



The Printer Working Group

March 8, 2019
Working Draft

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

**IPP Job Extensions v1.1
(JOBEXT)**

Status: Prototype

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

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

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

This specification is available electronically at:

<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippjobext11-20190308.docx>
<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippjobext11-20190308.pdf>

23 Copyright © 2003-2019 The Printer Working Group. All rights reserved.

24 This document may be copied and furnished to others, and derivative works that comment
25 on, or otherwise explain it or assist in its implementation may be prepared, copied, published
26 and distributed, in whole or in part, without restriction of any kind, provided that the above
27 copyright notice, this paragraph and the title of the Document as referenced below are
28 included on all such copies and derivative works. However, this document itself may not be
29 modified in any way, such as by removing the copyright notice or references to the IEEE-
30 ISTO and the Printer Working Group, a program of the IEEE-ISTO.

31 Title: *IPP Job Extensions v1.1 (JOBEXT)*

32 The IEEE-ISTO and the Printer Working Group DISCLAIM ANY AND ALL WARRANTIES,
33 WHETHER EXPRESS OR IMPLIED INCLUDING (WITHOUT LIMITATION) ANY IMPLIED
34 WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

35 The Printer Working Group, a program of the IEEE-ISTO, reserves the right to make
36 changes to the document without further notice. The document may be updated, replaced
37 or made obsolete by other documents at any time.

38 The IEEE-ISTO takes no position regarding the validity or scope of any intellectual property
39 or other rights that might be claimed to pertain to the implementation or use of the technology
40 described in this document or the extent to which any license under such rights might or
41 might not be available; neither does it represent that it has made any effort to identify any
42 such rights.

43 The IEEE-ISTO invites any interested party to bring to its attention any copyrights, patents,
44 or patent applications, or other proprietary rights which may cover technology that may be
45 required to implement the contents of this document. The IEEE-ISTO and its programs shall
46 not be responsible for identifying patents for which a license may be required by a document
47 and/or IEEE-ISTO Industry Group Standard or for conducting inquiries into the legal validity
48 or scope of those patents that are brought to its attention. Inquiries may be submitted to the
49 IEEE-ISTO by e-mail at: ieee-isto@ieee.org.

50 The Printer Working Group acknowledges that the IEEE-ISTO (acting itself or through its
51 designees) is, and shall at all times be the sole entity that may authorize the use of
52 certification marks, trademarks, or other special designations to indicate compliance with
53 these materials.

54 Use of this document is wholly voluntary. The existence of this document does not imply that
55 there are no other ways to produce, test, measure, purchase, market, or provide other goods
56 and services related to its scope.

57

58 **About the IEEE-ISTO**

59 The IEEE-ISTO is a not-for-profit corporation offering industry groups an innovative and
60 flexible operational forum and support services. The IEEE-ISTO provides a forum not only
61 to develop standards, but also to facilitate activities that support the implementation and
62 acceptance of standards in the marketplace. The organization is affiliated with the IEEE
63 (<http://www.ieee.org/>) and the IEEE Standards Association (<http://standards.ieee.org/>).

64 For additional information regarding the IEEE-ISTO and its industry programs visit:

65 <http://www.ieee-isto.org>

66 **About the IEEE-ISTO PWG**

67 The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and
68 Technology Organization (ISTO) with member organizations including printer
69 manufacturers, print server developers, operating system providers, network operating
70 system providers, network connectivity vendors, and print management application
71 developers. The PWG is chartered to make printers and the applications and operating
72 systems supporting them work together better. All references to the PWG in this document
73 implicitly mean “The Printer Working Group, a Program of the IEEE ISTO.”

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

80 For additional information regarding the Printer Working Group visit:

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

82 Contact information:

83 The Printer Working Group
84 c/o The IEEE Industry Standards and Technology Organization
85 445 Hoes Lane
86 Piscataway, NJ 08854
87 USA
88

Table of Contents

89		
90	1. Introduction	9
91	1.1 Document Natural Language and Character Set	9
92	1.2 Attribute Fidelity	9
93	1.3 Rendering Optimizations	9
94	1.4 Printing on a Specific Output Device	9
95	1.5 Results of Job/Document Processing	9
96	1.6 Job Scheduling and Lifecycle	10
97	1.7 Job Operations	10
98	1.8 Obsolete Attributes and Values	10
99	2. Terminology	11
100	2.1 Conformance Terminology	11
101	2.2 Printing Terminology	11
102	2.3 Protocol Role Terminology	11
103	2.4 Other Terminology	12
104	2.5 Acronyms and Organizations	12
105	3. Requirements	13
106	3.1 Rationale	13
107	3.2 Use Cases	13
108	3.2.1 Print a Plain Text File	13
109	3.2.2 Print a Document Using a Matching Size	13
110	3.2.3 Force a Document to Print on a Specific Media Size	13
111	3.2.4 Print a Presentation with Best Quality	14
112	3.2.5 Print Using a Specific Output Device	14
113	3.2.6 Monitor Whether Jobs are Printed Correctly	14
114	3.2.7 Hold a Job Until a Specific Date and Time	14
115	3.2.8 Delay Output Until a Specific Time Period	14
116	3.2.9 Submit a Variable Number of Documents in a Job	14
117	3.2.10 Cancel a Job After a Specific Time Period	14
118	3.2.11 Cancel Multiple Jobs	14
119	3.2.12 Resubmit a Job	15
120	3.2.13 Retain Jobs for a Specific Time Period	15
121	3.2.14 Keep Job History Information for a Specific Time Period	15
122	3.3 Exceptions	15
123	3.3.1 Too Many Jobs on a Printer	15
124	3.3.2 Too Many Documents in a Job	15
125	3.4 Out of Scope	15
126	3.5 Design Requirements	15
127	4. New Operations	17
128	4.1 Cancel-Jobs	17
129	4.1.1 Cancel-Jobs Request	17
130	4.1.2 Cancel-Jobs Response	18
131	4.2 Cancel-My-Jobs	18
132	4.2.1 Cancel-My-Jobs Request	18
133	4.2.2 Cancel-My-Jobs Response	19
134	4.3 Close-Job	19

135	4.3.1 Close-Job Request	20
136	4.3.2 Close-Job Response.....	20
137	4.4 Resubmit-Job	21
138	4.4.1 Resubmit-Job Request	22
139	4.4.2 Resubmit-Job Response.....	22
140	5. Attributes	24
141	5.1 Operation Attributes.....	24
142	5.1.1 job-hold-until-time (dateTime).....	24
143	5.1.2 job-ids (1setOf integer(1:MAX)).....	24
144	5.1.3 job-mandatory-attributes (1setOf keyword).....	24
145	5.2 Document and Job Status Attributes	24
146	5.2.1 errors-count (integer(0:MAX)).....	24
147	5.2.2 print-content-optimize-actual (1setOf type2 keyword)	25
148	5.2.3 warnings-count (integer(0:MAX)).....	25
149	5.3 Document and Job Template Attributes	25
150	5.3.1 output-device (name(127)).....	25
151	5.3.2 print-content-optimize (type2 keyword).....	25
152	5.4 Job Template Attributes.....	25
153	5.4.1 job-cancel-after (integer(0:MAX)).....	25
154	5.4.2 job-delay-output-until (type2 keyword name(MAX)).....	25
155	5.4.3 job-delay-output-until-time (dateTime)	26
156	5.4.4 job-hold-until-time (dateTime)	27
157	5.4.5 job-retain-until (type2 keyword name(MAX))	27
158	5.4.6 job-retain-until-interval (integer(0:MAX)).....	27
159	5.4.7 job-retain-until-time (dateTime).....	27
160	5.5 Printer Description Attributes.....	28
161	5.5.1 document-charset-default (charset)	28
162	5.5.2 document-charset-supported (1setOf charset)	28
163	5.5.3 document-natural-language-default (naturalLanguage).....	28
164	5.5.4 document-natural-language-supported (1setOf naturalLanguage).....	28
165	5.5.5 job-cancel-after-default (integer(0:MAX) no-value)	28
166	5.5.6 job-cancel-after-supported (rangeOfInteger(0:MAX))	28
167	5.5.7 job-creation-attributes-supported (1setOf keyword).....	28
168	5.5.8 job-delay-output-until-default (type2 keyword name(MAX)).....	29
169	5.5.9 job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	29
170	5.5.10 job-delay-output-until-time-supported (rangeOfInteger(0:MAX))	29
171	5.5.11 job-history-attributes-configured (1setOf keyword)	29
172	5.5.12 job-history-attributes-supported (1setOf keyword).....	29
173	5.5.13 job-history-interval-configured (integer(0:MAX)).....	29
174	5.5.14 job-history-interval-supported (rangeOfInteger(0:MAX)).....	29
175	5.5.15 job-ids-supported (boolean)	30
176	5.5.16 job-mandatory-attributes-supported (boolean).....	30
177	5.5.17 job-retain-until-default (type2 keyword name(MAX))	30
178	5.5.18 job-retain-until-interval-default (integer(0:MAX) no-value)	30
179	5.5.19 job-retain-until-interval-supported (rangeOfInteger(0:MAX))	30
180	5.5.20 job-retain-until-supported (1setOf (type2 keyword name(MAX)))	30

