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6
7 The Printer Working Group

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9 **Standard for Internet Printing Protocol (IPP):**
10 **Production Printing Attributes – Set 2**

11
12 **Status:** Prototype Draft

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14
15 **Abstract:** This document specifies an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and
16 IPP/1.1 [RFC2910, RFC2911]. The attributes defined in this document provide additional attributes primarily (but not
17 limited) to production printers in the same vein as those defined in [PWG5100.3] "Internet Printing Protocol (IPP):
18 Production Printing Attributes - Set1. This extension consists of OPTIONAL Job Template for submitting print
19 jobs that permit a user to save jobs for later reprinting, provide a recipient name and a job phone number, provide the
20 feed orientation, provide the font name and font size, hold a job until a specific date and time, specify an interpreter
21 initialization file, and print a proof print(s) of the job prior to printing the full run of the job.

22 There are also Printer Description attributes to list the Job Creation attributes supported, indicate whether jobs are
23 spooled, and list the set of media collections supported.

24 In addition, semantics for Attribute Precedence, a Queue Override capability, and the capability to guarantee protocol
25 precedence over the PDL attribute are defined.

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31 This document is a PWG Working Draft. For a definition of a "PWG Working Draft" and "Prototype Draft", see:

32 <http://ftp.pwg.org/pub/pwg/general/process/pwg-process30.pdf>

33 This document is available electronically at:

34 <http://ftp.pwg.org/pub/pwg/wd/wd-ippprodprintext10-20090803.pdf>
35

Comment [th1]: 2009-08-30, Version 0.2 of the draft.

Here are the notes that I took at the PWG IPP WG telecon, Tuesday, August 18.

I propose to follow a technique which I have found efficient during telecons when reviewing standard drafts:

I flag problem that need to be resolved, with red highlight **ISSUE** ahead of the meeting.

During the meeting we visit each red **ISSUE** comment.

Those that are solved during a meeting, I change to green highlight **ISSUE** and type the resolution into the same comment. Then off-line I carry out the agreement with change tracking and re-post the next version of the draft.

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97 Instructions for subscribing to the IPP mailing list can be found at the following link:

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99 Members of the PWG and interested parties are encouraged to join the PWG and IPP WG mailing lists in order to
100 participate in discussions, clarifications and review of the WG product.

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234 **1 Introduction**

235 This document specifies an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1
 236 [RFC2910, RFC2911]. This extension consists primarily of OPTIONAL Job Template attributes defined for submitting
 237 print jobs primarily (but not limited to) to production printers and Printer Description attributes as summarized in Table
 238 1. All of these Job Template attributes are OPTIONAL for a Printer to support. However, some of these Job
 239 Template attributes do require other Job Template attributes in this document to be supported. See the Conformance
 240 section (section 9.1).

241 In addition, semantics for Attribute Precedence, a Queue Override capability, and the capability to guarantee protocol
 242 precedence over the PDL attribute are defined.

243 **Table 1 - Summary of Attributes defined**

Attribute Name (syntax)	Description
Operation attributes:	
job-password (octetString(255))	password for secure printing
job-password-encryption (type3 keyword name(MAX))	password encryption method for secure printing
Job Template attributes:	
feed-orientation (type3 keyword)	media edge to be fed into the print engine from the paper tray
font-name-requested (name(MAX))	font name when missing from the document data (e.g. text documents)
font-size-requested (integer (1:MAX))	font size when missing from the document data (e.g. text documents)
job-hold-until-time (dateTime)	hold the job until the supplied date and time
job-phone-number (text(127))	contact telephone number for the job
job-recipient-name (name(MAX))	name of the person that is to receive the output of the job
job-save-disposition (collection)	save the Document Data of a job, such that the job can be re-printed
pdl-init-file (1setOf collection)	controls initialization of the Printer's PDL interpreter(s)
proof-print (collection)	control a proof print of the job before printing a full run of the job
Job Description attribute:	
job-printer-make-and-model (text(127))	make and model of the output device which saved this job
Printer Description	
job-creation-attributes-supported (1setOf type2 keyword)	set of Job Creation attributes supported
job-password-supported (integer(0:127))	maximum unencrypted password length supported
job-password-encryption-supported (1setOf (type3 keyword name(MAX)))	encryption methods supports for Secure Print
job-spooling-supported (type2 keyword)	indicates whether or not jobs are spooled before printing
max-save-info-supported (integer(1:MAX))	maximum number of "save-info" member attribute collections that a Printer can accept
media-col-database (1setOf collection)	set of media collections available in the printer's media database

Attribute Name (syntax)	Description
printer-detailed-status-messages (1setOf text(MAX))	additional detailed and technical information about the printer
which-jobs-supported (1setOf type2 keyword)	supported values for the “which-jobs” operation attribute of the Get-Jobs operation

244 Many of these functions MAY be specified in a document format (PDL). In such cases, the user MAY request that the
 245 application include these instructions as part of the document data when the document is generated, rather than in
 246 the IPP protocol at print time. However, some applications are unable to support some of the functions. Also some
 247 of these functions are not supported in some PDLs. Finally, in a production environment, the document may be
 248 generated separately from being printed, in which case the end user or the production printer operator supplies the
 249 instructions at print time, long after the document had been created.

250 2 Terminology

251 This section defines the following additional terms that are used throughout this document.

252 2.1 Conformance Terminology

253 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**,
 254 **NEED NOT**, and **OPTIONAL**, have special meaning relating to conformance to this document.
 255 These terms are defined in [RFC2911 section 13.1 on conformance terminology, most of which
 256 is taken from RFC 2119 [RFC2119]. Since support of the attributes defined in this specification
 257 is OPTIONAL for conformance to IPP/1.0 ([RFC2566], [RFC2565]) or IPP/1.1 ([RFC2911],
 258 [RFC2910]), the terms **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, **NEED**
 259 **NOT**, and **OPTIONAL** apply *if and only if the attribute is implemented*. Thus a feature labeled
 260 as **REQUIRED** in this document is not **REQUIRED** if implementing the basic IPP/1.1 protocol
 261 defined by [RFC2911] and [RFC2910], but is **REQUIRED** if implementing the attribute in which
 262 the term occurs.

263 2.2 Other terminology

Actual File Name	The absolute URI path to one of the job components of a saved job (See Virtual File Name.)
Document Creation Operations	The operations that create documents: Print-Job, Print-URI, Send-Document and Sent-URI.
Job Creation operation	One of the operations that creates a Job object: Print-Job, Print-URI and Create-Job. The Restart-Job operation [RFC2911] is not considered a Job Creation operation, since the Printer re-uses the existing Job object. The Validate-Job operation is not considered a Job Creation operation because no Job object is created. Therefore, when a statement also applies to either the Restart-Job and/or the Validate-Job operation, they are mentioned explicitly.
Job Instructions	Information that affects how the job and its associated documents are to be processed. This includes the Job Template Attributes, some Operation Request Attributes, and other attributes (such as defaults) that are applied to a job.
Job Save and Reprint	The Job Save and Reprint Capability is additional OPTIONAL functionality to

Capability	allow a user to save a print job as part of job processing and print it at another time. When saving a job, a user MAY specify saving parameters such as the location (remote or local) to save the Job Instructions and/or the Document Data, and/or specify the format in which the print data and job instructions are saved.
Job-Submission Operations	The Job-Submission Operations are the IPP operations that create jobs and send document content, namely Print-Job, Print-URI, Create-Job, Send-Document and Send-URI. See [RFC2911] for further information.
Precedence	The specification of the order or ranking of a series of instructions or attributes from multiple sources referring to the same functionality. See Section 3.2 of this specification for a description of the Attribute Precedence model.
Print-stream pages	The sequence of pages according to the definition of pages in the language used to express the document data defined relative to the Input Document. See Section 2.5 of [PWG5100.3] for more information.
Production Printer	A Printer that produces large quantities of high quality output, that often requires operator participation to make decisions as to the choice of job and its parameters.
Raster image	A binary representation of an image.
RIP	Raster Image Processor - a page description language interpreter.
Virtual File Name	The absolute URI path supplied by the client as a handle when saving a job that the Printer will associate with the saved job and all its job components. Whether or not the Virtual File Name is the same as the Actual File Name of one of the job components depends on the save file format. When referencing a saved job, a client MUST be able to use the Virtual File Name, and the Printer MUST resolve the Virtual File Name to identify the saved job components. For example, the difference between a Virtual File Name and an Actual File Name might be the addition of a file name extension to the Virtual File Name to reference an Actual File Name of a component (see the description of the "save-location" member attribute for the "job-save-disposition" Job Template attribute, described in this specification.) The general mechanism should be that the same value for "save-location", which is the Virtual File Name, is also used for referencing the saved job. The fact that the Actual File name of a component can be reference directly is an implementation coincidence, and should not be encouraged. However, a Printer MUST support both means of referencing a saved job in the Print-URI operation.

264

265 3 Semantics common to more than one attribute

266 3.1 Guaranteed Protocol Precedence Over the PDL and Queue Overrides

267 The IPP "pdl-override-supported" attribute has a new 'guaranteed' value which a Printer implementation uses to
 268 indicate that it can guarantee that Job Template attribute supplied in the protocol will override corresponding
 269 instructions in the PDL document data. The existing values for this attribute are 'not-attempted' and 'attempted' which
 270 are weaker than 'guaranteed'. See the description of the "pdl-override-supported" attribute in [RFC2911].

271 IPP does not preclude multiple Printer objects representing a single output device, i.e., so-called "device fan-in".
 272 [RFC2911] describes device fan-in in detail and also introduces the concept of "Printer fan-in" in which multiple Printer
 273 objects represent a single Printer object, each with the ability to accept IPP requests. "Printer fan-in" is described
 274 more fully in [RFC3998]. A system with multiple queues can be represented as separate Printer objects for each
 275 queue, using either device fan-in or Printer fan-in depending on implementation. The administrator can configure
 276 each such Printer object with different policies, including supported and default attributes. Each Printer can also have
 277 a different access control list, as well.

