attributes' status code.](#)

## 1040 [6.5 Print-Job, Print-URI, Send-Document, Send-URI: server-error-too-](#) 1041 [many-documents Status Code](#)

1042 [This specification extends the Document Creation operations to return the 'server-error-too-](#)  
1043 [many-documents' status code value when the Printer is currently unable to create a new](#)  
1044 [Document object.](#)

## 1045 [6.6 Set-Job-Attributes Operation: "job-hold-until-time \(dateTime\)"](#)

1046 [The "job-hold-until-time" \(section 5.4.4\) Job Template attribute can be provided to specify a](#)  
1047 [date and time when the Job will become a candidate for processing. Printers that support](#)  
1048 [the "job-hold-until-time" attribute and Set-Job-Attributes operation MUST support its use with](#)  
1049 [the Set-Job-Attributes operation. If accepted, the "job-hold-until-time" operation attribute is](#)  
1050 [copied to the Job, replacing any existing "job-hold-until" \[STD92\] or "job-hold-until-time"](#)  
1051 [attribute.](#)

1052 [Clients MUST NOT send both the "job-hold-until" \[STD92\] and "job-hold-until-time" Job](#)  
1053 [Template attributes in a Set-Job-Attributes request. If both attributes are sent, Printers](#)  
1054 [MUST reject the request and return the 'client-error-conflicting-attributes' status code.](#)

## 1055 [7. Additional Values for Existing Attributes](#)

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### 1056 [7.1 job-state-reasons \(1setOf type2 keyword\)](#)

1057 This specification adds the following new keyword values for the "job-state-reasons" Job  
1058 Status attribute [STD92]:

1059 'digital-signature-did-not-verify': One or more documents in the Job contains a  
1060 digital signature that could not be verified by the Printer.

1061 'errors-detected': The Printer has detected one or more errors during processing of  
1062 the Job.

1063 '[job-delay-until-specified](#)': [The Job's output is delayed because the "job-delay-](#)  
1064 [output-until" or "job-delay-output-until-time" Job Template attribute was specified.](#)

1065 'warnings-detected': The Printer has detected one or more warnings during  
1066 processing of the Job.

1068 **7.2 media (type2 keyword | name(MAX))**

1069 This specification adds the following new keyword value for the "media" Job Template  
1070 attribute [STD92]:

1071 'choice\_iso\_a4\_210x297mm\_na\_letter\_8.5x11in': Print using US Letter or ISO A4  
1072 media (whichever is available).

1073 Note: The semantics of the 'choice' prefix are documented in the PWG Media Standardized  
1074 Names v2.0 (MSN2) specification [PWG5101.1].

1075 **[7.3 media-col \(collection\)](#)**

1076 [This specification adds the "media-grain", "media-thickness", and "media-tooth" member](#)  
1077 [attributes to the "media-col" Job/Document Template attribute.](#)

1078 **[7.3.1 media-grain \(type2 keyword | name\(MAX\)\)](#)**

1079 [This member attribute specifies the desired grain of the media being specified \[ISO10175\].](#)  
1080 [Grain affects the curl and the folding of the media. Some marking engines are sensitive to](#)  
1081 [the resulting curl. Standard keyword values for "media-grain" include:](#)

1082 ['x-direction': The direction of the paper fibers is in the cross-feed direction of the](#)  
1083 [media.](#)

1084 ['y-direction': The direction of the paper fibers is in the feed direction of the media.](#)

1085 **[7.3.2 media-thickness \(integer\(1:MAX\)\)](#)**

1086 [This member attribute specifies the thickness of the media \[JDF\] in hundreds of millimeters](#)  
1087 [\(1/2540th of an inch\).](#)

1088 **[7.3.3 media-tooth \(type2 keyword | name\(MAX\)\)](#)**

1089 [This member attribute specifies the tooth \(or roughness\) of the media \[ISO10175\]. The tooth](#)  
1090 [is particularly important for marking engines that use pens \(e.g. plotters\) to mark the media](#)  
1091 [- the type of pen used matches the tooth of the media for best resolution.](#)

1092 [Standard keyword values for "media-tooth" include:](#)

1093 ['antique': Rougher than 'vellum' \[JDF\].](#)

1094 ['calendared': Extra smooth or polished, uncoated paper \[JDF\].](#)

1095 ['coarse': Rough finish.](#)

1096 ['fine': Smoother finish than 'smooth'.](#)

- 1097 ['linen': Finish like coarse woven cloth \[JDF\].](#)
- 1098 ['medium': Regular finish.](#)
- 1099 ['smooth': Smooth finish \[JDF\].](#)
- 1100 ['stipple': Fine pebble finish \[JDF\].](#)
- 1101 ['uncalendared': Rough, unpolished and uncoated papers \[JDF\].](#)
- 1102 ['vellum': Slightly rough surface \[JDF\].](#)