181	5.5.21 job-retain-until-time-supported (rangeOfInteger(0:MAX))	30
182	5.5.22 job-spooling-supported (type2 keyword)	30
183	5.5.23 media-col-database (1setOf collection)	31
184	5.5.24 output-device-supported (1setOf name(127))	32
185	5.5.25 print-content-optimize-default (type2 keyword)	32
186	5.5.26 print-content-optimize-supported (1setOf type2 keyword)	32
187	5.5.27 which-jobs-supported (1setOf type2 keyword)	32
188	5.6 Printer Status Attributes	32
189	5.6.1 printer-detailed-status-messages (1setOf text(MAX))	32
190	6. Additional Semantics for Existing Operations	33
191	6.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-attributes	33
192	6.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status Code	33
193	6.3 Get-Jobs Operation: "job-ids (1setOf integer(1:MAX))"	33
194	6.4 Hold-Job Operation: "job-hold-until-time (dateTime)"	33
195	6.5 Print-Job, Print-URI, Send-Document, Send-URI: server-error-too-many-documents	
196	Status Code	34
197	6.6 Set-Job-Attributes Operation: "job-hold-until-time (dateTime)"	34
198	7. Additional Values for Existing Attributes	34
199	7.1 job-state-reasons (1setOf type2 keyword)	34
200	7.2 media (type2 keyword name(MAX))	35
201	7.3 media-col (collection)	35
202	7.3.1 media-grain (type2 keyword name(MAX))	35
203	7.3.2 media-thickness (integer(1:MAX))	35
204	7.3.3 media-tooth (type2 keyword name(MAX))	35
205	7.4 pdl-override-supported (type2 keyword)	36
206	7.5 which-jobs (type2 keyword)	36
207	8. New Status Codes	38
208	8.1 server-error-too-many-jobs (0x050B)	38
209	8.2 server-error-too-many-documents (0x050C)	38
210	9. Obsolete Attributes	38
211	9.1 Obsolete Operation Attributes	38
212	9.2 Obsolete Job Status Attributes	38
213	9.3 Obsolete Job Template Attributes	39
214	9.4 Obsolete Printer Description Attributes	39
215	10. Obsolete Values	40
216	10.1 Obsolete "job-state-reasons" Values	40
217	11. Conformance Requirements	40
218	11.1 Printer Conformance Requirements	40
219	11.2 Client Conformance Requirements	41
220	12. Internationalization Considerations	41
221	13. Security Considerations	42
222	14. IANA Considerations	42
223	14.1 Attribute Registrations	42
224	14.2 Attribute Keyword Value Registrations	45
225	14.3 Type2 enum Registrations	46
226	14.4 Operation Registrations	46

227 14.5 Status Code Registrations..... 47
228 15. Overview of Changes..... 48
229 15.1 IPP Job Extensions v1.1..... 48
230 16. References..... 49
231 16.1 Normative References..... 49
232 16.2 Informative References 51
233 17. Author's Address 52
234 18. Change History 53
235 18.1 March 8, 2019..... 53
236 18.2 October 23, 2018..... 53
237 18.3 September 26, 2018..... 53
238 18.4 September 25, 2018..... 54

List of Tables

240
241 Table 1 - Obsolete Operation Attributes..... 38
242 Table 2 - Obsolete Job Status Attributes 38
243 Table 3 - Obsolete Job Template AttributesTable 2..... 39
244 Table 4 - Obsolete Printer Description Attributes..... 39
245
246

247

248 **1. Introduction**

249 This specification extends the Job management, monitoring, and processing capabilities of
250 IPP. This specification obsoletes portions of the previous version of this specification
251 [PWG5100.7-2003] - a list of changes can be found in section 15. This specification also
252 incorporates the relevant portions of the obsolete IPP Job and Printer Extensions - Set 2
253 [PWG5100.11-2010] specification.

254 **1.1 Document Natural Language and Character Set**

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

262 **1.2 Attribute Fidelity**

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

267 **1.3 Rendering Optimizations**

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

273 **1.4 Printing on a Specific Output Device**

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

277 **1.5 Results of Job/Document Processing**

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

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

282 **1.6 Job Scheduling and Lifecycle**

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

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

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

294 **1.7 Job Operations**

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

- 297 • Cancel all Jobs on a given Printer;
- 298 • Cancel all Jobs owned by a User on a given Printer;
- 299 • Close a Job in the 'pending' state that is still open for additional Document
300 submissions; and
- 301 • Resubmit an existing Job for processing as a new Job, potentially with different Job
302 Template attributes and values.

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

305 **1.8 Obsolete Attributes and Values**

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

309 **2. Terminology**

310 **2.1 Conformance Terminology**

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

316 The term DEPRECATED is used for previously defined and approved protocol elements that
317 SHOULD NOT be used or implemented. The term OBSOLETE is used for previously
318 defined and approved protocol elements that MUST NOT be used or implemented.

319 **2.2 Printing Terminology**

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

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

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

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

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

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

332 **2.3 Protocol Role Terminology**

333 This document also defines the following protocol roles to specify unambiguous
334 conformance requirements:

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

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

340 **2.4 Other Terminology**

341 *Document Creation Operation*: operations that accept Document Content. Specifically:
342 Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are
343 both Job Creation and Document Creation operations.

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

346 *Job Attribute*: an Operation attribute or a Job Template attribute that applies to the Job
347 (object) as a whole. For example, “job-name” is an Operation attribute and “job-priority” is
348 a Job Template attribute.

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

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

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

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

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

365 **2.5 Acronyms and Organizations**

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

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

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

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

370 **3. Requirements**

371 **3.1 Rationale**

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

- 376 1. Define attributes and values that specify the Document character set and
377 rendering optimizations;
- 378 2. Define an attribute for doing selective fidelity enforcement;
- 379 3. Define a media size for automatically printing Documents on the correct size;
- 380 4. Define attributes and values that allow a Client to discover the results of
381 Document processing;
- 382 5. Define attributes for delaying the output from a Job until a specified time period;
- 383 6. Define attributes for holding a Job until a specified date and time;
- 384 7. Define attributes for retaining a Job for a specified time period;
- 385 8. Define attributes for configuring the Job history attributes and time period;
- 386 9. Define attributes for automatically canceling a Job after a specified time period;
- 387 10. Define operations for managing one or more Jobs; and
- 388 11. Define values that allow a Client to monitor specific groups of Jobs.

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

391 **3.2 Use Cases**

392 **3.2.1 Print a Plain Text File**

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

396 **3.2.2 Print a Document Using a Matching Size**

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

400 **3.2.3 Force a Document to Print on a Specific Media Size**

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

404 3.2.4 Print a Presentation with Best Quality

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

407 3.2.5 Print Using a Specific Output Device

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

411 3.2.6 Monitor Whether Jobs are Printed Correctly

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

415 3.2.7 Hold a Job Until a Specific Date and Time

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

418 3.2.8 Delay Output Until a Specific Time Period

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

421 3.2.9 Submit a Variable Number of Documents in a Job

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

426 3.2.10 Cancel a Job After a Specific Time Period

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

430 3.2.11 Cancel Multiple Jobs

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

434 3.2.12 Resubmit a Job

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

439 3.2.13 Retain Jobs for a Specific Time Period

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

443 3.2.14 Keep Job History Information for a Specific Time Period

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

447 3.3 Exceptions**448 3.3.1 Too Many Jobs on a Printer**

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

451 3.3.2 Too Many Documents in a Job

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

454 3.4 Out of Scope

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

- 456 1. Definition of new file formats; and
- 457 2. Definition of new protocol bindings.

458 3.5 Design Requirements

459 The design requirements for this specification are:

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

- 464 4. Define attributes to select an Output Device for printing;
- 465 5. Define attributes and values to report processing errors and warnings;
- 466 6. Define attributes to hold Jobs until a specific date and time;
- 467 7. Define attributes to cancel Jobs after a specific time period;
- 468 8. Define attributes and values to retain Jobs for a specific time period;
- 469 9. Define an operation to close an open Job;
- 470 10. Define attributes and operations to cancel groups of Jobs;
- 471 11. Define an operation to resubmit a Job with new Job Template attributes; and
- 472 12. Define sections to register all attributes, values, and operations with IANA.
- 473

474 **4. New Operations**

475 **4.1 Cancel-Jobs**

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

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

485 **4.1.1 Cancel-Jobs Request**

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

487 Group 1: Operation Attributes

488 "attributes-charset" (charset) and
489 "attributes-natural-language" (naturalLanguage):

490 The Client MUST supply and the Printer MUST support both of these
491 attributes.

492 "printer-uri" (uri):

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

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

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

498 "requesting-user-name" (name(MAX)) and
499 "requesting-user-uri" (uri):

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

501 "message" (text(127)):

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

505 **4.1.2 Cancel-Jobs Response**

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

507 Group 1: Operation Attributes

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

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

511 "status-message" (text(255)) and/or
512 "detailed-status-message" (text(MAX)):

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

514 Group 2: Unsupported Attributes

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

516 **4.2 Cancel-My-Jobs**

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

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

525 **4.2.1 Cancel-My-Jobs Request**

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

527 Group 1: Operation Attributes

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

530 The Client **MUST** supply and the Printer **MUST** support both of these
531 attributes.

532 "printer-uri" (uri):

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

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

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

538 "requesting-user-name" (name(MAX)) and
539 "requesting-user-uri" (uri):

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

541 "message" (text(127)):

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

545 **4.2.2 Cancel-My-Jobs Response**

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

547 Group 1: Operation Attributes

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

550 The Printer MUST return both of these attributes.

551 "status-message" (text(255)) and/or
552 "detailed-status-message" (text(MAX)):

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

554 Group 2: Unsupported Attributes

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

556 **4.3 Close-Job**

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

562 A Client SHOULD check whether the Printer supports the Close-Job operation by querying
563 the values of the "operations-supported" Printer Description attribute.