278 Sometimes, the system administrator needs to set up a Printer object that will override one or more attributes with a
 279 single fixed value for each attribute. These are called "queue overrides". The administrator can configure a Printer
 280 that supports the 'guaranteed' value of "pdl-override-supported" to achieve a queue override for the "xxx" attribute by
 281 configuring the "xxx-supported" Printer attribute with only a single value. That value will not only override the PDL, but
 282 it will also force the job to have that same value when queried or processed. See the description of the "pdl-override-
 283 supported" attribute in Section 8.1 of this volume.

284 3.2 Attribute Precedence

285 This section defines the precedence rules for Queue Override attributes, Page Override attributes, Document
 286 Override attributes, attributes supplied in the protocol, PDL instructions, and Printer object defaults. Since each
 287 attribute can be specified for all of these levels, it is important to define which level takes precedence when the same
 288 attribute occurs at different levels with differing values.

289 The attribute precedence model has the following features:

- 290 1) In principle, each defined attribute can occur at each of the precedence levels.
- 291 2) Attributes can be introduced and modified at different points in the job workflow, e.g., in the
 292 application, print driver, submission client, protocol, and Printer:
 - 293 • Attributes are supplied by different agents in the system: application, user, print driver,
 294 administrator, operator, Printer object, and the output device hardware.
 - 295 • Attributes are supplied at different points in time: PDL generation, job submission, job
 296 acceptance, job pending, job processing.
- 297 3) Attributes can be introduced and modified at different points in the job workflow, e.g., in the
 298 application, print driver, submission client, protocol, and Printer:

299 The following levels of precedence are defined in order of decreasing priority:

- 300 1. **queue override** - The value that the Printer enforces for any job submitted to it (see section 3.1). Set
 301 by the administrator when configuring the Printer by setting an "xxx-supported" Printer attribute to
 302 contain a single value, i.e., the override value. Example: the administrator sets the Printer's "sides" =
 303 'two-sided-long' so that all jobs submitted to that (logical) Printer are printed two-sided flipped along the
 304 long edge.

305 Note: The **queue override** level is only available for Printers that support the 'guaranteed' value for
 306 its "pdl-override-supported" attribute (see section 3.1 of this specification). All other levels are
 307 available for all Printers independent of the "pdl-override-supported" value.

- 308 2. **page override programming** - A special "overrides" collection Job Template attribute that contains the
 309 attributes **that** are to have the page override status (see [PWG5100.6]). Set by the client when
 310 submitting a job either in the protocol, or set by the user or operator after the job has been accepted

311 either using the Set-Job-Attributes operation, or by the operator using means local to the Printer.
 312 Example: "overrides" = {"page-number" = '1'; "media" = 'letterhead'}

- 313 3. **protocol job object attribute** - The Job Template attribute submitted in the protocol (IPP, LPR, etc).
 314 Set by the client when submitting a job in the protocol, or set by the user or operator after the job has
 315 been accepted either using the Set-Job-Attributes operation, or by the operator using means local to
 316 the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.
- 317 4. **PDL document data** - an instruction in the PDL document data. Set by the application or print driver
 318 that created the PDL. Example: PostScript setPageDevice specifying na-letter media.
- 319 5. **PDL Init File data** - a file that the Printer uses to initialize the PDL Interpreter before it starts
 320 interpreting each document in a Job. See description of "pdl-init-file" Job Template attribute in Section
 321 5.8 of this specification. It is immaterial how this file is specified, whether it be by a queue override, job
 322 object attribute or printer default – the precedence of the contents of this file is at this level.
- 323 6. **printer default** - a Printer "xxx-default" attribute that is applied by the Printer provided that none of the
 324 higher levels have supplied a value. The Printer implementation MUST supply values for all of the
 325 Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For
 326 example, if the output device will use media from the large-capacity input tray if not directed otherwise,
 327 the implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity'
 328 keyword value without requiring the administrator to configure that value. The implementation MUST
 329 allow the administrator to configure the Printer's "xxx-default" attributes to other values, if other value
 330 are supported by the implementation. Example: The administrator changes the Printer's "media-
 331 default" from 'large-capacity' to 'na-letter'.

332 Note: Because of the requirement that the implementation supply pre-configured values for
 333 the Printer's "xxx-default" attributes, there is no need for a lower "hardware default"
 334 precedence level.

335 3.3 Job Save and Reprint Capability

336 The Job Save and Reprint Capability is additional OPTIONAL functionality to allow a user to save a print job as part of
 337 job processing and print it at another time. When saving a job, a user MAY specify saving the Document Data, and
 338 specify the format in which the print data is saved. These semantics necessitate the definition of additional values for
 339 the "job-state-reasons" Job Description attribute, the "job-printer-make-and-model" Job Description attribute, and the
 340 use of the Print-URI operation to print these saved jobs.

341 This section, in conjunction with the description of the "job-save-disposition" Job Template attribute (see section 5.7)
 342 fully describe the Job Save and Reprint Capability.

343 3.3.1 Reprinting Saved Jobs

344 This section defines the method by which to reprint the saved job using the Print-URI operation.

345 3.3.1.1 Reprinting using the Print-URI operation

346 Job Reprint is accomplished by using the Print-URI operation. First a client requests the Printer to create a saved job
 347 by supplying the "job-save-disposition" Job Template attribute in a Job Creation operation (see description in section
 348 5.7) with a URI value for the "save-location" member attribute and a name value for the "save-name" member
 349 attribute. To reprint the saved job, a client concatenates the original "save-location" and "save-name" values into a
 350 URI reference value to the saved job using the "document-uri" (uri) operation attribute (in Group 1) of the Print-URI

351 operation (see [RFC2911]). The "document-uri" attribute value MUST be a URI reference to an object in saved
 352 document format (see description of "save-document-format" member attribute in the "job-save-disposition"
 353 description in Section 5.7). The Printer MAY perform implementation dependent actions in order to resolve the URI,
 354 since the URI MAY be a Virtual Name (see section 2.2 and the "save-location" member attribute of "job-save-
 355 disposition" described in Section 5.7.1.2.3.1), or an Actual File Name (see section 2.2), that the Printer uses to
 356 determine the locations of the saved job's component files and directories.

357 If the "document-uri" operation attribute value in the Print-URI request is a valid reference to a PDL document format,
 358 and the Printer object supports that format as specified by the "document-format-supported" Printer Description
 359 attribute, the Printer processes the job as defined by the Print-URI operation defined in [RFC2911].

360 4 Operation attributes

361 4.1 job-password (octetString(255))

362 This Operation attribute may OPTIONALLY be included in the request of the following Job Creation operations: Print-
 363 Job, Print-URI, and Create-Job.

364 The OPTIONAL "job-password" operation attribute allows a user to perform Secure Print. The user enters a
 365 password in the job submitting application which is encrypted by the client using one of the methods specified by the
 366 "job-password-encryption-supported" attribute. The encrypted password is sent to the Printer as the value of the "job-
 367 password" attribute. If a "job-password" value is provided, the printer MUST hold the job in the 'pending-held' state,
 368 and the 'job-password-wait' value is added to the "job-state-reason" attribute.

369 The user enters the same password at the device to release the job for printing. The Printer uses the same
 370 encryption method specified in the "job-password-encryption" attribute on this password. The printer MUST resume
 371 the print job when the locally-supplied encrypted password matches the value of the "job-password" attribute. The
 372 method in which the password is entered and validated at the Printer is implementation dependent.

373 The "job-password" attribute value MUST NOT be returned in a Get-Job-Attributes response.

374 If a "job-password" attribute value other than a zero-length string is provided in a job creation operation, the job is
 375 placed into the 'pending-held' state, and the 'job-password-wait' value is added to the "job-state-reason" attribute.

376 Other jobs may be printed before the release of the Secure Print Job from the 'pending-held' state. If the Secure Print
 377 Job is released by the user while another job is printing, the Secure Job MUST NOT resume printing until the current
 378 job is done printing. The Secure Job SHOULD be the next job printed after the current job, unless there is another
 379 job in the Printer which has a higher priority than the Secure Job as determined by the "job-priority" attribute.

380 4.2 job-password-encryption (type3 keyword | name(MAX))

381 The "job-password-encryption" attribute specifies the type of encryption used for the value of the "job-password"
 382 attribute in the request of the following Job Creation operations: Print-Job, Print-URI, and Create-Job. The client
 383 MUST supply this operation attribute whenever the "job-password" attribute is supplied.

384 The valid keyword values are the same as the valid values for the "job-password-encryption-supported" attribute (See
 385 description below in section 7.3).

Comment [th2]: ISSUE: The IPP WG discussed on 8/18/09 that it was better to use an integer(1:MAX) "job-id" handle that the Printer generates for the Saved Job object which the client then uses to reference a Saved Job object rather than the URI "save-location" / "save-name" that the client supplied in the "job-save-disposition". OK?

Comment [th3R2]: ISSUE: The "document-uri" operation attribute of the Print-URI operation is defined to reference a printable document. It's not good to overload the "document-uri" attribute to reference a Saved Job object. Instead, OK to re-print using the existing Reprocess-Job operation which takes the "job-id" integer(1:MAX) value hat the Printer generates for the Saved Job object and reprints an exact copy of the Saved Job object?

Comment [th4R3]: ISSUE: Ok to introduce a new Resubmit-Job operation that allows the client to identify a Saved Job object using the "job-id" integer(1:MAX) value generated by the Printer and to supply additional operation and Job Template attributes to augment and override attributes supplied in the Saved Job object?