#### 1103 **7.4 pdl-override-supported (type2 keyword)**

1104 [This \*\*specification\*\* defines a new 'guaranteed' value for the "pdl-override-supported" \[STD92\]](#)  
1105 [Printer Description attribute. This value indicates that the Printer guarantees that:](#)

- 1106 [1. Document and/or Job Template attribute values take precedence over instructions of](#)  
1107 [any form embedded anywhere in the Document data;](#)
- 1108 [2. Document and/or Job Template attributes that have only a single supported value](#)  
1109 [take precedence over instructions of any form embedded anywhere in the Document](#)  
1110 [data, even if the attribute is not included in the Job or Document Creation request;](#)  
1111 [and](#)
- 1112 [3. No PDL instruction is performed that does not correspond to a current value in the](#)  
1113 [corresponding "xxx-supported" Printer Description attribute.](#)

1114 [If a Printer cannot honor the advertised "pdl-override-supported" value for a Job, it can abort](#)  
1115 [the Job, stop the Printer, hold the Job, or substitute a supported value. This choice can be](#)  
1116 [fixed by the implementation or configurable by the Administrator and can depend on the](#)  
1117 [Document and/or Job Template attribute.](#)

#### 1118 **7.5 which-jobs (type2 keyword)**

1119 [This specification adds the following new keyword values for the "which-jobs" operation](#)  
1120 [attribute \[STD92\]:](#)

- 1121 ['aborted': Any Job in the 'aborted' state.](#)
- 1122 ['all': All Jobs regardless of state.](#)
- 1123 ['canceled': Any Job in the 'canceled' state.](#)
- 1124 ['pending': Any Job in the 'pending' state.](#)
- 1125 ['pending-held': Any Job in the 'pending-held' state.](#)

**Commented [MS6]:** I've greatly simplified the original text from 5100.11 - I believe the simplified text honors the original semantics...

- 1126 ['processing': Any Job in the 'processing' state.](#)
- 1127 ['processing-stopped': Any Job in the 'processing-stopped' state.](#)
- 1128

1129 **8. New Status Codes**

1130 This section defines additional status code values.

1131 **8.1 server-error-too-many-jobs (0x050B)**

1132 The Client has attempted to create a Job using any of the Job Creation operations which  
1133 would exceed the capacity of the Printer. The Client can retry the unmodified request.

1134 **8.2 server-error-too-many-documents (0x050C)**

1135 The Client has attempted to create a Document using any of the Document Creation  
1136 operations which would exceed the capacity of the Printer for this Job. The Client can retry  
1137 the unmodified request.

1138 **9. Obsolete Attributes**

1139 **9.1 Obsolete Operation Attributes**

1140 [Table 1 lists the](#) operation attributes from the previous version of this specification  
1141 [PWG5100.7-2003] [which](#) are now obsolete.

1142 [Table 1 - Obsolete Operation Attributes](#)

Attribute	Notes
<a href="#">document-digital-signature (type2 keyword)</a>	Not usable
<a href="#">document-format-details (1setOf collection)</a>	Interoperability issues and privacy concerns
<a href="#">document-format-version (text(127))</a>	Interoperability issues

1143 **9.2 Obsolete Job Status Attributes**

1144 [Table 2 lists the](#) Job Status attributes from the previous version of this specification  
1145 [PWG5100.7-2003] [which](#) are now obsolete.

1146 [Table 2 - Obsolete Job Status Attributes](#)

Attribute	Notes
<a href="#">compression-supported (type2 keyword)</a>	Not usable
<a href="#">document-charset-supported (charset)</a>	Superseded by PWG 5100.5
<a href="#">document-digital-signature-supplied (type2 keyword)</a>	Obsolete parent attribute
<a href="#">document-format-details-supported (1setOf collection)</a>	Obsolete parent attribute
<a href="#">document-format-supplied (mimeMediaType)</a>	Superseded by PWG 5100.5
<a href="#">document-format-version-supplied (text(127))</a>	Obsolete parent attribute

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Attribute	Notes
<a href="#">document-message-supplied (text(MAX))</a>	<a href="#">Superseded by PWG 5100.5</a>
<a href="#">document-name-supplied</a>	<a href="#">Superseded by PWG 5100.5</a>
<a href="#">document-natural-language-supplied (naturalLanguage)</a>	<a href="#">Superseded by PWG 5100.5</a>
<a href="#">ipp-attribute-fidelity (boolean)</a>	<a href="#">Only used at time of creation</a>
<a href="#">job-copies-actual (integer(1:MAX))</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-cover-back-actual (collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-cover-front-actual (collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-actual (1setOf type2 enum)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-col-actual (1setOf collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-mandatory-attributes (1setOf keyword)</a>	<a href="#">Only used at time of creation</a>
<a href="#">output-device-actual (1setOf name(127))</a>	<a href="#">Redundant</a>

1153 **9.3 Obsolete Job Template Attributes**

1154 [Table 3](#) lists the Job Templates attributes from the previous version of this specification  
 1155 [PWG5100.7-2003] [which](#) are now obsolete.