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

568 **4.3.1 Close-Job Request**

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

570 Group 1: Operation Attributes

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

573 The Client MUST supply and the Printer MUST support both of these
574 attributes.

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

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

578 "requesting-user-name" (name(MAX)) and
579 "requesting-user-uri" (uri):

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

581 **4.3.2 Close-Job Response**

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

583 Group 1: Operation Attributes

584 "attributes-charset" (charset) and
585 "attributes-natural-language" (naturalLanguage):

586 The Printer MUST return both of these attributes.

587 "status-message" (text(255)) and/or
588 "detailed-status-message" (text(MAX)):

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

590 Group 2: Unsupported Attributes

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

592 Group 3: Job Attributes

593 "job-state" (type1 enum):

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

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

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

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

600 The Printer SHOULD return the Job's RECOMMENDED "job-state-message"
601 attribute. If the Printer supports this attribute, then it MUST be returned in the
602 response. If this attribute is not returned in the response, the Client can
603 assume that the "job-state-message" attribute is not supported and will not
604 be returned in a subsequent Job query.

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

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

611 **4.4 Resubmit-Job**

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

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

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

627 **4.4.1 Resubmit-Job Request**

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

629 Group 1: Operation Attributes

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

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

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

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

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

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

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

641 The Client MAY supply and the Printer MUST support either of these
642 attributes.

643 Group 2: Job Template Attributes

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

647 **4.4.2 Resubmit-Job Response**

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

649 Group 1: Operation Attributes

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

652 The Printer MUST return both of these attributes.

653 "status-message" (text(255)) and/or
654 "detailed-status-message" (text(MAX)):

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

656 Group 2: Unsupported Attributes

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

658 Group 3: Job Attributes

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

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

661 "job-state" (type1 enum):

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

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

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

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

668 The Printer SHOULD return the Job's RECOMMENDED "job-state-message"
669 attribute. If the Printer supports this attribute, then it MUST be returned in the
670 response. If this attribute is not returned in the response, the Client can
671 assume that the "job-state-message" attribute is not supported and will not
672 be returned in a subsequent Job query.

673 "job-uri" (uri):

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

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

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

681 **5. Attributes**

682 **5.1 Operation Attributes**

683 **5.1.1 job-hold-until-time (dateTime)**

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

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

690 **5.1.2 job-ids (1setOf integer(1:MAX))**

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

693 **5.1.3 job-mandatory-attributes (1setOf keyword)**

694 This RECOMMENDED attribute identifies which Job Template attributes the Printer MUST
695 support in the Job Creation request in order to accept the Job. The values are the names of
696 Job Template attributes, for example, 'job-hold-until', 'copies', and 'media'. In order to
697 identify a member attribute of a collection attribute, the keyword names of both the collection
698 attribute and the member attribute are given separated by a period (.) character. For
699 example, to make the "media" attribute of the "cover-front" collection attribute mandatory,
700 supply the keyword value 'cover-front.media'.

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

705 **5.2 Document and Job Status Attributes**

706 **5.2.1 errors-count (integer(0:MAX))**

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

712 5.2.2 print-content-optimize-actual (1setOf type2 keyword)

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

715 5.2.3 warnings-count (integer(0:MAX))

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

719 5.3 Document and Job Template Attributes**720 5.3.1 output-device (name(127))**

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

724 5.3.2 print-content-optimize (type2 keyword)

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

727 'graphics': Graphs and line drawings.

728 'photo': Photographs.

729 'text': Text.

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

731 5.4 Job Template Attributes**732 5.4.1 job-cancel-after (integer(0:MAX))**

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

737 5.4.2 job-delay-output-until (type2 keyword | name(MAX))

738 This RECOMMENDED attribute specifies a time period in the future when the Printer will
739 produce the output for the Job. If the specified time period has not yet arrived, the Printer
740 MUST set the Job's "job-state-reasons" value to 'job-delay-output-until-specified'. The
741 Printer MUST NOT produce any output until the time period arrives but MAY perform pre-

742 processing. When the time period arrives, the Job MUST become a candidate for output,
743 including any processing required to produce the output. The only way to alter the delay
744 period for a Job is by using the Set-Job-Attributes [RFC3380] operation.

745 Standard keyword values for named time periods are:

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

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

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

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

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

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

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

754 'weekend': Delay output until the weekend.

755 Clients MUST NOT supply both the "job-delay-output-until" and "job-delay-output-until-time"
756 (section 5.4.3) Job Template attributes in a Job Creation request. If a Client supplies both
757 attributes, the Printer MUST reject the request and return the 'client-error-conflicting-
758 attributes' status code.

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

761 **5.4.3 job-delay-output-until-time (dateTime)**

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

769 Clients MUST NOT supply both the "job-delay-output-until-time" and "job-delay-output-until"
770 (section 5.4.2) Job Template attributes in a Job Creation request. If a Client supplies both
771 attributes, the Printer MUST reject the request and return the 'client-error-conflicting-
772 attributes' status code.

773 Note: Unlike the "job-hold-until-time" (section 5.4.4) Job Template attribute, the "job-delay-
774 output-until-time" attribute does not cause the Job to enter the 'pending-held' state.

775 5.4.4 job-hold-until-time (dateTime)

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

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

782 5.4.5 job-retain-until (type2 keyword | name(MAX))

783 This RECOMMENDED attribute specifies how long the Job remains in the Job Retention
784 phase. Standard values include:

785 'end-of-day': Retain the Job until the end of the current day.

786 'end-of-month': Retain the Job until the end of the current month.

787 'end-of-week': Retain the Job until the end of the current week.

788 'indefinite': Retain the Job indefinitely.

789 'none': Do not retain the Job.

790 Clients MUST NOT supply the "job-retain-until", "job-retain-until-interval" (section 5.4.6),
791 and/or "job-retain-until-time" (section 0) Job Template attributes together in a Job Creation
792 request. If a Client supplies more than one of these attributes, the Printer MUST reject the
793 request and return the 'client-error-conflicting-attributes' status code.

794 5.4.6 job-retain-until-interval (integer(0:MAX))

795 This RECOMMENDED attribute specifies the number of seconds the Job remains in the Job
796 Retention phase.

797 Clients MUST NOT supply the "job-retain-until" (section 5.4.5), "job-retain-until-interval",
798 and/or "job-retain-until-time" (section 0) Job Template attributes together in a Job Creation
799 request. If a Client supplies more than one of these attributes, the Printer MUST reject the
800 request and return the 'client-error-conflicting-attributes' status code.

801 5.4.7 job-retain-until-time (dateTime)

802 This RECOMMENDED attribute specifies the date and time when the Job can leave the Job
803 Retention phase.

804 Clients MUST NOT supply the "job-retain-until" (section 5.4.5), "job-retain-until-interval"
805 (section 5.4.6), and/or "job-retain-until-time" Job Template attributes together in a Job

806 Creation request. If a Client supplies more than one of these attributes, the Printer MUST
807 reject the request and return the 'client-error-conflicting-attributes' status code.

808 **5.5 Printer Description Attributes**

809 **5.5.1 document-charset-default (charset)**

810 This RECOMMENDED attribute specifies the default charset that the Printer will assume for
811 charset-ambiguous Document formats when the Client omits the “document-charset”
812 operation attribute [PWG5100.5]. Printers that support the "document-charset" operation
813 attribute MUST support this attribute.

814 **5.5.2 document-charset-supported (1setOf charset)**

815 This RECOMMENDED attribute lists the charsets that the Printer supports for charset-
816 ambiguous Document formats. Printers that support the "document-charset" operation
817 attribute [PWG5100.5] MUST support this attribute.

818 **5.5.3 document-natural-language-default (naturalLanguage)**

819 This RECOMMENDED attribute specifies the default natural language that the Printer will
820 assume for Document data when the Client omits the “document-natural-language”
821 operation attribute [STD92]. Printers that support the "document-natural-language" attribute
822 MUST support this attribute.

823 **5.5.4 document-natural-language-supported (1setOf naturalLanguage)**

824 This RECOMMENDED attribute lists the natural languages supported for Printer-supported
825 Document formats. Printers that support the "document-natural-language" attribute MUST
826 support this attribute.

827 **5.5.5 job-cancel-after-default (integer(0:MAX) | no-value)**

828 This RECOMMENDED attribute specifies the default value for the "job-cancel-after" (section
829 5.4.1) Job Template attribute. Printers that support the "job-cancel-after" attribute MUST
830 support this attribute.