Comment [th5R4]: ISSUE: OK that the signature of the new Resubmit-Job operation is the same as Print-URI, except "job-id", instead of "document-uri"?

Comment [th6R2]: ISSUE: OK to remove the Print-URI from the draft?

386 **5 Job Template Attributes**

387 Job Template attributes describe job processing behavior and conform to a set of rules. See [RFC2911] for the
 388 complete text of the rules that apply to each Job Template attribute called "xxx".

389 **5.1 feed-orientation (type3 keyword)**

390 The OPTIONAL "feed-orientation" Job Template attribute specifies the media edge which is fed into the print engine
 391 from the paper tray. Long-edge-first is the preferred method of feeding media to attain the fastest printing speed.
 392 Certain media will have adverse effects when fed from a certain direction; for instance, some labels will peel off in the
 393 paper path when fed long-edge-first, but not when fed short-edge-first. The feed orientation also may allow the job to
 394 be finished in more acceptable ways; for instance, a stationary finishing stapler may provide a preferred stapling
 395 location when the media is fed short-edge-first.

396 When this attribute is specified, the printer selects media that has already been loaded in the requested orientation. If
 397 the media is not currently loaded in the requested orientation, the job may enter the 'processing-stopped' state with a
 398 "job-state-reason" of 'resources-are-not-ready'.

399 Standard keyword values are:

Keyword	Description
'long-edge-first'	The specified media is fed using the long edge first.
'short-edge-first'	The specified media is fed using the short edge first.

400 This attribute allows a PDL interpreter to determine which way to send the image data to the frame buffer for
 401 imposition on the media. Although Postscript supports this attribute as a PDL construct, support in other PDLs such
 402 as PCL and TIFF are dependent on the implementation. Therefore, this attribute is defined to be specified as a Job
 403 Template attribute such that printers may use this feature with PDLs other than Postscript. Some printer
 404 implementations may be able to internally determine the best feed orientation to use so that if this attribute was sent
 405 over the wire to the printer, the attribute would be ignored.

406 This attribute has no special interaction with the "orientation-requested" attribute. It is possible to print a portrait
 407 document on either SEF (short edge feed) or LEF (long edge feed) paper, and likewise for landscape documents.
 408 However, this may affect staple placement and other finishing, depending on the device's capabilities.

409 This attribute applies as to how the media is loaded into the tray rather than the media itself, and is therefore a job-
 410 level attribute rather than a media collection member attribute. This attribute may be used with "overrides" just as any
 411 other Job Template attribute (see [PWG5100.6]).

412 **5.1.1 feed-orientation-default (type3 keyword)**

413 The "feed-orientation-default" (type3 keyword) Printer attribute specifies the default value of "feed-orientation" when
 414 not supplied in a request. This default depends upon the media-size being requested and is printer implementation
 415 dependent upon how the default value is calculated.

416 5.1.2 feed-orientation-supported (1setOf (type3 keyword))

417 The "feed-orientation-supported" (1setOf (type3 keyword)) Printer attribute specifies which values of "feed-orientation"
418 that the Printer supports.

419 5.2 font-name-requested (name(MAX))**420 5.2.1 font-name-requested-default (name(MAX))****421 5.2.2 font-name-requested-supported (1setOf name(MAX))**

422 This extension enables an IPP client to specify what default font name the printer MUST use to print a job if the
423 document data is in a format that does not have inherent font information (e.g., 'text/plain'). For document formats
424 which have inherent font information (such as PostScript), this attribute will be ignored and will NOT override that
425 information.

426 For some document formats (such as 'application/postscript'), the desired default font name of the print-stream pages
427 is specified within the document data. This information is generated by a device driver prior to the submission of the
428 print job. Other document formats (such as 'text/plain') do not include the notion of desired font name within the
429 document data. In the latter case it is possible for the Printer object to bind the desired font name to the document
430 data after it has been submitted. It is expected that a Printer object would only support "font-name-requested" for
431 some document formats (e.g., 'text/plain' or 'text/html') but not others (e.g., 'application/postscript'). This PDL-
432 dependent behavior is no different than any other Job Template attribute since a Printer object may support or not
433 support any Job Template attribute based on the document format supplied by the client. However, a special mention
434 is made here since it is very likely that a Printer object will support "font-name-requested" for only a subset of the
435 supported document formats.

436 This attribute can be specified as a Document Override that affects the Input-Document. The use of this attribute on
437 a Page override basis is not supported since changing the font characteristics can affect the pagination.

438 NOTE: The use of the "xxx-requested" pattern for attribute names indicates that the value of the attribute is to be
439 used ONLY in the case when a value for the attribute is not contained within the source document. This value will
440 override the printer's default value but will not override the source document's value. See the description of the
441 "orientation-requested" Job Template attribute later in [RFC2911].

442 5.3 font-size-requested (integer (1:MAX))**443 5.3.1 font-size-requested-default (integer (1:MAX))****444 5.3.2 font-size-requested-supported (1setOf rangeOfInteger (1:MAX))**

445 This extension enables an IPP client to specify what default font size the printer MUST use to print a job if the
446 document data is in a format that does not have inherent font information (e.g., 'text/plain'). For document formats
447 which have inherent font information (such as PostScript), this attribute will be ignored and will NOT override that
448 information.

449 For some document formats (such as 'application/postscript'), the desired default font size of the print-stream pages
450 is specified within the document data. This information is generated by a device driver prior to the submission of the
451 print job. Other document formats (such as 'text/plain') do not include the notion of desired font size within the
452 document data. In the latter case it is possible for the Printer object to bind the desired font size to the document data
453 after it has been submitted. It is expected that a Printer object would only support "font-size-requested" for some
454 document formats (e.g., 'text/plain' or 'text/html') but not others (e.g., 'application/postscript'). This PDL-dependent
455 behavior is no different than any other Job Template attribute since a Printer object may support or not support any
456 Job Template attribute based on the document format supplied by the client. However, a special mention is made
457 here since it is very likely that a Printer object will support "font-size-requested" for only a subset of the supported
458 document formats.

459 The "font-size-requested" units are points, equivalent to 1/72nd of an inch.

460 This attribute can be specified as a Document Override that affects the Input-Document. The use of this attribute on
461 a Page override basis is not supported since changing the font characteristics can affect the pagination.

462 NOTE: The use of the "xxx-requested" pattern for attribute names indicates that the value of the attribute is to be
463 used ONLY in the case when a value for the attribute is not contained within the source document. This value will
464 override the printer's default value but will not override the source document's value. See the description of the
465 "orientation-requested" Job Template attribute in [RFC2911].

466 5.4 job-hold-until-time (dateTime)

467 This attribute permits the client to specify the date and time after which the Job MUST become a candidate for
468 processing.

469 Note: The client application has the choice to present the "job-hold-until-time" to the end user as either a delta time
470 (the amount of time until the job is no longer held), or a fixed time when the job will no longer be held. The fixed time
471 is represented using the appropriate time zone(s) (usually the client's time zone, or the Printer's time zone, or both if
472 the client is capable). See the description of "printer-current-time" in [RFC2911].

473 If the Printer supports the "job-hold-until-time" attribute, the "job-hold-until" attribute MUST also be supported.
474 However, if the "job-hold-until" attribute is supported, the "job-hold-until-time" attribute NEED NOT be supported. If
475 the Printer supports the "job-hold-until-time" attribute, the "printer-current-time" (dateTime) Printer Description
476 attribute MUST also be supported.

477 The client MUST NOT supply both the "job-hold-until" and "job-hold-until-time" Job Template attributes in a Job
478 Creation request. If the client supplies such a mal-formed request by supplying both, the Printer MUST (depending
479 on implementation) either:

- 480 1. reject the request and return the 'client-error-bad-request' status code (see [RFC2911]) or
- 481 2. use either the "job-hold-until" or the "job-hold-until-time" attribute, independent of the value of the "ipp-attribute-
482 fidelity" attribute supplied by the client.

483 An Activity Diagram for "job-hold-until-time" is shown in Figure 1 below. A Hold Job request is sent by the Client with
484 a "job-hold-until-time" value specified as a dateTime. The Printer calculates the number of seconds between the "job-
485 hold-until-time" value and the "printer-current-time" value. If this number of seconds is NOT in the range specified by
486 the Printer's "job-hold-until-time-supported" attribute value, then the Printer either:

- 487 1. rejects the request with the 'client-error-attributes-or-values-not-supported' status code (see [RFC2911]) if the
488 "ipp-attribute-fidelity" is 'true' or
- 489 2. accepts the request with the 'successful-ok-ignored-or-substituted-attributes', if the client-supplied "ipp-attribute-
490 fidelity" is 'false'. Also, the Printer MUST return the "job-hold-until-time" attribute and the client-supplied value in

491 the Unsupported Attributes group of the operation response. If the "job-hold-until-time" value is earlier than the
492 "printer-current-time" value plus the minimum value of "job-hold-until-time-supported", the Printer MUST set the
493 value of the Job's "job-hold-until-time" to the current dateTime plus the minimum time. Also, if the "job-hold-until-
494 time" value is later than the "printer-current-time" value plus the maximum value of "job-hold-until-time-
495 supported", the Printer MUST set the value of the Job's "job-hold-until-time" to the current dateTime plus the
496 maximum time.

497 If the job is accepted, the Printer then determines the state in which to place this job. If the dateTime value is equal to
498 or sooner than the Printer's "printer-current-time" dateTime value, then no hold is placed on the job and the job moves
499 into the pending state (assuming there are no other reasons to hold the job).