1156 **[Table 3 - Obsolete Job Template Attributes](#)**

Attribute	Notes
<a href="#">job-copies (integer(1:MAX))</a>	<a href="#">Interoperability issues</a>
<a href="#">job-cover-back (collection)</a>	<a href="#">Interoperability issues</a>
<a href="#">job-cover-front (collection)</a>	<a href="#">Interoperability issues</a>
<a href="#">job-finishings (1setOf type2 enum)</a>	<a href="#">Interoperability issues</a>
<a href="#">job-finishings-col (1setOf collection)</a>	<a href="#">Interoperability issues</a>

1157 **9.4 Obsolete Printer Description Attributes**

1158 The following Printer Description attributes from the previous version of this specification  
 1159 [PWG5100.7-2003] [which](#) are now obsolete.

1160 **[Table 4 - Obsolete Printer Description Attributes](#)**

Attribute	Notes
<a href="#">document-digital-signature-default (type2 keyword)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">document-digital-signature-supported (1setOf type2 keyword)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">document-format-details-default (collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">document-format-details-supported (1setOf keyword)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">document-format-version-default (text(127))</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">document-format-version-supported (1setOf text(127))</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-copies-default (integer(1:MAX))</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-copies-supported (rangeOfInteger(1:MAX))</a>	<a href="#">Obsolete parent attribute</a>

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Attribute	Notes
<a href="#">job-cover-back-default (collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-cover-back-supported (1setOf keyword)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-cover-front-default (collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-cover-front-supported (1setOf keyword)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-col-default (1setOf collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-col-ready (1setOf collection)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-col-supported (1setOf keyword)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-default (1setOf type2 enum)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-ready (1setOf type2 enum)</a>	<a href="#">Obsolete parent attribute</a>
<a href="#">job-finishings-supported (1setOf type2 enum)</a>	<a href="#">Obsolete parent attribute</a>

1166 **10. Obsolete Values**

Deleted: ¶ ... [4]

1167 **10.1 Obsolete "job-state-reasons" Values**

1168 The ['digital-signature-type-not-supported'](#) and ['job-digital-signature-wait'](#) keyword values  
 1169 from the previous version of this specification [PWG5100.7-2003] are now obsolete [because](#)  
 1170 [the corresponding Job Template attribute is obsolete](#).

Deleted: following

Deleted: :

1171 **11. Conformance Requirements**

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

1172 **11.1 Printer Conformance Requirements**

Moved up [1]: Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-attributes ¶

1173 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1174 [1. The new operations defined in section 4;](#)
- 1175 [2. The operation attributes defined in 5.1;](#)
- 1176 3. The Job Status attributes defined in section 5.2 that correspond to any
- 1177 supported Job Template attributes defined in section 5.3;
- 1178 4. The Document Status attributes defined in section 5.2 that correspond to any
- 1179 supported Document Template attributes defined in section 5.3;
- 1180 [5. The Printer Description attributes defined in section 5.5 that correspond to any](#)
- 1181 [supported Document/Job Template attributes defined in section 5.3;](#)
- 1182 [6. The additional semantics defined in section 6;](#)
- 1183 7. The additional values defined in section 7;
- 1184 8. The internationalization considerations defined in section 12; and
- 1185 9. The security considerations defined in section 13.

1186 Printers that support the "job-mandatory-attributes" operation attribute (section 5.1.3) MUST  
 1187 also support the additional semantics defined in section 1.



1198 **11.2 Client Conformance Requirements**

1199 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1200 1. The internationalization considerations defined in section 12; and
- 1201 2. The security considerations defined in section 13.

1202 **12. Internationalization Considerations**

1203 For interoperability and basic support for multiple languages, conforming implementations  
1204 MUST support:

- 1205 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
- 1206 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1207 2. The Unicode Format for Network Interchange [RFC5198] which requires
- 1208 transmission of well-formed UTF-8 strings and recommends transmission of
- 1209 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1210 Unicode NFC is defined as the result of performing Canonical Decomposition (into base  
1211 characters and combining marks) followed by Canonical Composition (into canonical  
1212 composed characters wherever Unicode has assigned them).

1213 WARNING – Performing normalization on UTF-8 strings received from Clients and  
1214 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client  
1215 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now  
1216 'hidden').

1217 Implementations of this specification SHOULD conform to the following standards on  
1218 processing of human-readable Unicode text strings, see:

1219 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1220 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1221 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1222 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1223 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1224 Unicode Collation Algorithm [UTS10] – sorting

1225 Unicode Locale Data Markup Language [UTS35] – locale databases

1226 Implementations of this specification are advised to also review the following informational  
1227 documents on processing of human-readable Unicode text strings:

1228 Unicode Character Encoding Model [UTR17] – multi-layer character model

1229 Unicode Character Property Model [UTR23] – character properties

1230 Unicode Conformance Model [UTR33] – Unicode conformance basis

### 1231 **13. Security Considerations**

1232 The IPP extensions defined in this document require the same security considerations as  
1233 defined in the Internet Printing Protocol/1.1 [STD92].