831 **5.5.6 job-cancel-after-supported (rangeOfInteger(0:MAX))**

832 This RECOMMENDED attribute specifies the range of values supported for the "job-cancel-
833 after" (section 5.4.1) Job Template attribute. Printers that support the "job-cancel-after"
834 attribute MUST support this attribute.

835 **5.5.7 job-creation-attributes-supported (1setOf keyword)**

836 This RECOMMENDED attribute lists the names of the operation and Job Template attributes
837 that can be sent in a Job Creation or Validate-Job request.

838 5.5.8 job-delay-output-until-default (type2 keyword | name(MAX))

839 This RECOMMENDED attribute specifies the default value of the "job-delay-output-until"
840 (section 5.4.2) Job Template attribute. Printers that support the "job-delay-output-until"
841 attribute MUST support this attribute.

842 5.5.9 job-delay-output-until-supported (1setOf (type2 keyword | name(MAX)))

843 This RECOMMENDED attribute lists the supported values of the "job-delay-output-until"
844 (section 5.4.2) Job Template attribute. Printers that support the "job-delay-output-until"
845 attribute MUST support this attribute.

846 5.5.10 job-delay-output-until-time-supported (rangeOfInteger(0:MAX))

847 This RECOMMENDED attribute specifies the range of time values supported by the "job-
848 delay-output-until-time" (section 5.4.3) Job Template attribute. Printers that support the "job-
849 delay-output-until-time" attribute MUST support this attribute.

850 5.5.11 job-history-attributes-configured (1setOf keyword)

851 This RECOMMENDED attribute lists the Job attributes that will be retained in the history
852 phase of each Job. IPP/1.1 [STD92] specifies that at least the "job-id", "job-printer-uri", "job-
853 state", and "job-state-reasons" attributes MUST be retained in the history phase. Printers
854 that support the "job-history-attributes-supported" (section N.M.P) attribute MUST support
855 this attribute.

856 5.5.12 job-history-attributes-supported (1setOf keyword)

857 This RECOMMENDED attribute lists the Job attributes that can be retained in the history
858 phase of each Job. Printers that support the "job-history-attributes-configured" (section
859 N.M.P) attribute MUST support this attribute.

860 5.5.13 job-history-interval-configured (integer(0:MAX))

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

866 5.5.14 job-history-interval-supported (rangeOfInteger(0:MAX))

867 This RECOMMENDED attribute specifies the range of values that are supported for the "job-
868 history-interval-configured" Printer Description attribute. Printers that support the "job-
869 history-interval-configured" (section N.M.P) attribute MUST support this attribute.

870 5.5.15 job-ids-supported (boolean)

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

873 5.5.16 job-mandatory-attributes-supported (boolean)

874 This attribute specifies whether the "job-mandatory-attributes" operation attribute (section
875 5.1.3) is supported. Printers that support the "job-mandatory-attributes" operation attribute
876 SHOULD support this attribute.

877 5.5.17 job-retain-until-default (type2 keyword | name(MAX))

878 This RECOMMENDED attribute specifies the default value of the "job-retain-until" (section
879 5.4.5) Job Template attribute. Printers that support the "job-retain-until" attribute MUST
880 support this attribute.

881 5.5.18 job-retain-until-interval-default (integer(0:MAX) | no-value)

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

885 5.5.19 job-retain-until-interval-supported (rangeOfInteger(0:MAX))

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

889 5.5.20 job-retain-until-supported (1setOf (type2 keyword | name(MAX)))

890 This RECOMMENDED attribute lists the supported values of the "job-retain-until" (section
891 5.4.5) Job Template attribute. Printers that support the "job-retain-until" attribute MUST
892 support this attribute.

893 5.5.21 job-retain-until-time-supported (rangeOfInteger(0:MAX))

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

897 5.5.22 job-spooling-supported (type2 keyword)

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

903 Standard keyword values include:

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

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

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

908 **5.5.23 media-col-database (1setOf collection)**

909 This RECOMMENDED attribute lists the set of pre-defined "media-col" collections available
910 in the Printer's media database. This attribute is similar to "media-col-ready" [PWG5100.3]
911 but returns the entire set of pre-defined "media-col" collections known by the Printer instead
912 of just the media loaded in the Printer. If this attribute is supported, the members of the
913 collections correspond to the supported members of the "media-col" [PWG5100.3]
914 Job/Document Template attribute.

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

919 In order to limit the number and size of values of this attribute, Printers MAY exclude the
920 "media-source" and/or "media-type" member attributes from collection values when all
921 values of the corresponding member attribute are supported when combined with the other
922 member attributes and values.

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

```
927 media-size-supported={...}
928 media-source-supported='by-pass-tray','main','manual'
929 media-type-supported='cardstock','envelope','labels','stationery',
930                       'stationery-letterhead','transparency'
931 media-col-database={
932   /* ISO A4 cardstock only from manual feed */
933   media-size={
934     x-dimension=21000
935     y-dimension=29700
936   }
937   media-source='manual'
938   media-type='cardstock'
939 },{
940   /* ISO A4 transparency only from manual feed */
941   media-size={
942     x-dimension=21000
943     y-dimension=29700
```

```

944     }
945     media-source='manual'
946     media-type='transparency'
947 },{
948     /* ISO A4 plain paper from any source */
949     media-size={
950         x-dimension=21000
951         y-dimension=29700
952     }
953     media-type='stationery'
954 },{
955     /* ISO A4 letterhead from any source */
956     media-size={
957         x-dimension=21000
958         y-dimension=29700
959     }
960     media-type='stationery-letterhead'
961 },... /* Lots of other values */

```

962 **5.5.24 output-device-supported (1setOf name(127))**

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

965 **5.5.25 print-content-optimize-default (type2 keyword)**

966 This RECOMMENDED attribute specifies the default “print-content-optimize” (section 5.3.2)
 967 value. Printers that support the "print-content-optimize" attribute MUST support this attribute.

968 **5.5.26 print-content-optimize-supported (1setOf type2 keyword)**

969 This RECOMMENDED attribute lists the supported “print-content-optimize” (section 5.3.2)
 970 values. Printers that support the "print-content-optimize" attribute MUST support this
 971 attribute.

972 **5.5.27 which-jobs-supported (1setOf type2 keyword)**

973 This RECOMMENDED attribute lists the supported values for the "which-jobs" operation
 974 attribute [STD92] that is used with the Get-Jobs operation [STD92].

975 **5.6 Printer Status Attributes**

976 **5.6.1 printer-detailed-status-messages (1setOf text(MAX))**

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

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

983 **6.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-** 984 **attributes**

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

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

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

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

997 **6.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status** 998 **Code**

999 This specification extends the Job Creation operations to return the 'server-error-too-many-
1000 jobs' status code value when the Printer is currently unable to create a new Job object.

1001 **6.3 Get-Jobs Operation: "job-ids (1setOf integer(1:MAX))"**

1002 The "job-ids" (section 5.1.2) operation attribute, if supplied, specifies a list of target Jobs to
1003 be returned in the response to a Get-Jobs [STD92] request. Printers that support the "job-
1004 ids" operation attribute MUST support it in Get-Jobs requests to limit the list of Jobs that are
1005 returned.

1006 If the Client supplies the "job-ids" operation attribute in a Get-Jobs request, the Client MUST
1007 NOT also supply any of the following operation attributes in the same request: "limit", "my-
1008 jobs", or "which-jobs". If the Client does supply prohibited operation attributes, the Printer
1009 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1010 **6.4 Hold-Job Operation: "job-hold-until-time (dateTime)"**

1011 The "job-hold-until-time" (section 5.1.1) operation attribute can be provided to specify a date
1012 and time when the Job will become a candidate for processing. Printers that support the
1013 "job-hold-until-time" attribute and Hold-Job operation MUST support its use with the Hold-

1014 Job operation. If accepted, the "job-hold-until-time" operation attribute is copied to the Job,
1015 replacing any existing "job-hold-until" [STD92] or "job-hold-until-time" attribute.

1016 Clients MUST NOT send both the "job-hold-until" [STD92] and "job-hold-until-time" operation
1017 attributes in a Hold-Job request. If both attributes are sent, Printers MUST reject the request
1018 and return the 'client-error-conflicting-attributes' status code.

1019 **6.5 Print-Job, Print-URI, Send-Document, Send-URI: server-error-too-** 1020 **many-documents Status Code**

1021 This specification extends the Document Creation operations to return the 'server-error-too-
1022 many-documents' status code value when the Printer is currently unable to create a new
1023 Document object.

1024 **6.6 Set-Job-Attributes Operation: "job-hold-until-time (dateTime)"**

1025 The "job-hold-until-time" (section 5.4.4) Job Template attribute can be provided to specify a
1026 date and time when the Job will become a candidate for processing. Printers that support
1027 the "job-hold-until-time" attribute and Set-Job-Attributes operation MUST support its use with
1028 the Set-Job-Attributes operation. If accepted, the "job-hold-until-time" operation attribute is
1029 copied to the Job, replacing any existing "job-hold-until" [STD92] or "job-hold-until-time"
1030 attribute.