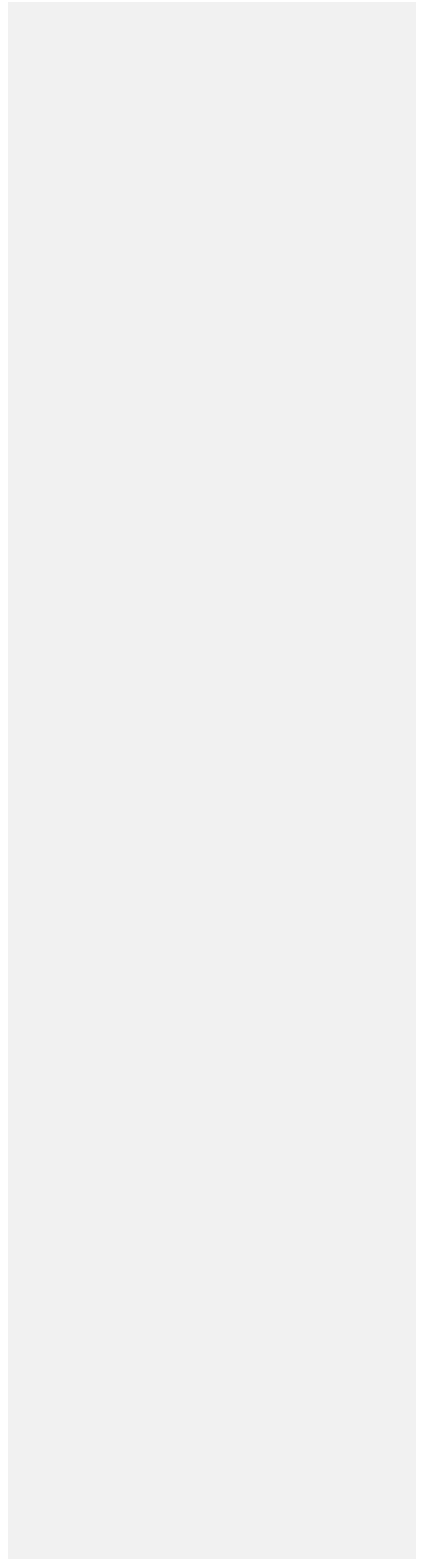
500 If the value of this attribute specifies a time period that is in the future, the Printer 1) SHOULD add the 'job-hold-until-
501 specified' value to the job's "job-state-reasons" attribute, 2) MUST move the job to the 'pending-held' state, and 3)
502 MUST NOT schedule the job for printing until the specified time arrives. When the specified time arrives, the Printer
503 MUST remove the 'job-hold-until-specified' value from the job's "job-state-reason" attribute and, and then if there are
504 no other job state reasons that keep the job in the 'pending-held' state, the Printer MUST consider the job as a
505 candidate for processing by moving the job to the 'pending' state.

506 **5.4.1 Why there is no job-hold-until-time-default**

507 There is no attribute "job-hold-until-time-default" because it would either be a fixed time in the future or would have to
508 be updated periodically. Neither seem useful enough to be worth the complexity.

509 **5.4.2 job-hold-until-time-supported (rangeOfInteger(0:MAX))**

510 A range of integer values of the "job-hold-until-supported" attribute specifies the span of relative amount of time in
511 seconds into the future that the printer supports keeping the submitted job in the 'pending-held' state. The Printer
512 MUST use the time range to validate a job that is submitted with a "job-hold-until-time" attribute.



519 **5.6 job-recipient-name (name(MAX))**

520 **5.6.1 job-recipient-name-default (name(MAX))**

521 **5.6.2 job-recipient-name-supported (boolean)**

522 This attribute contains the name of the person that is to receive the output of the job. The value of the "job-recipient-
 523 name" attribute is commonly printed on job sheets printed with the job. An example of another use of the "job-
 524 recipient-name" attribute is if the printer accesses a database to get job delivery instructions for the recipient of a job.
 525 A zero-length value indicates that there is no job recipient name.

526 If the client omits this attribute in a create request, the printer MAY use the "job-recipient-name-default" attribute
 527 value, unless it has not been configured by the administrator, or MAY use the "authenticated user" name (see
 528 [MOD1.1] section 8.3), depending on implementation.

529 **5.7 job-save-disposition (collection)**

530 The "job-save-disposition" Job Template attribute is used to archive/save the Document Data of a job, such that the
 531 job can be re-printed on demand at some undefined time in the future. See also section 3.3 of this specification for a
 532 detailed description of the Job Save and Reprint Capability.

533 If a Printer object is able to save a Job in a particular document format, the Printer SHOULD be able to ingest that
 534 document format for reprint using the Print-URI operation.

535 **Interaction with "job-hold-until"**: The "job-hold-until" attribute causes the job to be moved to the 'pending-held'
 536 state, which prevents processing of the job. The "job-save-disposition" attribute on the other hand does not become
 537 relevant until the job is moved to the 'processing' state. These two attributes can be used in tandem with no adverse
 538 interactions.

539 **5.7.1 Member Attributes for the "job-save-disposition" Job Template Attribute**

540 The member attributes of the "job-save-disposition" attribute are:

541 **Table 2 - "job-save-disposition" member attributes**

Member Attribute Name	Attribute Syntax	Request	Printer Support
save-disposition	type3 keyword	MUST	MUST
save-info	1setOf collection	MAY	MUST

542 **5.7.1.1 save-disposition (type3 keyword)**

543 The "save-disposition" member attribute specifies whether or not the job MUST be printed and/or saved. When a job
 544 moves into the 'processing' state, the value of the member attribute "save-disposition" is checked to determine what
 545 is to happen during the 'processing' state.

546 The "save-disposition" member attribute specifies processing steps that either MUST occur or that are prohibited.
 547 However, other processing steps MAY occur during the 'processing' state, provided they are not prohibited by the
 548 value of the "save-disposition" member attribute.

549 Standard keyword values are:

Keyword	Description	Printer Support
'none'	<p>The Printer MUST print the job. The Printer MUST NOT save any portion of the job except for processing purposes. The Printer MUST NOT apply the "job-save-disposition-default" attribute.</p> <p>If the print was successful, the Printer MUST add the 'job-completed-successfully' value to the job's "job-state-reasons" attribute.</p> <p>If the printing had (1) warnings or (2) errors (possibly with warnings), the Printer MUST add the 'job-completed-with-warnings' or 'job-completed-with-errors' value, respectively.</p>	MUST
'save-only'	<p>The following constraints apply to the 'processing' of the job:</p> <ul style="list-style-type: none"> The job MUST NOT be printed. The Document Data MUST be saved to the location specified by the "save-location" member attribute. <p>The Printer's job scheduling algorithm MAY depend on whether or not the job is 'save-only'. However, the Printer MUST save the job while the job is in the 'processing' state (the job's "job-state" attribute is set to 'processing'). Thus the Printer MUST move the job (typically from the 'pending' state) to 'processing' state and add the 'job-saving' value (see description of new "job-state-reasons" later in section 8.3) to the job's "job-state-reasons" attribute.</p> <p>When the Printer completes saving the job, the Printer MUST move the job to the 'completed' state by setting the job's "job-state" attribute to the 'completed' value and removing the 'job-saving' value (see description of new "job-state-reasons" later in section 8.3) from the job's "job-state-reasons" attribute.</p> <p>If the save was not successful, the Printer MUST add the 'job-save-error' value to the job's "job-state-reasons" attribute (see description of new "job-state-reasons" later in section 8.3). If the Printer encounters an error during saving, such that a reprint of that job using the Print-URI URI operation (see section 3.3.1.1) will not produce complete results, the Printer MUST ensure that the saved job is not accessible for such a reprint in some IMPLEMENTATION DEFINED way.</p>	MUST
'print-save'	<p>The following constraints apply to the 'processing' of the job:</p> <ul style="list-style-type: none"> The job MUST be printed. The Document Data MUST be saved to the location specified by the "save-location" member attribute. <p>The order of the processing steps required for the 'print-save' disposition is implementation dependent. However, the Printer MUST save the job during the same period that it prints the job, namely, while the job is in the 'processing' state (the job's "job-state" attribute is set to 'processing'). Thus the Printer MUST move the job (typically from from the 'pending' state) to 'processing' state and add the 'job-printing' and 'job-saving' value (see description of new "job-state-reasons" later</p>	MUST

Comment [th11]: ISSUE: The IPP WG agreed on 8/18/2009 that the Printer MUST generate a separate Saved Job object and assign it a different "job-id" (integer(1:MAX)) from that of the submitted job to represent the saving of the job. This simplifies accounting and keeps track of the two separate activities of printing and saving. In other words, there is a process fork, even for 'save-only'. So OK to remove the language about the submitted job being in the processing state while the Printer generates the Saved Job; the separate state of the Saved Job object should represent the state of the Saved Job.

Comment [th12]: ISSUE: The IPP WG agreed on 8/18/2009 that the Printer MUST generate a separate Saved Job object and assign it a different "job-id" (integer(1:MAX)) from that of the submitted job to represent the saving of the job. In other words, there is a process fork, even for 'save-only'. So OK to remove the 'job-saving' state reason from the draft?

Comment [th13]: ISSUE: OK to add that the Printer MUST generate a new "job-id" (integer(1:MAX)) value for the Saved Job object and return it as a Job Description attribute with the name "save-job-id" on the submitted job, so that the client knows what the "job-id" value is that the Printer generated for the associated Save Job object?

Comment [th14R13]: ISSUE: OK to add that the Printer MUST generate a new "job-uri" (uri) value for the Saved Job object and return it as a Job Description attribute with the name "save-job-uri" on the submitted job, so that the client knows what the "job-uri" value is that the Printer generated for the associated Save Job object? Then the Saved Job object has the same two handles available to clients as any other IPP Job.

in section 8.3) to the job's "job-state-reasons" attribute at the appropriate times.