1234 Implementations of this specification SHOULD conform to the following standard on  
1235 processing of human-readable Unicode text strings, see:

1236 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1237 Implementations of this specification are advised to also review the following informational  
1238 document on processing of human-readable Unicode text strings:

1239 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

### 1240 **14. IANA Considerations**

#### 1241 **14.1 Attribute Registrations**

1242 The attributes defined in this specification will be published by IANA according to the  
1243 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1244 <http://www.iana.org/assignments/ipp-registrations>

1245 The registry entries will contain the following information:

1246	Document Status attributes:	Reference
1247	-----	-----
1248	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1249	document-charset-supplied(obsolete) (charset)	[PWG5100.7]
1250	document-digital-signature-supplied(obsolete) (type2 keyword)	
1251		[PWG5100.7]
1252	document-format-details-supplied(obsolete) (1setOf collection)	
1253		[PWG5100.7]
1254	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1255	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1256	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1257	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1258	document-natural-language-supplied(obsolete) (naturalLanguage)	
1259		[PWG5100.7]
1260	errors-count (integer(0:MAX))	[PWG5100.7]
1261	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1262	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]

1263	warnings-count (integer(0:MAX))	[PWG5100.7]
1264		
1265	Document Template attributes:	Reference
1266	-----	-----
1267	output-device (name(127))	[PWG5100.7]
1268	print-content-optimize (type2 keyword)	[PWG5100.7]
1269		
1270	Job Status attributes:	Reference
1271	-----	-----
1272	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1273	document-charset-supplied(obsolete) (charset)	[PWG5100.7]
1274	document-digital-signature-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1275		[PWG5100.7]
1276	document-format-details-supplied(obsolete) (1setOf collection)	[PWG5100.7]
1277		[PWG5100.7]
1278	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1279	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1280	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1281	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1282	document-natural-language-supplied(obsolete) (naturalLanguage)	[PWG5100.7]
1283		[PWG5100.7]
1284	errors-count (integer(0:MAX))	[PWG5100.7]
1285	ipp-attribute-fidelity(obsolete) (boolean)	[PWG5100.7]
1286	job-copies-actual(obsolete) (integer(1:MAX))	[PWG5100.7]
1287	job-cover-back-actual(obsolete) (collection)	[PWG5100.7]
1288	job-cover-front-actual(obsolete) (collection)	[PWG5100.7]
1289	job-finishings-actual(obsolete) (1setOf type2 enum)	[PWG5100.7]
1290	job-finishings-col-actual(obsolete) (1setOf collection)	[PWG5100.7]
1291	job-mandatory-attributes(obsolete) (1setOf keyword)	[PWG5100.7]
1292	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1293	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1294	warnings-count (integer(0:MAX))	[PWG5100.7]
1295		
1296	Job Template attributes:	Reference
1297	-----	-----
1298	<a href="#">job-cancel-after (integer(0:MAX))</a>	[PWG5100.7]
1299	job-copies(obsolete) (integer(1:MAX))	[PWG5100.7]
1300	job-cover-back(obsolete) (collection)	[PWG5100.7]
1301	job-cover-front(obsolete) (collection)	[PWG5100.7]
1302	<a href="#">job-delay-output-until (type2 keyword   name(MAX))</a>	[PWG5100.7]
1303	<a href="#">job-delay-output-until-time (dateTime)</a>	[PWG5100.7]
1304	<a href="#">job-hold-until-time (dateTime)</a>	[PWG5100.7]
1305	job-finishings(obsolete) (1setOf type2 enum)	[PWG5100.7]
1306	job-finishings-col(obsolete) (1setOf collection)	[PWG5100.7]
1307	<a href="#">job-retain-until (type2 keyword   name(MAX))</a>	[PWG5100.7]
1308	<a href="#">job-retain-until-interval (integer(0:MAX))</a>	[PWG5100.7]
1309	<a href="#">job-retain-until-time (dateTime)</a>	[PWG5100.7]
1310	output-device (name(127))	[PWG5100.7]
1311	print-content-optimize (type2 keyword)	[PWG5100.7]
1312		
1313	Operation attributes:	Reference
1314	-----	-----
1315	document-digital-signature(obsolete) (type2 keyword)	[PWG5100.7]
1316	document-format-details(obsolete) (1setOf collection)	[PWG5100.7]
1317	document-format-version(obsolete) (text(127))	[PWG5100.7]
1318	<a href="#">job-hold-until-time (dateTime)</a>	[PWG5100.7]