1031 Clients MUST NOT send both the "job-hold-until" [STD92] and "job-hold-until-time" Job
1032 Template attributes in a Set-Job-Attributes request. If both attributes are sent, Printers
1033 MUST reject the request and return the 'client-error-conflicting-attributes' status code.

1034 **7. Additional Values for Existing Attributes**

1035 **7.1 job-state-reasons (1setOf type2 keyword)**

1036 This specification adds the following new keyword values for the "job-state-reasons" Job
1037 Status attribute [STD92]:

1038 'digital-signature-did-not-verify': One or more documents in the Job contains a
1039 digital signature that could not be verified by the Printer.

1040 'errors-detected': The Printer has detected one or more errors during processing of
1041 the Job.

1042 'job-delay-until-specified': The Job's output is delayed because the "job-delay-
1043 output-until" or "job-delay-output-until-time" Job Template attribute was specified.

1044 'warnings-detected': The Printer has detected one or more warnings during
1045 processing of the Job.

1046 **7.2 media (type2 keyword | name(MAX))**

1047 This specification adds the following new keyword value for the "media" Job Template
1048 attribute [STD92]:

1049 'choice_iso_a4_210x297mm_na_letter_8.5x11in': Print using US Letter or ISO A4
1050 media (whichever is available).

1051 Note: The semantics of the 'choice' prefix are documented in the PWG Media Standardized
1052 Names v2.0 (MSN2) specification [PWG5101.1].

1053 **7.3 media-col (collection)**

1054 This specification adds the "media-grain", "media-thickness", and "media-tooth" member
1055 attributes to the "media-col" Job/Document Template attribute.

1056 **7.3.1 media-grain (type2 keyword | name(MAX))**

1057 This member attribute specifies the desired grain of the media being specified [ISO10175].
1058 Grain affects the curl and the folding of the media. Some marking engines are sensitive to
1059 the resulting curl. Standard keyword values for "media-grain" include:

1060 'x-direction': The direction of the paper fibers is in the cross-feed direction of the
1061 media.

1062 'y-direction': The direction of the paper fibers is in the feed direction of the media.

1063 **7.3.2 media-thickness (integer(1:MAX))**

1064 This member attribute specifies the thickness of the media [JDF] in hundreds of millimeters
1065 (1/2540th of an inch).

1066 **7.3.3 media-tooth (type2 keyword | name(MAX))**

1067 This member attribute specifies the tooth (or roughness) of the media [ISO10175]. The tooth
1068 is particularly important for marking engines that use pens (e.g. plotters) to mark the media
1069 - the type of pen used matches the tooth of the media for best resolution.

1070 Standard keyword values for "media-tooth" include:

1071 'antique': Rougher than 'vellum' [JDF].

1072 'calendared': Extra smooth or polished, uncoated paper [JDF].

1073 'coarse': Rough finish.

1074 'fine': Smoother finish than 'smooth'.

- 1075 'linen': Finish like coarse woven cloth [JDF].
- 1076 'medium': Regular finish.
- 1077 'smooth': Smooth finish [JDF].
- 1078 'stipple': Fine pebble finish [JDF].
- 1079 'uncalendared': Rough, unpolished and uncoated papers [JDF].
- 1080 'vellum': Slightly rough surface [JDF].

1081 **7.4 pdl-override-supported (type2 keyword)**

1082 This specification defines a new 'guaranteed' value for the "pdl-override-supported" [STD92]
1083 Printer Description attribute. This value indicates that the Printer guarantees that:

- 1084 1. Document and/or Job Template attribute values take precedence over instructions of
1085 any form embedded anywhere in the Document data;
- 1086 2. Document and/or Job Template attributes that have only a single supported value
1087 take precedence over instructions of any form embedded anywhere in the Document
1088 data, even if the attribute is not included in the Job or Document Creation request;
1089 and
- 1090 3. No PDL instruction is performed that does not correspond to a current value in the
1091 corresponding "xxx-supported" Printer Description attribute.

1092 If a Printer cannot honor the advertised "pdl-override-supported" value for a Job, it can abort
1093 the Job, stop the Printer, hold the Job, or substitute a supported value. This choice can be
1094 fixed by the implementation or configurable by the Administrator and can depend on the
1095 Document and/or Job Template attribute.

1096 **7.5 which-jobs (type2 keyword)**

1097 This specification adds the following new keyword values for the "which-jobs" operation
1098 attribute [STD92]:

- 1099 'aborted': Any Job in the 'aborted' state.
- 1100 'all': All Jobs regardless of state.
- 1101 'canceled': Any Job in the 'canceled' state.
- 1102 'pending': Any Job in the 'pending' state.
- 1103 'pending-held': Any Job in the 'pending-held' state.

1104 'processing': Any Job in the 'processing' state.

1105 'processing-stopped': Any Job in the 'processing-stopped' state.

1106

1107 8. New Status Codes

1108 This section defines additional status code values.

1109 8.1 server-error-too-many-jobs (0x050B)

1110 The Client has attempted to create a Job using any of the Job Creation operations which
1111 would exceed the capacity of the Printer. The Client can retry the unmodified request.

1112 8.2 server-error-too-many-documents (0x050C)

1113 The Client has attempted to create a Document using any of the Document Creation
1114 operations which would exceed the capacity of the Printer for this Job. The Client can retry
1115 the unmodified request.

1116 9. Obsolete Attributes

1117 9.1 Obsolete Operation Attributes

1118 Table 1 lists the operation attributes from the previous version of this specification
1119 [PWG5100.7-2003] which are now obsolete.

1120 **Table 1 - Obsolete Operation Attributes**

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

1121 9.2 Obsolete Job Status Attributes

1122 Table 2 lists the Job Status attributes from the previous version of this specification
1123 [PWG5100.7-2003] which are now obsolete.

1124 **Table 2 - Obsolete Job Status Attributes**

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

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

1125 9.3 Obsolete Job Template Attributes

1126 Table 3 lists the Job Templates attributes from the previous version of this specification
1127 [PWG5100.7-2003] which are now obsolete.

1128 **Table 3 - Obsolete Job Template Attributes**

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

1129 9.4 Obsolete Printer Description Attributes

1130 The following Printer Description attributes from the previous version of this specification
1131 [PWG5100.7-2003] which are now obsolete.

1132 **Table 4 - Obsolete Printer Description Attributes**

Attribute	Notes
document-digital-signature-default (type2 keyword)	Obsolete parent attribute
document-digital-signature-supported (1setOf type2 keyword)	Obsolete parent attribute
document-format-details-default (collection)	Obsolete parent attribute
document-format-details-supported (1setOf keyword)	Obsolete parent attribute
document-format-version-default (text(127))	Obsolete parent attribute
document-format-version-supported (1setOf text(127))	Obsolete parent attribute
job-copies-default (integer(1:MAX))	Obsolete parent attribute
job-copies-supported (rangeOfInteger(1:MAX))	Obsolete parent attribute

Attribute	Notes
job-cover-back-default (collection)	Obsolete parent attribute
job-cover-back-supported (1setOf keyword)	Obsolete parent attribute
job-cover-front-default (collection)	Obsolete parent attribute
job-cover-front-supported (1setOf keyword)	Obsolete parent attribute
job-finishings-col-default (1setOf collection)	Obsolete parent attribute
job-finishings-col-ready (1setOf collection)	Obsolete parent attribute
job-finishings-col-supported (1setOf keyword)	Obsolete parent attribute
job-finishings-default (1setOf type2 enum)	Obsolete parent attribute
job-finishings-ready (1setOf type2 enum)	Obsolete parent attribute
job-finishings-supported (1setOf type2 enum)	Obsolete parent attribute

1133 10. Obsolete Values

1134 10.1 Obsolete "job-state-reasons" Values

1135 The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' keyword values
 1136 from the previous version of this specification [PWG5100.7-2003] are now obsolete because
 1137 the corresponding Job Template attribute is obsolete.

1138 11. Conformance Requirements

1139 11.1 Printer Conformance Requirements

1140 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1141 1. The new operations defined in section 4;
- 1142 2. The operation attributes defined in 5.1;
- 1143 3. The Job Status attributes defined in section 5.2 that correspond to any
 1144 supported Job Template attributes defined in section 5.3;
- 1145 4. The Document Status attributes defined in section 5.2 that correspond to any
 1146 supported Document Template attributes defined in section 5.3;
- 1147 5. The Printer Description attributes defined in section 5.5 that correspond to any
 1148 supported Document/Job Template attributes defined in section 5.3;
- 1149 6. The additional semantics defined in section 6;
- 1150 7. The additional values defined in section 7;
- 1151 8. The internationalization considerations defined in section 12; and
- 1152 9. The security considerations defined in section 13.

1153 Printers that support the "job-mandatory-attributes" operation attribute (section 5.1.3) MUST
 1154 also support the additional semantics defined in section 1.

1155 **11.2 Client Conformance Requirements**

1156 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1157 1. The internationalization considerations defined in section 12; and
1158 2. The security considerations defined in section 13.