When the Printer completes saving the job, then the Printer MUST move the job to the 'completed' state by setting the job's "job-state" attribute to the 'completed' value and removing the 'job-printing' and 'job-saving' (see description of new "job-state-reasons" later in section 8.3) values from the job's "job-state-reasons" attribute.

If both the save and the print were successful, the Printer MUST add the 'job-completed-successfully' value to the job's "job-state-reasons" attribute.

If the printing had (1) warnings or (2) errors (possibly with warnings), the Printer MUST add the 'job-completed-with-warnings' or 'job-completed-with-errors' value, respectively.

As with the 'save-only' value, if the save was not successful, the Printer MUST add the 'job-save-error' value to the job's "job-state-reasons" attribute (see description of new "job-state-reasons" later in section 8.3). 8.3).

550 5.7.1.1.1 save-disposition-supported (1setOf type3 keyword)

551 The "save-disposition-supported (1setOf type3 keyword)" Printer attribute defines the save dispositions supported by
552 the Printer for the "save-disposition" member attribute (see standard keyword values in above table).

553 5.7.1.2 save-info (1setOf collection)

554 The "save-info" member attribute is a collection that contains the attributes that tell the printer how to save the job.
555 This includes the format in which the Document Data MUST be saved, and the location to which these are saved.
556 Multiple save locations or document formats MAY be saved by specifying multiple collections within this attribute.

557 If the client supplies the "job-save-disposition" Job Template attribute, but omits the "save-info" member attribute, the
558 Printer supplies a single collection value for the "save-info" member attribute from the values of its "save-location-
559 default" attribute, the job's "job-name", and its "save-document-format-default" attribute (see descriptions immediately
560 below).

561 A client MUST supply in a request a number of collections not to exceed the maximum number supported specified in
562 the "max-save-info-supported" Printer Description attribute (see "max-save-info-supported" description in section 7.5).
563 As with any Job Template attribute, if the client does supply more values than the Printer supports and the values of
564 the "ipp-attribute-fidelity" is 'false' (or omitted), the Printer MUST accept the job, return the 'successful-ok-ignored-or-
565 substituted-attributes' status code, return the ignored values in the Ignored Attributes group, use the first n values,
566 and ignore the remaining values. If the client does supply more values than the Printer supports and the values of the
567 "ipp-attribute-fidelity" is 'true', the Printer MUST reject the request and return the 'client-error-request-entity-too-large'
568 status code.

569 5.7.1.2.1 There is no save-info-default Printer attribute

570 There is no "save-info-default" Printer attribute. If the client supplies the "job-save-disposition" Job Template attribute,
571 but omits the "save-info" member attribute, the Printer creates a single collection value for the "save-info" member
572 attribute using from the Printer's "save-location-default" and "save-document-format-default" Printer attributes and the
573 job's "job-name" attribute (see "save-info" description above).

574 **5.7.1.2.2 save-info-supported (1setOf type2 keyword)**

575 The "save-info-supported (1setOf type2 keyword)" attribute identifies the names of the member attributes supported
 576 in the "save-info" collection attribute, i.e., the names of the member attributes in Table 3 that the Printer supports.

577 **5.7.1.2.3 Member Attributes for the "save-info" member attribute**

578 The "save-info" collection member attributes are:

579 **Table 3 - "save-info" member attributes**

Member Attribute Name	Attribute Syntax	Request	Printer Support
save-location	uri	MAY	MUST
save-name	name (MAX)	MAY	MAY
save-document-format	mimeMediaType	MAY	MUST

Comment [th15]: ISSUE: If Saved Jobs are identified by a new "job-id" generated by the Printer to re-print using Reprocess-Job and (new) Resubmit-Job, OK to remove the "save-location" (uri) attribute altogether and let the Printer decide where to store Saved Job objects?

580

581 The "save-location" member attribute specifies the path to the directory as a URI where the Printer MUST save the
 582 Document Data and other information.

583 The "save-location" and ("save-location-default" and "save-location-supported") attribute value MUST be an Absolute
 584 URI [RFC2396]. Absolute URIs are specified with a URI scheme, an optional authority component, and an absolute
 585 path (e.g., 'ftp://prinhost.printco.com/var/spool/jobdir/' or 'file:///job-repository/jobdir/').

586 **Note:** As any other member attribute of a Job Template attribute, the Printer validates the "save-location"
 587 member attribute as follows: If the client supplies the "save-location" member attribute, the value
 588 MUST match one of the values of the Printer's "save-location-supported" (1setOf uri) attribute. If the
 589 value does not match, the Printer's action depends on the value of the job's "ipp-attribute-fidelity"
 590 (boolean) attribute: If "ipp-attribute-fidelity" is 'false' or omitted, the Printer MUST accept the job,
 591 return the 'successful-ok-ignored-or-substituted-attributes' status code, return the ignored attributes
 592 in the Unsupported Attributes Group, and perform one of the following actions DEPENDING ON
 593 IMPLEMENTATION: (1) ignore the attribute and not save the job, (2) put the job in the 'held' state
 594 and let the operator fix the problem, either by changing the job's "save-location" attribute value or
 595 adding the value to the Printer's "save-location-supported" attribute, or (3) substitute the job's "save-
 596 location" value with one of the values of the Printer's "save-location-supported" values. If "ipp-
 597 attribute-fidelity" is 'true', the Printer MUST reject the request, return the 'client-error-attributes-or-
 598 values-not-supported' status code, along with the "job-save-disposition" attribute in the Unsupported
 599 Attributes Group.

600 If the client wants to put the saved job in a sub-directory (whether it exists or not) of one of the directories specified by
 601 the "save-location-supported" Printer attribute, the client supplies that sub-directory name as part of the "save-name"
 602 attribute (see "save-name" description below), not as part of the "save-location" member attribute.

603 **Note:** As with any other 'name', 'integer', 'uri', or 'collection' Job Template or Job Template member
 604 attribute, the administrator can suspend validation by configuring the Printer's "user-defined-values-
 605 supported" attribute with the 'save-location' keyword (see "user-defined-values-supported" description
 606 in [PWG5100.3]), so that the user can specify an arbitrary path and the Printer will accept the job. If
 607 the Printer cannot process the job using the specified value for "save-location", then the Printer

608 MUST hold the job so that an operator can attempt to create the necessary sub-directories to
 609 populate the path, if they don't already exist, or change the job's "save-location" attribute value. See
 610 Table 4 below entitled "Printer actions for various Job and Printer attribute values", at the end of the
 611 "job-save-disposition" description.

612 If the client supplies the "save-info" member attribute, but omits the "save-location" member attribute, the Printer
 613 supplies the "save-location" member attribute value from its "save-location-default" attribute (see "save-location-
 614 default" description below).

615 Defined Job Save URI Schemes for use in the "save-location" member attribute include:

URI Scheme	Description	Printer Support
ftp	Use IETF FTP protocol [RFC959], [RFC2228], [RFC2640]	SHOULD
file	Use the Printer's configured file system. Since the 'file:' URI scheme cannot be separated from the Printer object's native file system, the semantic of the 'file:' URI scheme is IMPLEMENTATION DEPENDENT. Also the 'file:' URI scheme on some Printer objects MAY be limited to the local file system, while on other Printer objects it MAY be configured to use a network file system. The Printer implementation MAY allow the system administrator to configure where the 'file:' scheme is based in the file system. However, the base for the 'file:' scheme MUST be the same as for all other uses of the 'file:' scheme, such as the value of the "document-uri" operation attribute in a Printer-URI operation (for print by reference reference of a saved job - see section 3.3.1.1).	SHOULD

616 It is RECOMMENDED that for each URI scheme supported for saving jobs, that all of these values have the first
 617 token in the file path be 'job-repository'. Then an administrator that has to manage the saved jobs for several Printers
 618 will have a consistent naming schemes for locating all the saved jobs by whatever means used to access the saved
 619 jobs. For example, for the 'file:' scheme, all of the values SHOULD start out with: file:///job-repository/ and for the 'ftp:'
 620 scheme, all of the values SHOULD start out with: ftp://xxx/job-repository/. (Note: in URIs, the final "/" is redundant,
 621 and the Printer MUST behave the same whether or not the final "/" is present).

622 **5.7.1.2.3.1.1 save-location-default (uri)**

623 The "save-location-default (uri)" Printer attribute indicates the value that the Printer supplies, if the client omits the
 624 "save-location" member attribute from the "save-info" member attribute.

625 **5.7.1.2.3.1.2 save-location-supported (1setOf uri)**

626 The "save-location-supported (1setOf uri)" Printer attribute defines a list of URI values supported by the Printer object
 627 for the "save-location" member attribute (see above description). The client MUST supply a value of the "save-
 628 location" member attribute that completely matches one of these values. Note: The administrator can configure the
 629 "save-location-supported" to have separate directories for individuals, groups, projects, or may just have one directory
 630 for all saved jobs. Whether or not access control is applied to these directories is IMPLEMENTATION DEPENDENT.

631

632 The "save-name" member attribute specifies the name of the saved job in the directory specified by the "save-
 633 location" member attribute. The client can supply a "save-name" attribute value that is either a simple file name or a
 634 relative path where each component of the path is separated by a "/" character. The "save-name" member attribute
 635 value concatenated with the "save-location" attribute value (supplying a "/" between them, if necessary) specifies a

Comment [th16]: ISSUE (repeat): OK to remove "save-location" member attribute?

636 Virtual File Name (see definition in Section 2.2) that will be associated with the saved job. For example, if "save-
637 location" is 'a/b' or 'a/b/' and 'save-name' is 'c/d', the resulting Virtual File name is: 'a/b/c/d'.

638 The actual job saved by the Printer object are a function of the "save-document-format" attribute value.
639 Some values of the "save-document-format" attribute MAY cause the Printer to append a file type extension to the
640 Virtual File Name supplied by the client in the "save-name" attribute.