1319	<a href="#">job-ids (1setOf integer(1:MAX))</a>	<a href="#">[PWG5100.7]</a>
1320	<a href="#">job-mandatory-attributes (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1321		
1322	Printer Description attributes:	Reference
1323	-----	-----
1324	<a href="#">document-charset-default (charset)</a>	<a href="#">[PWG5100.7]</a>
1325	<a href="#">document-charset-supported (1setOf charset)</a>	<a href="#">[PWG5100.7]</a>
1326	<a href="#">document-digital-signature-default (obsolete) (type2 keyword)</a>	
1327		<a href="#">[PWG5100.7]</a>
1328	<a href="#">document-digital-signature-supported (obsolete) (1setOf type2 keyword)</a>	
1329		<a href="#">[PWG5100.7]</a>
1330	<a href="#">document-format-details-default (obsolete) (collection)</a>	<a href="#">[PWG5100.7]</a>
1331	<a href="#">document-format-details-supported (obsolete) (1setOf keyword)</a>	
1332		<a href="#">[PWG5100.7]</a>
1333	<a href="#">document-format-version-default (obsolete) (text(127))</a>	<a href="#">[PWG5100.7]</a>
1334	<a href="#">document-format-version-supported (obsolete) (1setOf text(127))</a>	
1335		<a href="#">[PWG5100.7]</a>
1336	<a href="#">document-natural-language-default (naturalLanguage)</a>	<a href="#">[PWG5100.7]</a>
1337	<a href="#">document-natural-language-supported (1setOf naturalLanguage)</a>	
1338		<a href="#">[PWG5100.7]</a>
1339	<a href="#">job-cancel-after-default (integer(0:MAX)   no-value)</a>	<a href="#">[PWG5100.7]</a>
1340	<a href="#">job-cancel-after-supported (rangeOfInteger(0:MAX))</a>	<a href="#">[PWG5100.7]</a>
1341	<a href="#">job-copies-default (obsolete) (integer(1:MAX))</a>	<a href="#">[PWG5100.7]</a>
1342	<a href="#">job-copies-supported (obsolete) (rangeOfInteger(1:MAX))</a>	<a href="#">[PWG5100.7]</a>
1343	<a href="#">job-cover-back-default (obsolete) (collection)</a>	<a href="#">[PWG5100.7]</a>
1344	<a href="#">job-cover-back-supported (obsolete) (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1345	<a href="#">job-cover-front-default (obsolete) (collection)</a>	<a href="#">[PWG5100.7]</a>
1346	<a href="#">job-cover-front-supported (obsolete) (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1347	<a href="#">job-creation-attributes-supported (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1348	<a href="#">job-delay-output-until-default (type2 keyword   name(MAX))</a>	<a href="#">[PWG5100.7]</a>
1349	<a href="#">job-delay-output-until-interval-supported (rangeOfInteger(0:MAX))</a>	
1350		<a href="#">[PWG5100.7]</a>
1351	<a href="#">job-delay-output-until-supported (1setOf (type2 keyword   name(MAX)))</a>	
1352		<a href="#">[PWG5100.7]</a>
1353	<a href="#">job-delay-output-until-time-supported (rangeOfInteger(0:MAX))</a>	
1354		<a href="#">[PWG5100.7]</a>
1355	<a href="#">job-finishings-col-default (obsolete) (1setOf collection)</a>	<a href="#">[PWG5100.7]</a>
1356	<a href="#">job-finishings-col-ready (obsolete) (1setOf collection)</a>	<a href="#">[PWG5100.7]</a>
1357	<a href="#">job-finishings-col-supported (obsolete) (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1358	<a href="#">job-finishings-default (obsolete) (1setOf type2 enum)</a>	<a href="#">[PWG5100.7]</a>
1359	<a href="#">job-finishings-ready (obsolete) (1setOf type2 enum)</a>	<a href="#">[PWG5100.7]</a>
1360	<a href="#">job-finishings-supported (obsolete) (1setOf type2 enum)</a>	<a href="#">[PWG5100.7]</a>
1361	<a href="#">job-history-attributes-configured (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1362	<a href="#">job-history-attributes-supported (1setOf keyword)</a>	<a href="#">[PWG5100.7]</a>
1363	<a href="#">job-history-interval-configured (integer(0:MAX))</a>	<a href="#">[PWG5100.7]</a>
1364	<a href="#">job-history-interval-supported (rangeOfInteger(0:MAX))</a>	<a href="#">[PWG5100.7]</a>
1365	<a href="#">job-ids-supported (boolean)</a>	<a href="#">[PWG5100.7]</a>
1366	<a href="#">job-mandatory-attributes-supported (boolean)</a>	<a href="#">[PWG5100.7]</a>
1367	<a href="#">job-retain-until-default (type2 keyword   name(MAX))</a>	<a href="#">[PWG5100.7]</a>
1368	<a href="#">job-retain-until-interval-supported (rangeOfInteger(0:MAX))</a>	<a href="#">[PWG5100.7]</a>
1369	<a href="#">job-retain-until-supported (1setOf (type2 keyword   name(MAX)))</a>	
1370		<a href="#">[PWG5100.7]</a>
1371	<a href="#">job-retain-until-time-supported (rangeOfInteger(0:MAX))</a>	<a href="#">[PWG5100.7]</a>
1372	<a href="#">job-spooling-supported (type2 keyword)</a>	<a href="#">[PWG5100.7]</a>
1373	<a href="#">media-col-database (1setOf collection)</a>	<a href="#">[PWG5100.7]</a>
1374	<a href="#">output-device-supported (1setOf name(127))</a>	<a href="#">[PWG5100.7]</a>