1159 **12. Internationalization Considerations**

1160 For interoperability and basic support for multiple languages, conforming implementations
1161 MUST support:

- 1162 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
1163 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
1164 2. The Unicode Format for Network Interchange [RFC5198] which requires
1165 transmission of well-formed UTF-8 strings and recommends transmission of
1166 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1167 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1168 characters and combining marks) followed by Canonical Composition (into canonical
1169 composed characters wherever Unicode has assigned them).

1170 WARNING – Performing normalization on UTF-8 strings received from Clients and
1171 subsequently storing the results (e.g., in Job objects) could cause false negatives in Client
1172 searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now
1173 'hidden').

1174 Implementations of this specification SHOULD conform to the following standards on
1175 processing of human-readable Unicode text strings, see:

1176 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1177 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1178 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1179 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1180 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1181 Unicode Collation Algorithm [UTS10] – sorting

1182 Unicode Locale Data Markup Language [UTS35] – locale databases

1183 Implementations of this specification are advised to also review the following informational
1184 documents on processing of human-readable Unicode text strings:

1185 Unicode Character Encoding Model [UTR17] – multi-layer character model

1186 Unicode Character Property Model [UTR23] – character properties

1187 Unicode Conformance Model [UTR33] – Unicode conformance basis

1188 **13. Security Considerations**

1189 The IPP extensions defined in this document require the same security considerations as
1190 defined in the Internet Printing Protocol/1.1 [STD92].

1191 Implementations of this specification SHOULD conform to the following standard on
1192 processing of human-readable Unicode text strings, see:

1193 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1194 Implementations of this specification are advised to also review the following informational
1195 document on processing of human-readable Unicode text strings:

1196 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

1197 **14. IANA Considerations**

1198 **14.1 Attribute Registrations**

1199 The attributes defined in this specification will be published by IANA according to the
1200 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1201 <http://www.iana.org/assignments/ipp-registrations>

1202 The registry entries will contain the following information:

1203	Document Status attributes:	Reference
1204	-----	-----
1205	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1206	document-charset-supplied(obsolete) (charset)	[PWG5100.7]
1207	document-digital-signature-supplied(obsolete) (type2 keyword)	
1208		[PWG5100.7]
1209	document-format-details-supplied(obsolete) (1setOf collection)	
1210		[PWG5100.7]
1211	document-format-supplied(obsolete) (mimeType)	[PWG5100.7]
1212	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1213	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1214	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1215	document-natural-language-supplied(obsolete) (naturalLanguage)	
1216		[PWG5100.7]
1217	errors-count (integer(0:MAX))	[PWG5100.7]
1218	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1219	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]

1220	warnings-count (integer(0:MAX))	[PWG5100.7]
1221		
1222	Document Template attributes:	Reference
1223	-----	-----
1224	output-device (name(127))	[PWG5100.7]
1225	print-content-optimize (type2 keyword)	[PWG5100.7]
1226		
1227	Job Status attributes:	Reference
1228	-----	-----
1229	compression-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1230	document-charset-supplied(obsolete) (charset)	[PWG5100.7]
1231	document-digital-signature-supplied(obsolete) (type2 keyword)	[PWG5100.7]
1232		[PWG5100.7]
1233	document-format-details-supplied(obsolete) (1setOf collection)	[PWG5100.7]
1234		[PWG5100.7]
1235	document-format-supplied(obsolete) (mimeMediaType)	[PWG5100.7]
1236	document-format-version-supplied(obsolete) (text(127))	[PWG5100.7]
1237	document-message-supplied(obsolete) (text(MAX))	[PWG5100.7]
1238	document-name-supplied(obsolete) (name(MAX))	[PWG5100.7]
1239	document-natural-language-supplied(obsolete) (naturalLanguage)	[PWG5100.7]
1240		[PWG5100.7]
1241	errors-count (integer(0:MAX))	[PWG5100.7]
1242	ipp-attribute-fidelity(obsolete) (boolean)	[PWG5100.7]
1243	job-copies-actual(obsolete) (integer(1:MAX))	[PWG5100.7]
1244	job-cover-back-actual(obsolete) (collection)	[PWG5100.7]
1245	job-cover-front-actual(obsolete) (collection)	[PWG5100.7]
1246	job-finishings-actual(obsolete) (1setOf type2 enum)	[PWG5100.7]
1247	job-finishings-col-actual(obsolete) (1setOf collection)	[PWG5100.7]
1248	job-mandatory-attributes(obsolete) (1setOf keyword)	[PWG5100.7]
1249	output-device-actual(obsolete) (1setOf name(127))	[PWG5100.7]
1250	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1251	warnings-count (integer(0:MAX))	[PWG5100.7]
1252		
1253	Job Template attributes:	Reference
1254	-----	-----
1255	job-cancel-after (integer(0:MAX))	[PWG5100.7]
1256	job-copies(obsolete) (integer(1:MAX))	[PWG5100.7]
1257	job-cover-back(obsolete) (collection)	[PWG5100.7]
1258	job-cover-front(obsolete) (collection)	[PWG5100.7]
1259	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1260	job-delay-output-until-time (dateTime)	[PWG5100.7]
1261	job-hold-until-time (dateTime)	[PWG5100.7]
1262	job-finishings(obsolete) (1setOf type2 enum)	[PWG5100.7]
1263	job-finishings-col(obsolete) (1setOf collection)	[PWG5100.7]
1264	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1265	job-retain-until-interval (integer(0:MAX))	[PWG5100.7]
1266	job-retain-until-time (dateTime)	[PWG5100.7]
1267	output-device (name(127))	[PWG5100.7]
1268	print-content-optimize (type2 keyword)	[PWG5100.7]
1269		
1270	Operation attributes:	Reference
1271	-----	-----
1272	document-digital-signature(obsolete) (type2 keyword)	[PWG5100.7]
1273	document-format-details(obsolete) (1setOf collection)	[PWG5100.7]
1274	document-format-version(obsolete) (text(127))	[PWG5100.7]
1275	job-hold-until-time (dateTime)	[PWG5100.7]

1276	job-ids (1setOf integer(1:MAX))	[PWG5100.7]
1277	job-mandatory-attributes (1setOf keyword)	[PWG5100.7]
1278		
1279	Printer Description attributes:	Reference
1280	-----	-----
1281	document-charset-default (charset)	[PWG5100.7]
1282	document-charset-supported (1setOf charset)	[PWG5100.7]
1283	document-digital-signature-default (obsolete) (type2 keyword)	
1284		[PWG5100.7]
1285	document-digital-signature-supported (obsolete) (1setOf type2 keyword)	
1286		[PWG5100.7]
1287	document-format-details-default (obsolete) (collection)	[PWG5100.7]
1288	document-format-details-supported (obsolete) (1setOf keyword)	
1289		[PWG5100.7]
1290	document-format-version-default (obsolete) (text(127))	[PWG5100.7]
1291	document-format-version-supported (obsolete) (1setOf text(127))	
1292		[PWG5100.7]
1293	document-natural-language-default (naturalLanguage)	[PWG5100.7]
1294	document-natural-language-supported (1setOf naturalLanguage)	
1295		[PWG5100.7]
1296	job-cancel-after-default (integer(0:MAX) no-value)	[PWG5100.7]
1297	job-cancel-after-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1298	job-copies-default (obsolete) (integer(1:MAX))	[PWG5100.7]
1299	job-copies-supported (obsolete) (rangeOfInteger(1:MAX))	[PWG5100.7]
1300	job-cover-back-default (obsolete) (collection)	[PWG5100.7]
1301	job-cover-back-supported (obsolete) (1setOf keyword)	[PWG5100.7]
1302	job-cover-front-default (obsolete) (collection)	[PWG5100.7]
1303	job-cover-front-supported (obsolete) (1setOf keyword)	[PWG5100.7]
1304	job-creation-attributes-supported (1setOf keyword)	[PWG5100.7]
1305	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1306	job-delay-output-until-interval-supported (rangeOfInteger(0:MAX))	
1307		[PWG5100.7]
1308	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	
1309		[PWG5100.7]
1310	job-delay-output-until-time-supported (rangeOfInteger(0:MAX))	
1311		[PWG5100.7]
1312	job-finishings-col-default (obsolete) (1setOf collection)	[PWG5100.7]
1313	job-finishings-col-ready (obsolete) (1setOf collection)	[PWG5100.7]
1314	job-finishings-col-supported (obsolete) (1setOf keyword)	[PWG5100.7]
1315	job-finishings-default (obsolete) (1setOf type2 enum)	[PWG5100.7]
1316	job-finishings-ready (obsolete) (1setOf type2 enum)	[PWG5100.7]
1317	job-finishings-supported (obsolete) (1setOf type2 enum)	[PWG5100.7]
1318	job-history-attributes-configured (1setOf keyword)	[PWG5100.7]
1319	job-history-attributes-supported (1setOf keyword)	[PWG5100.7]
1320	job-history-interval-configured (integer(0:MAX))	[PWG5100.7]
1321	job-history-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1322	job-ids-supported (boolean)	[PWG5100.7]
1323	job-mandatory-attributes-supported (boolean)	[PWG5100.7]
1324	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1325	job-retain-until-interval-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1326	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	
1327		[PWG5100.7]
1328	job-retain-until-time-supported (rangeOfInteger(0:MAX))	[PWG5100.7]
1329	job-spooling-supported (type2 keyword)	[PWG5100.7]
1330	media-col-database (1setOf collection)	[PWG5100.7]
1331	output-device-supported (1setOf name(127))	[PWG5100.7]