641 If the "save-name" attribute value specifies a handle that would require a sub-directory to be created, the Printer
642 MUST attempt to create that sub-directory. Access control MAY prevent the Printer from creating such a sub-
643 directory, DEPENDING ON IMPLEMENTATION, including configuration.

644 If the "save-name" attribute value in combination with the "save-location" attribute value specifies a handle that
645 already exists, the Printer MUST accept the job, return the 'successful-ok' status code, hold the job, and prompt an
646 administrator in an IMPLEMENTATION-DEFINED manner to change the job's "save-location" or "save-name"
647 attribute values before processing the job. The Printer MUST hold the job independent of the value of the "ipp-
648 attribute-fidelity" (since with operator assistance, the Printer is able to save the job) and whether or not the 'save-
649 name' keyword has been configured as a value of the Printer's "user-defined-values-supported" attribute. See Table
650 4 below entitled "Printer actions for various Job and Printer attribute values", at the end of the "job-save-disposition"
651 description. Note: A "job-save-disposition" member attribute to control the Printer's action (reject job, over write file,
652 hold job and prompt administrator, or auto-generate a non-conflicting name) to resolve any URI conflict may be a
653 desirable future extension.

654 If the "save-name" member attribute is not specified by the client in the "job-save-disposition" Job Template attribute,
655 the Printer object MUST generate a "save-name" attribute value for the job using the job's "job-name" attribute value.
656 Note: Printers MUST generate a "job-name" value, when the client does not supply a "job-name" operation attribute
657 (see Print-Job operation), so there is always a "job-name" value. After generating the "save-name" value, the Printer
658 MUST handle any conflict between the generated value and the existing values as above.

659 **5.7.1.2.3.2.1 There is no "save-name-default" Printer attribute**

660 There is no "save-name-default". If the client omits the "save-name" member attribute when supplying the "save-info"
661 member attribute, the Printer uses the job's "job-name" attribute as the value of the "save-name" attribute (described
662 above).

663 **5.7.1.2.3.2.2 save-name-supported (boolean)**

664 The "save-name-supported (boolean)" attribute indicates support for the OPTIONAL "save-name" member attribute of
665 the "save-info" member attribute. Note: The means to query the Printer to see what saved jobs it has is a potential
666 future extension.

667

668 The "save-document-format" member attribute indicates the document format in which the job content (Document
669 Data) MUST be saved. If the "job-save-disposition" attribute is supported, the printer object MUST support the "save-
670 document-format" member attribute.

671 If the client supplies the "save-info" member attribute, but omits the "save-document-format" member attribute, the
672 Printer MUST use the value of its "save-document-format-default" attribute (see above "save-info" description).

673 Although there can be a many-to-one relationship of documents to a job, all documents in a job specified with a
674 disposition of 'save' or 'print-save' MUST be saved in the same format as specified by the "save-document-format"
675 attribute value. A job MAY be saved to multiple formats by specifying multiple collection values for the "save-info"
676 member attribute.

Comment [th17]: **ISSUE:** Now that each Saved Job object is separately identified by a "job-id" integer(1:MAX) value, instead of a "save-locatoin" / "save-name" pair, there can be any number of Saved Job objects with the same "save-name" value. Therefore, OK to remove this language about "save-name" that already exists?

677 The "job-save-disposition" member attribute (and the "save-document-format" member attribute) is NOT defined to be
 678 used with the "page-overrides" attribute (see [PWG5100.6]). Thus all documents MUST be saved in the same
 679 document format in each saved job.

680 The 'mimeMediaType' values defined for the "save-document-format" attribute are listed in the Table below. All
 681 values MUST include saving PDL data. A Printer MUST support at least one value. However, at this time, this
 682 specification does NOT REQUIRE a Printer to support any particular formats for saving jobs.

683 If the saved job is submitted to a different make-and-model printer that supports the same document-format (i.e., the
 684 same value of the "document-format" operation attribute in the Document Creation request), then the Printer MUST
 685 be able to print the job, but the output cannot be guaranteed to appear exactly the same as the original output.

MIME Media Type	Description
any PDL document format	If any PDL document-format value is supplied from the Printer's "document-format-supported" attribute, such as 'application/postscript', then the Printer MUST save the PDL data in that document format. The 'application/octet-stream' value MUST NOT be supplied for this attribute since it doesn't make any sense for saving jobs.

686 The referenced specifications that define the saved format MUST meet the conformance requirements listed in
 687 section 9.3.1.3.

688 A "hard-proof" is when the user want to print one copy of a job to review before printing the remaining copies. This
 689 can be accomplished using the "job-save-disposition" attribute by setting the "save-disposition" attribute to 'print-save'
 690 with the "copies" attribute set to 1. The job is printed and saved. If the proof is satisfactory, the user submits a Print-
 691 URI request (see section 3.3.1.1) to print the saved job with no "job-save-disposition" specified and the "copies"
 692 attribute set to the desired value.

693 **5.7.1.2.3.3.1 save-document-format-default (mimeMediaType)**

694 If the client supplies the "save-info" member attribute, but omits the "save-document-format" member attribute (see
 695 above description), the Printer MUST use the value of its "save-document-format-default" (mimeMediaType) attribute.

696 **5.7.1.2.3.3.2 save-document-format-supported (1setOf mimeMediaType)**

697 The "save-document-format-supported" (1setOf mimeMediaType) attribute specifies the document formats which a
 698 Printer supports for saving jobs.

699 If a Printer supports this Job Save & Reprint Capability, the Printer SHOULD be able to accept all of the formats for
 700 Reprint using the Print-URI operation (see Section 3.3.1.1) as the formats in which it is capable of saving jobs, i.e.,
 701 the mimeMediaType values of the Printer's "document-format-supported" Printer Description attribute SHOULD be a
 702 superset of the values of the Printer's "save-document-format-supported" attribute. For example, if a Printer supports
 703 the 'application/X-single-page-tiff' format for saving jobs, it SHOULD also accept and support 'application/X-single-
 704 page-tiff' format in a Printer-URI operation as indicated by the 'application/X-single-page-tiff' also being a value of the
 705 Printer's "document-format-supported" Printer Description attribute (along with PDL mimeMediaType values, such as
 706 'application/postscript').

707

708 This section lists the Printer actions for various combinations of "save-location" (uri), "save-name" (name(MAX)),
 709 "save-location-supported" (1setOf uri), existing saved jobs, ipp-attribute-fidelity (boolean), "user-defined-values-
 710 supported" (1setOf keyword) and Printer actions.

- 711 The possible Printer actions are (see above descriptions of "save-location" and "save-name" for details):
- 712 1. reject: The Printer rejects the Job Creation request, returns the 'client-error-attributes-or-values-not-
713 supported' status code and the "job-save-disposition" attribute and value in the Unsupported Attributes group.
- 714 2. accept-save: The Printer accepts the Job Creation request, returns the 'successful-ok' status code, and
715 attempts to create all necessary files and sub-directories.
- 716 3. accept-substitute: The Printer accepts the Job Creation request, returns the 'successful-ok-ignored-or-
717 substituted-attributes' status code and the "job-save-disposition" attribute and value in the Unsupported
718 Attributes group, and, DEPENDING ON IMPLEMENTATION: (1) ignores the attribute and does not perform
719 the save, (2) puts the job in the 'held' state and let the operator fix the problem, either by changing the job's
720 "save-location" attribute value or adding the value to the Printer's "save-location-supported" attribute, or (3)
721 substitutes the job's "save-location" value with one of the values of the Printer's "save-location-supported"
722 values.
- 723 4. accept-hold: The Printer accepts the Job Creation request, returns the 'successful-ok' status code, and holds
724 the job for the operator to resolve the conflict so that the job can be saved.

725 Table 4 shows the Printer actions for the various possible value combinations of the other Job and Printer attributes.
726 In the example, there is already one saved job: 'a/bar'. The Printer supports three save-location directories: a, b, c.

727 **Table 4 - Printer actions for various Job and Printer attribute values**

MIME Media Type	save-name	save-location-supported	existing saved jobs	ipp-attribute-fidelity	user-defined-values-supported	Printer action
a	foo	a, b, c	a/bar	T F	none	accept-save
a	d/foo	a, b, c	a/bar	T F	none	accept-save
a	bar	a, b, c	a/bar	T F	none	accept-hold
d	foo	a, b, c	a/bar	F	none	accept-substitute
d	foo	a, b, c	a/bar	T	none	reject
a/d	foo	a, b, c	a/bar	F	none	accept-substitute
a/d	foo	a, b, c	a/bar	T	none	reject
a	foo	a, b, c	a/bar	T F	save-location	accept-save
a	d/foo	a, b, c	a/bar	T F	save-location	accept-save
a	bar	a, b, c	a/bar	T F	save-location	accept-hold
d	foo	a, b, c	a/bar	F	save-location	accept-hold
d	foo	a, b, c	a/bar	T	save-location	accept-hold
a/d	foo	a, b, c	a/bar	F	save-location	accept-hold
a/d	foo	a, b, c	a/bar	T	save-location	accept-hold

728 **5.7.2 job-save-disposition-default (collection)**

729 The "job-save-disposition-default (collection)" attribute specifies the "job-save-disposition" member attributes and
730 values that the Printer will provide, if any, if the client omits the "job-save-disposition" collection attribute. A Printer
731 MUST support the same member attributes for these default attributes as it supports for the corresponding Job
732 Template attributes (see Table 2).

733 The "save-info" (1setOf collection) member attribute of the "job-save-disposition-default" Printer attribute specifies the
734 save information member attributes and values that the Printer will provide, if any, if the client omits the "job-save-
735 disposition" Job Template attribute entirely. A Printer MUST support the same member attributes for these default

736 attributes as it supports for the corresponding Job Template attributes (see Table 2 and Table 3), with the single
737 exception, that the "save-name" member attribute MUST NOT be supported (since the Printer MUST use the "job-
738 name" attribute to generate the default "save-name").