1375	<code>print-content-optimize-default</code> (type2 keyword)	[PWG5100.7]
1376	<code>print-content-optimize-supported</code> (1setOf type2 keyword)	[PWG5100.7]
1377	<code>which-jobs-supported</code> (1setOf type2 keyword)	[PWG5100.7]
1378		
1379	<u>Printer Status attributes:</u>	<u>Reference</u>
1380	-----	-----
1381	<code>printer-detailed-status-messages</code> (1setOf text(MAX))	[PWG5100.7]

## 1382 14.2 Attribute Keyword Value Registrations

1383 The keyword values defined in this specification will be published by IANA according to the  
 1384 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1385 <http://www.iana.org/assignments/ipp-registrations>

1386 The registry entries will contain the following information:

1387	Attributes (attribute syntax)	
1388	Keyword Attribute Value	Reference
1389	-----	-----
1390	<code>job-delay-output-until</code> (type2 keyword   name(MAX))	[PWG5100.7]
1391	<code>day-time</code>	[PWG5100.7]
1392	<code>evening</code>	[PWG5100.7]
1393	<code>indefinite</code>	[PWG5100.7]
1394	<code>night</code>	[PWG5100.7]
1395	<code>no-delay-output</code>	[PWG5100.7]
1396	<code>second-shift</code>	[PWG5100.7]
1397	<code>third-shift</code>	[PWG5100.7]
1398	<code>weekend</code>	[PWG5100.7]
1399	<code>job-delay-output-until-default</code> (type2 keyword   name(MAX))	[PWG5100.7]
1400	<Any "job-delay-output-until" value>	[PWG5100.7]
1401	<code>job-delay-output-until-supported</code> (1setOf (type2 keyword   name(MAX)))	[PWG5100.7]
1402	<Any "job-delay-output-until" value>	[PWG5100.7]
1403		
1404		
1405	<code>job-retain-until</code> (type2 keyword   name(MAX))	[PWG5100.7]
1406	<code>end-of-day</code>	[PWG5100.7]
1407	<code>end-of-month</code>	[PWG5100.7]
1408	<code>end-of-week</code>	[PWG5100.7]
1409	<code>indefinite</code>	[PWG5100.7]
1410	<code>none</code>	[PWG5100.7]
1411	<code>job-retain-until-default</code> (type2 keyword   name(MAX))	[PWG5100.7]
1412	<Any "job-retain-until" value>	[PWG5100.7]
1413	<code>job-retain-until-supported</code> (1setOf (type2 keyword   name(MAX)))	[PWG5100.7]
1414	<Any "job-retain-until" value>	[PWG5100.7]
1415		
1416		
1417	<code>job-state-reasons</code> (1setOf type2 keyword)	[RFC8011]
1418	<code>digital-signature-did-not-verify</code>	[PWG5100.7]
1419	<code>digital-signature-type-not-supported</code> (obsolete)	[PWG5100.7]
1420	<code>errors-detected</code>	[PWG5100.7]
1421	<code>job-delay-output-until-specified</code>	[PWG5100.7]
1422	<code>job-digital-signature-wait</code> (obsolete)	[PWG5100.7]
1423	<code>warnings-detected</code>	[PWG5100.7]

1424		
1425	media (type2 keyword   name(MAX))	[RFC8011]
1426	choice_iso_a4_210x297mm_na_letter_8.5x11in	[PWG5100.7]
1427		
1428	<u>pdl-override-supported (type2 keyword)</u>	<u>[RFC8011]</u>
1429	<u>guaranteed</u>	<u>[PWG5100.7]</u>
1430		
1431	print-content-optimize (type2 keyword)	[PWG5100.7]
1432	graphics	[PWG5100.7]
1433	photo	[PWG5100.7]
1434	text	[PWG5100.7]
1435	text-and-graphics	[PWG5100.7]
1436	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1437	<Any "print-content-optimize" value>	[PWG5100.7]
1438	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1439	<Any "print-content-optimize" value>	[PWG5100.7]
1440	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1441	<Any "print-content-optimize" value>	[PWG5100.7]
1442		
1443	<u>which-jobs (type2 keyword)</u>	<u>[RFC8011]</u>
1444	<u>aborted</u>	<u>[PWG5100.7]</u>
1445	<u>all</u>	<u>[PWG5100.7]</u>
1446	<u>canceled</u>	<u>[PWG5100.7]</u>
1447	<u>pending</u>	<u>[PWG5100.7]</u>
1448	<u>pending-held</u>	<u>[PWG5100.7]</u>
1449	<u>processing</u>	<u>[PWG5100.7]</u>
1450	<u>processing-stopped</u>	<u>[PWG5100.7]</u>