1332	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1333	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1334	which-jobs-supported (1setOf type2 keyword)	[PWG5100.7]
1335		
1336	Printer Status attributes:	Reference
1337	-----	-----
1338	printer-detailed-status-messages (1setOf text(MAX))	[PWG5100.7]

1339 14.2 Attribute Keyword Value Registrations

1340 The keyword values defined in this specification will be published by IANA according to the
1341 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1342 <http://www.iana.org/assignments/ipp-registrations>

1343 The registry entries will contain the following information:

1344	Attributes (attribute syntax)	
1345	Keyword Attribute Value	Reference
1346	-----	-----
1347	job-delay-output-until (type2 keyword name(MAX))	[PWG5100.7]
1348	day-time	[PWG5100.7]
1349	evening	[PWG5100.7]
1350	indefinite	[PWG5100.7]
1351	night	[PWG5100.7]
1352	no-delay-output	[PWG5100.7]
1353	second-shift	[PWG5100.7]
1354	third-shift	[PWG5100.7]
1355	weekend	[PWG5100.7]
1356	job-delay-output-until-default (type2 keyword name(MAX))	[PWG5100.7]
1357	<Any "job-delay-output-until" value>	[PWG5100.7]
1358	job-delay-output-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1359		[PWG5100.7]
1360	<Any "job-delay-output-until" value>	[PWG5100.7]
1361		
1362	job-retain-until (type2 keyword name(MAX))	[PWG5100.7]
1363	end-of-day	[PWG5100.7]
1364	end-of-month	[PWG5100.7]
1365	end-of-week	[PWG5100.7]
1366	indefinite	[PWG5100.7]
1367	none	[PWG5100.7]
1368	job-retain-until-default (type2 keyword name(MAX))	[PWG5100.7]
1369	<Any "job-retain-until" value>	[PWG5100.7]
1370	job-retain-until-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.7]
1371		[PWG5100.7]
1372	<Any "job-retain-until" value>	[PWG5100.7]
1373		
1374	job-state-reasons (1setOf type2 keyword)	[RFC8011]
1375	digital-signature-did-not-verify	[PWG5100.7]
1376	digital-signature-type-not-supported(obsolete)	[PWG5100.7]
1377	errors-detected	[PWG5100.7]
1378	job-delay-output-until-specified	[PWG5100.7]
1379	job-digital-signature-wait(obsolete)	[PWG5100.7]
1380	warnings-detected	[PWG5100.7]

1381		
1382	media (type2 keyword name(MAX))	[RFC8011]
1383	choice_iso_a4_210x297mm_na_letter_8.5x11in	[PWG5100.7]
1384		
1385	pdl-override-supported (type2 keyword)	[RFC8011]
1386	guaranteed	[PWG5100.7]
1387		
1388	print-content-optimize (type2 keyword)	[PWG5100.7]
1389	graphics	[PWG5100.7]
1390	photo	[PWG5100.7]
1391	text	[PWG5100.7]
1392	text-and-graphics	[PWG5100.7]
1393	print-content-optimize-actual (1setOf type2 keyword)	[PWG5100.7]
1394	<Any "print-content-optimize" value>	[PWG5100.7]
1395	print-content-optimize-default (type2 keyword)	[PWG5100.7]
1396	<Any "print-content-optimize" value>	[PWG5100.7]
1397	print-content-optimize-supported (1setOf type2 keyword)	[PWG5100.7]
1398	<Any "print-content-optimize" value>	[PWG5100.7]
1399		
1400	which-jobs (type2 keyword)	[RFC8011]
1401	aborted	[PWG5100.7]
1402	all	[PWG5100.7]
1403	canceled	[PWG5100.7]
1404	pending	[PWG5100.7]
1405	pending-held	[PWG5100.7]
1406	processing	[PWG5100.7]
1407	processing-stopped	[PWG5100.7]

1408 14.3 Type2 enum Registrations

1409 The attributes defined in this specification will be published by IANA according to the
1410 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1411 <http://www.iana.org/assignments/ipp-registrations>

1412 The registry entries will contain the following information:

1413	Attributes (attribute syntax)		
1414	Enum Value	Enum Symbolic Name	Reference
1415	-----	-----	-----
1416	operations-supported (1setOf type2 enum)		[RFC8011]
1417	0x0038	Cancel-Jobs	[PWG5100.7]
1418	0x0039	Cancel-My-Jobs	[PWG5100.7]
1419	0x003A	Close-Job	[PWG5100.7]
1420	0x003B	Resubmit-Job	[PWG5100.7]

1421 14.4 Operation Registrations

1422 The operations defined in this specification will be published by IANA according to the
1423 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1424 <http://www.iana.org/assignments/ipp-registrations>

1425 The registry entries will contain the following information:

1426	Operation Name	Reference
1427	-----	-----
1428	Cancel-Jobs	[PWG5100.7]
1429	Cancel-My-Jobs	[PWG5100.7]
1430	Close-Job	[PWG5100.7]
1431	Create-Job (Extension)	[PWG5100.7]
1432	Hold-Job (Extension)	[PWG5100.7]
1433	Print-Job (Extension)	[PWG5100.7]
1434	Print-URI (Extension)	[PWG5100.7]
1435	Resubmit-Job	[PWG5100.7]
1436	Send-Document (Extension)	[PWG5100.7]
1437	Send-URI (Extension)	[PWG5100.7]
1438	Set-Job-Attributes (Extension)	[PWG5100.7]
1439	Validate-Job (Extension)	[PWG5100.7]

1440 14.5 Status Code Registrations

1441 The status codes defined in this specification will be published by IANA according to the
1442 procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

1443 <http://www.iana.org/assignments/ipp-registrations>

1444 The registry entries will contain the following information:

1445	Value	Status Code Name	Reference
1446	-----	-----	-----
1447	0x0500:0x05FF	- Server Error:	
1448	0x050B	server-error-too-many-jobs	[PWG5100.7]
1449	0x050C	server-error-too-many-documents	[PWG5100.7]
1450			

1451 **15. Overview of Changes**

1452 **15.1 IPP Job Extensions v1.1**

1453 The following changes were made to the previous version of this specification [PWG5100.7-
1454 2003]:

- 1455 • A rationale section was added, including use cases, exceptions, and requirements;
- 1456 • References now point to the current versions of dependent documents and
1457 specifications at the time of publication;
- 1458 • Read-only attributes are now defined and registered as status attributes;
- 1459 • A RECOMMENDED "job-mandatory-attributes-supported" Printer Description
1460 attribute has been added to indicate support for the "job-mandatory-attributes" Job
1461 Template attribute;
- 1462 • The "job-hold-until-time" and "job-ids" operation attributes were moved from the
1463 OBSOLETE IPP Job and Printer Extensions - Set 3 [PWG5100.11-2010]
1464 specification;
- 1465 • The "job-delay-output-until", "job-delay-output-until-time", and "job-hold-until-time"
1466 Job Template attributes were moved from the OBSOLETE IPP Job and Printer
1467 Extensions - Set 3 [PWG5100.11-2010] specification;
- 1468 • The "job-creation-attributes-supported", "job-spooling-supported", "media-col-
1469 database", "printer-detailed-status-messages", and "which-jobs-supported" Printer
1470 attributes were moved from the OBSOLETE IPP Job and Printer Extensions - Set 3
1471 [PWG5100.11-2010] specification;
- 1472 • The "media-grain", "media-thickness", and "media-tooth" member attributes of the
1473 "media-col" Document/Job Template attribute were moved from the OBSOLETE IPP
1474 Job and Printer Extensions - Set 3 [PWG5100.11-2010] specification;
- 1475 • RECOMMENDED "job-retain-until", "job-retain-until-interval", and "job-retain-until-
1476 time" Job Template attributes were added to control the Job Retention phase of a
1477 Job's lifecycle;
- 1478 • RECOMMENDED "job-history-attributes-configured", "job-history-attributes-
1479 supported", "job-history-interval-configured", and "job-history-interval-supported"
1480 Printer Description attributes were added to control the Job History phase of a Job's
1481 lifecycle;
- 1482 • The "document-charset" operation attribute and corresponding operation semantics
1483 are now defined in PWG 5100.5: IPP Document Object v1.1;

- 1484 • The "document-digital-signature" operation attribute and corresponding Document
1485 Status, Job Status, and Printer Description attributes have been made obsolete
1486 because of interoperability issues;
- 1487 • The "document-format-details" operation attribute and corresponding Document
1488 Status, Job Status, and Printer Description attributes have been made obsolete
1489 because of interoperability issues and privacy concerns;
- 1490 • The "document-format-version" operation attribute and corresponding Document
1491 Status, Job Status, and Printer Description attributes have been made obsolete
1492 because of interoperability issues;
- 1493 • The "job-copies" Job Template attribute and corresponding Job Status and Printer
1494 Description attributes have been made obsolete because of interoperability issues;
- 1495 • The "job-cover-back" Job Template attribute and corresponding Job Status and
1496 Printer Description attributes have been made obsolete because of interoperability
1497 issues;
- 1498 • The "job-cover-front" Job Template attribute and corresponding Job Status and
1499 Printer Description attributes have been made obsolete because of interoperability
1500 issues;
- 1501 • The "job-finishings" Job Template attribute and corresponding Job Status and Printer
1502 Description attributes have been made obsolete because of interoperability issues;
- 1503 • The "job-finishings-col" Job Template attribute and corresponding Job Status and
1504 Printer Description attributes have been made obsolete because of interoperability
1505 issues; and
- 1506 • The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' values for
1507 the "job-state-reasons" attribute have been made obsolete because of interoperability
1508 issues.