739 If the client supplies the "job-save-disposition" Job Template attribute, but omits the "save-info" member attribute, the
740 Printer uses its "save-location-default" and "save-disposition-default" Printer attributes and the job's "job-name"
741 attribute to create the job's "save-info" member attribute, rather than using the "save-info" member attribute of the
742 Printer's "job-save-disposition-default" attribute (see "save-info" description above).

743 **5.7.3 job-save-disposition-supported (1setOf type2 keyword)**

744 The "job-save-disposition-supported (1setOf type2 keyword)" attribute identifies the names of the member attributes
745 supported in the "job-save-disposition" collection attribute, i.e., the names of the member attributes in Table 2 that the
746 Printer supports. The RECOMMENDED way for a client to determine whether or not a Printer support saving jobs, is
747 to query this Printer attribute.

748 **5.8 pdl-init-file (1setOf collection)**

749 This optional Job Template attribute controls initialization of the Printer's Page Description Language (PDL)
750 interpreter. This attribute specifies the files that the Printer uses to initialize the PDL interpreter before it starts
751 interpreting each Input Document (i.e. file) in a Job with one exception. When the value of "multiple-document-
752 handling" is 'single-document' or 'single-document-new-sheet', a PDL interpreter processes all of the Input-
753 Documents of a Job as if the Input Documents were a single file. In this case, the PDL interpreter is initialized just
754 before processing the first Input Document only.

755 Some PDLs (i.e. PostScript and HP PCL) have the ability to define reusable macros, code fragments, fonts, and other
756 resources. These components may reside either within the body of the document file to be printed or within files that
757 can be sent to the Printer's PDL interpreter separately. Having the ability to send these "pre-initialization" (prep) files
758 separately from the main body of the job to be printed, enables an application to "pre-condition" the PDL interpreter
759 with these definitions ahead of time. This in turn makes it possible to reduce the size of a given document data file to
760 be printed and to reuse the components on other jobs.

761 The exact mechanism by which an initialization file (or list of initialization files) is installed on the Printer is
762 implementation dependent and outside of the current scope of IPP.

763 Upon receipt of the "pdl-init-file" collection attribute(s) the Printer will send the initialization file (or list of files)
764 referenced to the Printer's PDL interpreter for processing BEFORE starting to process the document(s) attached to
765 the job (in the Print-Job request) or referenced by the job (in the Print-URI request).

766 If the Printer receives more than one "pdl-init-file" collection in a given print request, then the list of initialization files
767 will be sent to the Printer's PDL interpreter in the order that they are encountered in the Job Template attributes.

768 **5.8.1 Member Attributes for the "pdl-init-file" Job Template Attribute**

769 Table 5 lists the member attributes of the "pdl-init-file" Job Template attribute and specifies whether Clients MUST
770 supply them in collection values and whether Printers MUST support them if supporting this collection attribute. The
771 following sub-sections define these member attributes.

772 **Table 5 - "pdl-init-file" member attributes**

Member Attribute Name	Attribute Syntax	Request	Printer Support
pdl-init-file-location	uri	MAY	MUST
pdl-init-file-name	name(MAX)	MUST	MUST
pdl-init-file-entry	name(MAX)	MAY	MAY

773 **5.8.1.1 pdl-init-file-location (uri)**

774 This member attribute must be an Absolute URI [RFC 2396] that specifies the path to the directory where the
 775 initialization file to be sent to the Printer's PDL interpreter will be found. **According to RFC 2396, an Absolute URI**
 776 **MUST have a URI scheme, MAY have an authority (host name) component, and MUST have an absolute path (e.g.,**
 777 **'ftp://printhost.printco.com/var/spool/jobinitfiledir/initfile1' or 'file:///jobinitfiledir/initfile1').**

778 **5.8.1.1.1 pdl-init-file-location-supported (1setOf uri)**

779 The "pdl-init-file-location-supported (1setOf uri)" Printer attribute specifies the path(s) to the directory (directories) of
 780 the supported initialization file(s) that the client MAY ask the Printer to send to its PDL interpreter prior to processing
 781 the document.

782 **5.8.1.2 pdl-init-file-name (name(MAX))**

783 This member attribute specifies the name of the initialization file within the directory specified by the "pdl-init-file-
 784 location" member attribute that the Printer MUST send to its PDL interpreter prior to processing the document..

785 A well-formed request MUST include at least the name of the initialization file to be used (i.e. the "pdl-init-file-
 786 location" or directory containing the initialization file need not be supplied by the client and in fact, might not be known
 787 to the client). The client can supply a "pdl-init-file-name" attribute value that is either a simple file name or a relative
 788 path where each component of the path is separated by a "/" character. The "pdl-init-file-name" member attribute
 789 value concatenated with the "pdl-init-file-location" attribute value (supplying a "/" between them, if necessary)
 790 specifies a Virtual File Name (see definition in Section 2.2) that will be associated with the saved job. For example, if
 791 pdl-init-file-location is 'a/b' or 'a/b/' and "pdl-init-file-name" is 'c/d', the resulting Virtual File name is: 'a/b/c/d'.

792 **5.8.1.2.1 pdl-init-file-name-supported (1setOf name(MAX))**

793 The "pdl-init-file-name-supported (1setOf name(MAX))" Printer attribute specifies the name(s) of the supported
 794 initialization file(s) that the client MAY ask the Printer to send to its PDL interpreter prior to processing the document.

795 **5.8.1.3 pdl-init-file-entry (name(MAX))**

796 This member attribute is an optional member of the collection that if present specifies an entry point within the init file
 797 that the PDL interpreter starts at.

798 **5.8.1.3.1 pdl-init-file-entry-supported (1setOf name(MAX))**

799 The "pdl-init-file-entry-supported (1setOf name(MAX))" Printer attribute specifies the name(s) of the supported
800 initialization file(s) that the client MAY ask the Printer to send to its PDL interpreter prior to processing the document.

801 **5.8.2 pdl-init-file-default (1setOf collection)**

802 **pdl-init-file-default (1setOf collection):** The "pdl-init-file-default" Printer attribute collection specifies the default
803 initialization file (or list of files) and related information that the Printer will use if the client omits the "pdl-init-file" Job
804 Template attribute in a Job Creation operation. The member attributes are defined in Table 5. A Printer MUST
805 support the same member attributes and values for this default collection attribute as it supports for the
806 corresponding "pdl-init-file" Job Template attribute.

807 A "pdl-init-file-name" within "pdl-init-file-default" collection with a "0 length value" will be used to indicate that Printer
808 has no default initialization file (see description of "none" values in Section 2.7 in [PWG5100.3]).

809 **5.8.3 pdl-init-file-supported (1setOf type2 keyword)**

810 **pdl-init-file-supported (1setOf type2 keyword):** The "pdl-init-file-supported" Printer attribute identifies the keyword
811 names of the member attributes supported in the "pdl-init-file" collection Job Template attribute, i.e., the keyword
812 names of the member attributes in Table 5 that the Printer supports.

813 **5.9 proof-print (collection)**

814 The OPTIONAL "proof-print" attribute allows a user to specify the attributes of the proof print(s) of the job that are to
815 be printed prior to the printing the full run of the job. After the proof prints have been produced, the Printer changes
816 the "proof-print-copies" member attribute to zero, and the job placed in the 'pending-held' state until released by the
817 user or operator. The job is released from the held state by using the Release-Job operation either through a client
818 application or directly at the Printer device.

819 If a "proof-print-copies" member attribute value other than 0 is provided in a job creation operation, proof print copies
820 of the job are printed and the job is then placed into the 'pending-held' state, and the 'proof-print-wait' value is added
821 to the "job-state-reason" attribute.

822 Other jobs may be printed between the proof print and the release of the Proof Job from the 'pending-held' state. If
823 the proof print is accepted by the user while another job is printing, the Proof Job MUST NOT resume printing until the
824 current job is done printing. The proofed job SHOULD be the next job printed after the current job, unless there is
825 another job in the Printer which has a higher priority than the proofed job as determined by the "job-priority" attribute.

826 Note: The "job-save-disposition" Job Template attribute (see above) details a method for doing a "hard-
827 proof" by saving a job and resubmitting the saved job. If a Printer does not implement "job-save-
828 disposition", or would rather that proof jobs stay active (in the not-complete state) in the Printer, this
829 "proof-print" attribute provides a simpler method of specifying a "hard-proof".

830 **5.9.1 Member Attributes for the "proof-print" Job Template Attribute**

831 Table 6 lists the member attributes of the "job-sheets-col" collection attribute:

Comment [th18]: ISSUE: The Printer should NOT modify the original job, else accounting is messed up.

IPP WG agreed (8/18/09): the Printer needs to create a new job with a new "job-id" so that the proof print and the regulat job can be accounted separately.

Comment [th19]: ISSUE: How does the client cause the proof job to be re-printed? Use the new Resubmit-Job operation after the proof job has gone to completion?

832

Table 6 - "proof-print" member attributes

Member Attribute Name	Attribute Syntax	Request	Printer Support
proof-print-copies	integer (0:MAX)	MUST	MUST
media	type3 keyword name(MAX)	MUST be one or the other, but NOT both	MUST
media-col	collection		MAY

833 **5.9.1.1 proof-print-copies (integer (0:MAX))**

834 The "proof-print-copies" member attribute specifies the number of copies the Printer MUST produce in the proof job.
 835 The proof print(s) are produced using the Job Template attributes specified with the Job, except any overridden by
 836 member attributes in this collection.