### 1451 **14.3 Type2 enum Registrations**

1452 The attributes defined in this specification will be published by IANA according to the  
 1453 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1454 <http://www.iana.org/assignments/ipp-registrations>

1455 The registry entries will contain the following information:

1456	<u>Attributes (attribute syntax)</u>		
1457	<u>Enum Value</u>	<u>Enum Symbolic Name</u>	<u>Reference</u>
1458	<u>-----</u>	<u>-----</u>	<u>-----</u>
1459	<u>operations-supported (1setOf type2 enum)</u>		<u>[RFC8011]</u>
1460	<u>0x0038</u>	<u>Cancel-Jobs</u>	<u>[PWG5100.7]</u>
1461	<u>0x0039</u>	<u>Cancel-My-Jobs</u>	<u>[PWG5100.7]</u>
1462	<u>0x003A</u>	<u>Close-Job</u>	<u>[PWG5100.7]</u>
1463	<u>0x003B</u>	<u>Resubmit-Job</u>	<u>[PWG5100.7]</u>

### 1464 **14.4 Operation Registrations**

1465 The operations defined in this specification will be published by IANA according to the  
 1466 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1467 <http://www.iana.org/assignments/ipp-registrations>

1468 The registry entries will contain the following information:

1469	Operation Name	Reference
1470	-----	-----
1471	<a href="#">Cancel-Jobs</a>	[PWG5100.7]
1472	<a href="#">Cancel-My-Jobs</a>	[PWG5100.7]
1473	<a href="#">Close-Job</a>	[PWG5100.7]
1474	Create-Job (Extension)	[PWG5100.7]
1475	<a href="#">Hold-Job (Extension)</a>	[PWG5100.7]
1476	Print-Job (Extension)	[PWG5100.7]
1477	Print-URI (Extension)	[PWG5100.7]
1478	<a href="#">Resubmit-Job</a>	[PWG5100.7]
1479	Send-Document (Extension)	[PWG5100.7]
1480	Send-URI (Extension)	[PWG5100.7]
1481	<a href="#">Set-Job-Attributes (Extension)</a>	[PWG5100.7]
1482	Validate-Job (Extension)	[PWG5100.7]

## 1483 14.5 Status Code Registrations

1484 The status codes defined in this specification will be published by IANA according to the  
1485 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1486 <http://www.iana.org/assignments/ipp-registrations>

1487 The registry entries will contain the following information:

1488	Value	Status Code Name	Reference
1489	-----	-----	-----
1490	0x0500:0x05FF	- Server Error:	
1491	0x050B	server-error-too-many-jobs	[PWG5100.7]
1492	0x050C	server-error-too-many-documents	[PWG5100.7]

1493

## 1494 15. Overview of Changes

### 1495 15.1 IPP Job Extensions v1.1

1496 The following changes were made to the previous version of this specification [PWG5100.7-  
1497 2003]:

- 1498 • A rationale section was added, including use cases, exceptions, and requirements;
- 1499 • References now point to the current versions of dependent documents and  
1500 specifications at the time of publication;
- 1501 • Read-only attributes are now defined and registered as status attributes;
- 1502 • A RECOMMENDED "job-mandatory-attributes-supported" Printer Description  
1503 attribute has been added [to indicate support for the "job-mandatory-attributes" Job](#)  
1504 [Template attribute](#);
- 1505 • The "job-hold-until-time" and "job-ids" operation attributes were moved from the  
1506 [OBSOLETE IPP Job and Printer Extensions - Set 3 \[PWG5100.11-2010\]](#)  
1507 [specification](#);
- 1508 • The "job-delay-output-until", "job-delay-output-until-time", and "job-hold-until-time"  
1509 [Job Template attributes were moved from the OBSOLETE IPP Job and Printer](#)  
1510 [Extensions - Set 3 \[PWG5100.11-2010\] specification](#);
- 1511 • The "job-creation-attributes-supported", "job-spooling-supported", "media-col-  
1512 [database", "printer-detailed-status-messages", and "which-jobs-supported" Printer](#)  
1513 [attributes were moved from the OBSOLETE IPP Job and Printer Extensions - Set 3](#)  
1514 [\[PWG5100.11-2010\] specification](#);
- 1515 • The "media-grain", "media-thickness", and "media-tooth" member attributes of the  
1516 ["media-col" Document/Job Template attribute were moved from the OBSOLETE IPP](#)  
1517 [Job and Printer Extensions - Set 3 \[PWG5100.11-2010\] specification](#);
- 1518 • RECOMMENDED "job-retain-until", "job-retain-until-interval", and "job-retain-until-  
1519 [time" Job Template attributes were added to control the Job Retention phase of a](#)  
1520 [Job's lifecycle](#);
- 1521 • RECOMMENDED "job-history-attributes-configured", "job-history-attributes-  
1522 [supported", "job-history-interval-configured", and "job-history-interval-supported"](#)  
1523 [Printer Description attributes were added to control the Job History phase of a Job's](#)  
1524 [lifecycle](#);
- 1525 • The "document-charset" operation attribute and corresponding operation semantics  
1526 are now defined in PWG 5100.5: IPP Document Object v1.1;