1509 **16. References**

1510 **16.1 Normative References**

- 1511 [BCP14] S. Bradner, "Key words for use in RFCs to Indicate Requirement
1512 Levels", RFC 2119/BCP 14, March 1997,
1513 <https://tools.ietf.org/html/bcp14>
- 1514 [ISO10646] "Information technology -- Universal Coded Character Set (UCS)",
1515 ISO/IEC 10646:2011

- 1516 [PWG5100.3] K. Ocke, T. Hastings, "Internet Printing Protocol (IPP): Production
1517 Printing Attributes – Set 1", PWG 5100.3-2001, February 2001,
1518 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippprodprint10-20010212-
1519 5100.3.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippprodprint10-20010212-5100.3.pdf)
- 1520 [PWG5100.5] M. Sweet, "IPP Document Object v1.1", PWG 5100.5-YYYY, Month
1521 YYYY, [https://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject11-
1522 YYYYMMDD-5100.5.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject11-YYYYMMDD-5100.5.pdf)
- 1523 [PWG5101.1] M. Sweet, R. Bergman, T. Hastings, "PWG Media Standardized
1524 Names 2.0 (MSN2)", PWG 5101.1-2013, March 2013,
1525 [https://ftp.pwg.org/pub/pwg/candidates/cs-pwgmsn20-20130328-
1526 5101.1.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-pwgmsn20-20130328-5101.1.pdf)
- 1527 [RFC3380] T. Hastings, R. Herriot, C. Kugler, H. Lewis, "Internet Printing Protocol
1528 (IPP): Job and Printer Set Operations", RFC 3380, September 2002,
1529 <https://tools.ietf.org/html/rfc3380>
- 1530 [RFC5198] J. Klensin, M. Padlipsky, "Unicode Format for Network Interchange",
1531 RFC 5198, March 2008, <https://tools.ietf.org/html/rfc5198>
- 1532 [RFC7230] R. Fielding, J. Reschke, "Hypertext Transfer Protocol (HTTP/1.1):
1533 Message Syntax and Routing", RFC 7230, June 2014,
1534 <https://tools.ietf.org/html/rfc7230>
- 1535 [STD63] F. Yergeau, "UTF-8, a transformation format of ISO 10646", RFC
1536 3629/STD 63, November 2003, <https://tools.ietf.org/html/std63>
- 1537 [STD92] M. Sweet, I. McDonald, "Internet Printing Protocol/1.1", STD 92, June
1538 2018, <https://tools.ietf.org/html/std92>
- 1539 [UAX9] Unicode Consortium, "Unicode Bidirectional Algorithm", UAX#9, May
1540 2018, <https://www.unicode.org/reports/tr9>
- 1541 [UAX14] Unicode Consortium, "Unicode Line Breaking Algorithm", UAX#14,
1542 May 2018, <https://www.unicode.org/reports/tr14>
- 1543 [UAX15] M. Davis, M. Duerst, "Unicode Normalization Forms", Unicode
1544 Standard Annex 15, May 2018, <https://www.unicode.org/reports/tr15>
- 1545 [UAX29] Unicode Consortium, "Unicode Text Segmentation", UAX#29, May
1546 2018, <https://www.unicode.org/reports/tr29>
- 1547 [UAX31] Unicode Consortium, "Unicode Identifier and Pattern Syntax",
1548 UAX#31, June 2018, <https://www.unicode.org/reports/tr31>
- 1549 [UNICODE] Unicode Consortium, "Unicode Standard", Version 11.0.0, June 2018,
1550 <https://www.unicode.org/versions/Unicode11.0.0/>

- 1551 [UTS10] Unicode Consortium, “Unicode Collation Algorithm”, UTS#10, May
1552 2018, <https://www.unicode.org/reports/tr10>
- 1553 [UTS35] Unicode Consortium, “Unicode Locale Data Markup Language”,
1554 UTS#35, March 2018, <https://www.unicode.org/reports/tr35>
- 1555 [UTS39] Unicode Consortium, “Unicode Security Mechanisms”, UTS#39, May
1556 2018, <https://www.unicode.org/reports/tr39>
- 1557 **16.2 Informative References**
- 1558 [ISO10175] "Document Printing Application (DPA)", ISO/IEC 10175, June 1996
- 1559 [JDF] CIP4, "Job Definition Format (JDF) Specification Release 1.5",
1560 December 2013, <https://www.cip4.org>
- 1561 [PWG5100.7-2003] T. Hastings, P. Zehler, "Standard for the Internet Printing Protocol
1562 (IPP): Job Extensions", PWG 5100.7-2003, October 2003,
1563 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobext10-20031031-
1564 5100.7.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobext10-20031031-5100.7.pdf)
- 1565 [PWG5100.11-2010]
1566 T. Hastings, "Internet Printing Protocol (IPP): Job and Printer
1567 Extensions - Set 2 (JPS2)", PWG 5100.11-2010, October 2010,
1568 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-
1569 20101030-5100.11.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-20101030-5100.11.pdf)
- 1570 [UTR17] Unicode Consortium “Unicode Character Encoding Model”, UTR#17,
1571 November 2008, <https://www.unicode.org/reports/tr17>
- 1572 [UTR23] Unicode Consortium “Unicode Character Property Model”, UTR#23,
1573 May 2015, <https://www.unicode.org/reports/tr23>
- 1574 [UTR33] Unicode Consortium “Unicode Conformance Model”, UTR#33,
1575 November 2008, <https://www.unicode.org/reports/tr33>
- 1576 [UNISECFAQ] Unicode Consortium “Unicode Security FAQ”, November 2013,
1577 <https://www.unicode.org/faq/security.html>
1578

1579 **17. Author's Address**

1580 Primary author:

1581 Michael Sweet
1582 Apple Inc.
1583 One Apple Park Way
1584 MS 111-HOMC
1585 Cupertino CA 95014
1586 USA

1587 Send comments to the PWG IPP Mailing List:

1588 ipp@pwg.org (subscribers only)

1589 To subscribe, see the PWG web page:

1590 <http://www.pwg.org/>

1591 Implementers of this specification document are encouraged to join the IPP Mailing List in
1592 order to participate in any discussions of clarification issues and review of registration
1593 proposals for additional attributes and values.

1594 The editors would like to especially thank the following individuals who also contributed
1595 significantly to the development of this document:

1596 Tom Hastings (author of v1.0)

1597 Peter Zehler (author of v1.0)

1598

1599 **18. Change History**

1600 **18.1 March 8, 2019**

- 1601 • Status: Prototype
- 1602 • Abstract: Reworded for updated scope
- 1603 • Section 1: Reworded for updated scope, added discussion of obsolete JPS2 bits
1604 moving here
- 1605 • Section 2.1: Added definitions of OBSOLETE and DEPRECATED
- 1606 • Section 3: Added rationale, use cases, and design requirements for attributes and
1607 operations from JPS2.
- 1608 • New section 4 for operations from JPS2
- 1609 • Section 5: Made most attributes RECOMMENDED, added job-creation-attributes-
1610 supported, job-delay-output-until-xxx, job-history-xxx, job-hold-until-time, job-ids, job-
1611 spooling-supported, media-col-database, printer-detail-status-messages from JPS2
- 1612 • Section 5: Added new job-history-xxx and job-retain-until-xxx attributes
- 1613 • New section 6 for additional semantics (imported from JPS2)
- 1614 • Section 7: Added pdl-override-supported, which-jobs values, media-col member
1615 attributes.

1616 **18.2 October 23, 2018**

- 1617 • Status: Interim
- 1618 • Updated references to the first version of 5100.7 to include year and exclude the full
1619 name.
- 1620 • Abstract and intro: Clarified that this specification is defining attributes and values.
- 1621 • Editorial changes
- 1622 • Added reference to the MSN2 spec.

1623 **18.3 September 26, 2018**

- 1624 • Brought back the job-mandatory-attributes operation attribute, which is still needed.

- 1625 • Added a rationale, use case, and design requirement for selective fidelity/job-
1626 mandatory-attributes.
- 1627 • Added Additional Semantics and Operation Registrations sections for using job-
1628 mandatory-attributes with job creation/validation operations.
- 1629 • Added Additional Semantics and Operation Registrations sections for returning the
1630 too-many-jobs/documents status codes.

1631 **18.4 September 25, 2018**

1632 Initial revision.