- 1527 • The "document-digital-signature" operation attribute and corresponding Document  
1528 Status, Job Status, and Printer Description attributes have been made obsolete  
1529 [because of interoperability issues](#);
- 1530 • The "document-format-details" operation attribute and corresponding Document  
1531 Status, Job Status, and Printer Description attributes have been made obsolete  
1532 [because of interoperability issues and privacy concerns](#);
- 1533 • The "document-format-version" operation attribute and corresponding Document  
1534 Status, Job Status, and Printer Description attributes have been made obsolete  
1535 [because of interoperability issues](#);
- 1536 • The "job-copies" Job Template attribute and corresponding Job Status and Printer  
1537 Description attributes have been made obsolete [because of interoperability issues](#);
- 1538 • The "job-cover-back" Job Template attribute and corresponding Job Status and  
1539 Printer Description attributes have been made obsolete [because of interoperability](#)  
1540 [issues](#);
- 1541 • The "job-cover-front" Job Template attribute and corresponding Job Status and  
1542 Printer Description attributes have been made obsolete [because of interoperability](#)  
1543 [issues](#);
- 1544 • The "job-finishings" Job Template attribute and corresponding Job Status and Printer  
1545 Description attributes have been made obsolete [because of interoperability issues](#);
- 1546 • The "job-finishings-col" Job Template attribute and corresponding Job Status and  
1547 Printer Description attributes have been made obsolete [because of interoperability](#)  
1548 [issues](#); and
- 1549 • The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' values for  
1550 the "job-state-reasons" attribute have been made obsolete [because of interoperability](#)  
1551 [issues](#).

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1632 To subscribe, see the PWG web page:

1633 <http://www.pwg.org/>

1634 Implementers of this specification document are encouraged to join the IPP Mailing List in  
1635 order to participate in any discussions of clarification issues and review of registration  
1636 proposals for additional attributes and values.

1637 The editors would like to especially thank the following individuals who also contributed  
1638 significantly to the development of this document:

1639 Tom Hastings (author of v1.0)  
1640 Peter Zehler (author of v1.0)  
1641

1642 **18. Change History**

1643 **[18.1 March 8, 2019](#)**

- 1644 • [Status: Prototype](#)
- 1645 • [Abstract: Reworded for updated scope](#)
- 1646 • [Section 1: Reworded for updated scope, added discussion of obsolete JPS2 bits](#)  
1647 [moving here](#)
- 1648 • [Section 2.1: Added definitions of OBSOLETE and DEPRECATED](#)
- 1649 • [Section 3: Added rationale, use cases, and design requirements for attributes and](#)  
1650 [operations from JPS2.](#)
- 1651 • [New section 4 for operations from JPS2](#)
- 1652 • [Section 5: Made most attributes RECOMMENDED, added job-creation-attributes-](#)  
1653 [supported, job-delay-output-until-xxx, job-history-xxx, job-hold-until-time, job-ids, job-](#)  
1654 [spooling-supported, media-col-database, printer-detail-status-messages from JPS2](#)
- 1655 • [Section 5: Added new job-history-xxx and job-retain-until-xxx attributes](#)
- 1656 • [New section 6 for additional semantics \(imported from JPS2\)](#)
- 1657 • [Section 7: Added pdl-override-supported, which-jobs values, media-col member](#)  
1658 [attributes.](#)

1659 **18.2 October 23, 2018**

- 1660 • Status: Interim
- 1661 • Updated references to the first version of 5100.7 to include year and exclude the full  
1662 name.
- 1663 • Abstract and intro: Clarified that this specification is defining attributes and values.
- 1664 • Editorial changes
- 1665 • Added reference to the MSN2 spec.

1666 **18.3 September 26, 2018**

- 1667 • Brought back the job-mandatory-attributes operation attribute, which is still needed.

- 1668 • Added a rationale, use case, and design requirement for selective fidelity/job-  
1669 mandatory-attributes.
  - 1670 • Added Additional Semantics and Operation Registrations sections for using job-  
1671 mandatory-attributes with job creation/validation operations.
  - 1672 • Added Additional Semantics and Operation Registrations sections for returning the  
1673 too-many-jobs/documents status codes.
- 1674 **18.4 September 25, 2018**
- 1675 Initial revision.

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<b>Page 40: [4] Deleted</b>	<b>Michael Sweet</b>	<b>3/8/19 3:28:00 PM</b>
<b>Page 40: [5] Deleted</b>	<b>Michael Sweet</b>	<b>3/8/19 3:28:00 PM</b>