837 If the "proof-print-copies" value is 0, then no proof prints are produced.

838 After the requested number of proof prints have been produced by the Printer, then the Printer sets the value of
 839 "proof-print-copies" to 0, adds the 'proof-print-wait' value to the "job-state-reasons" attribute, and change the "job-
 840 state" to be 'pending-held'. A client may request additional proofs of this job by performing a Set-Job-Attributes
 841 operation on the "proof-print-copies" attribute. The user may also select to Set other Job Template attribute before
 842 releasing the Job. The user then performs a Release-Job operation, and the Printer changes the "job-state" to
 843 'pending' and removes the 'proof-print-wait' job state reason.

844 **5.9.1.2 media (type3 keyword | name(MAX)) or media-col (collection)**

845 Either the "media" (see [RFC2911]) or the "media-col" member attribute is used to indicate the media that the Printer
 846 MUST use for the specified "proof-print-copies" of the Proof Job. The member attributes are the same as those for
 847 the "media-col" attribute defined in [PWG5100.3] and in section 8.4 of this specification.

848 The client MUST supply either the "media" or the "media-col" member attribute, but NOT both. If the client supplies
 849 such a malformed request by supplying neither or both, the Printer MUST (depending on implementation) either (1)
 850 reject the request and return the 'client-error-bad-request' status code (see [RFC2911]) or (2) use either the "media"
 851 or the "media-col" member attribute, independent of the value of the "ipp-attribute-fidelity" attribute supplied by the
 852 client.

853 Since this "media" member attribute has the same name as the "media" Job Template attribute (defined [RFC2911]),
 854 the "media-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this "media"
 855 member attribute (as well as the values of the "media" Job Template attribute) that the Printer supports, i.e., the
 856 names of the supported media. A value that is provided for the "media" member attribute in the collection would have
 857 the same effect as if the job were submitted with that value as the value of the "media" Job Template attribute.

858 Since this "media-col" member attribute has the same name as the "media-col" Job Template attribute (defined in
 859 [PWG5100.3] and in section 8.4 of this specification), the "media-col-supported" Printer attribute identifies the
 860 keyword names of the member attributes supported in this "media-col" member attribute (as well as the keyword
 861 names of the "media-col" Job Template attribute), i.e., the names of the member attributes that the Printer supports.

862 5.9.2 proof-print-default (collection)

863 The "proof-print-default" (collection) Printer attribute specifies the default value of "proof-print" MUST use when not
864 supplied in a request. A Printer MUST support the same member attributes for this default collection as it supports
865 for the corresponding "proof-print" Job Template attribute.

866 5.9.3 proof-print-supported (1setOf type2 keyword)

867 The "proof-print-supported" (1setOf (type2 keyword)) Printer attribute specifies which member attributes of "proof-
868 print" that the Printer supports.

869 6 Job Description Attributes**870 6.1 job-save-printer-make-and-model (text(127))**

871 This attribute identifies the make and model of the output device which saved this job. The values are the same as
872 the corresponding "printer-make-and-model" Printer Description attribute (see "printer-make-and-model" description
873 in [RFC2911]). If this attribute is present in the saved Job, then only Printers that have the same make and model will
874 be able to print the saved job with identical appearance. Other make and models MAY be able to print the job, but not
875 necessarily with identical appearance, provided that the Printer supports the "save-document-format" value of the
876 saved job. If this attribute is not present in the saved Job Instructions and the Job object after saving, then the saved
877 job was saved in a format that can be printed on any output device and will generate the same appearance provided
878 that the Printer supports the "save-document-format" value of the saved job.

879 If the printer implementation supports the Job Save capability (see "job-save-disposition" attribute in section 5.7), then
880 it is REQUIRED that the printer support the "printer-make-and-model" Printer Description attribute.

881 7 Printer Description Attributes**882 7.1 job-creation-attributes-supported (1setOf type2 keyword)**

883 This OPTIONAL extension enables an IPP client to query the printer for the set of job attributes that can be set by the
884 client during a Create-Job, Print-Job, Validate-Job, or Print-URI operation.

885 This extension allows the IPP client to dynamically determine all the job attributes that it can specify at the time of job
886 creation.

887 The list of attribute names in "job-creation-attributes-supported" MUST include:

- 888 • all Job Template attributes that may be supplied by the client at the job level
- 889 • all operation attributes that are written to the job object as job description attributes (e.g.,
890 "job-name") at the job level

891 The list of attribute names in "job-creation-attributes-supported" MUST NOT include:

- 892 • collection member attribute names

893 Note: The client can determine which member attributes of "xxx" collection attributes are
 894 supported by querying the "xxx-supported" Printer attribute (see [RFC3382]).

- 895 • operation attributes that are not job attributes

896 NOTE: The only mechanism previously available for a IPP client to query the Printer for supported attributes is to
 897 specify the 'job-template' group value on a Get-Printer-Attributes operation. This has been problematic because: 1) it
 898 returns the entire list of "xxx-default" and "xxx-supported" attributes and values which will be excessively burdensome
 899 for production printing systems with extensive functionality, and 2) it does not include operation attributes that are
 900 written to the job object as job description attributes (i.e., "job-name"). [NOTE: See also the description of the Get-
 901 Printer-Attributes operation in [RFC2911] and the distinction between "xxx-default", "xxx-ready", and "xxx-supported"
 902 attributes when "xxx" is any Job Template attribute that a client can supply as a top-level attribute vs. (see
 903 [RFC3382]) when "xxx" is a member attribute for a Job Template 'collection' attribute (e.g. The "media-color-
 904 supported" Printer attribute lists the values of the "media-color" member attribute of the "media-col" collection
 905 attribute, but does not belong to the 'job-template' attribute group, or to the 'printer-description' attribute group).]

906 **7.2 job-password-supported (integer(0:255))**

907 The "job-password-supported" attribute indicates the maximum length that the Printer will accept for the unencrypted
 908 password which the client will encrypt as the value of the "job-password" Operation Attribute. A conforming Printer
 909 MUST be able to accept 127 octets without truncation. However, a Printer MAY be implemented as a gateway to
 910 another print system that cannot accept the full 127-octet range, in which case the client MUST NOT allow an
 911 unencrypted password greater than the length specified by this attribute.

Comment [th20]: **ISSUE**. But "job-password"
 (octetString(255)) can be 255 octets long.
 IPP WG agreed (8/18/09): Change 127 to 255.

912 **7.3 job-password-encryption-supported (1setOf (type3 keyword | name(MAX)))**

913 The "job-password-encryption-supported" Printer Description attribute specifies which encryption methods the Printer
 914 supports for Secure Print.

915 If the operation attribute "job-password" is supported, then this attribute MUST be supported .

916 Standard keyword values are:

Keyword	Description
'none'	The "job-password" attribute value is passed in the clear. No encryption has been applied. This value might also be used when the entire Operation is sent over a secure connection.
'md2'	The encryption method uses the MD2 hash algorithm defined in RFC 1319.
'md4'	The encryption method uses the MD4 hash algorithm defined in RFC 1320.
'md5'	The encryption method uses the MD5 hash algorithm defined in RFC 1321.
'sha'	The encryption method uses the Secure Hash Algorithm defined by the National Institute of Standards and Technology.

917 **7.4 job-spooling-supported (type2 keyword)**

918 This attribute indicates whether or not jobs are spooled before the document data is interpreted (RIPped). In other
 919 words, this attribute indicates when jobs are processed by the Printer with respect to when the Printer receives and
 920 returns responses to Job Creation requests (i.e., Print-Job, Print-URI), receives and returns responses to Document
 921 Creation requests (i.e., Send-Document and Send-Uri requests) and "receives" or "fetches" such document data.

922 If the Printer supports this attribute, the value supported depend on implementation. If the Printer does not support
 923 this attribute, the behavior is implementation dependent.

924 The Get-Printer-Supported-Values operation (see description in [RFC3380]) returns a '1setOf type2 keyword' so that
 925 all possible values that the implementation is capable of supporting are indicated.

926 The standard keyword values are:

Keyword	Description
'spool'	The Printer starts processing a job until the Printer has (1) accepted and responded to the Job Creation request and all Document Creation requests (for a multi-document job) and (2) has "received" or "fetched" all document data for the job, i.e., spool rather than stream.
'stream'	The Printer starts processing a job (1) before the Printer has accepted all Document Creation requests and (2) before the Printer has "received" or "fetched" all document data, i.e., stream rather than spool
'automatic'	The Printer chooses whether to process a job before or after the Printer has accepted all Document Creation requests and has "received" or "fetched" all document data, i.e., the Printer MAY spool and/or stream depending on policy and other factors, such as the size of the job, including a combination of spooling and streaming.

927 **7.5 max-save-info-supported (integer(1:MAX))**

928 This attribute specifies the maximum number of "save-info" member attribute collections that a Printer can accept in a
 929 job request. If the number of "save-info" member attribute collections supplied by a client in a Job Creation operation
 930 exceeds the value of this attribute, the Printer MUST accept or reject the request as described in the "save-info"
 931 description in the "job-save-disposition" description (see description in section 5.7). If the Printer only supports one
 932 "save-info" collection, then the Printer MAY either (1) support this attribute with a value of '1' or (2) omit support of this
 933 attribute. The RECOMMENDED way for a client to determine whether or not a Printer supports saving jobs, is to
 934 query the "job-save-disposition-supported" Printer attribute (see description in section 5.7.3).

935 **7.6 media-col-database (1setOf collection)**

936 This OPTIONAL extension enables a IPP client to query the set of pre-defined media collections available in the
 937 printer's media database, if the "media-col" attribute is supported. This attribute is identical in format and syntax to
 938 "media-col-ready", but returns the entire set of pre-defined media collections known by the printer instead of just the
 939 media collections currently in the printer trays. If this attribute is supported, the members of the collections correspond
 940 to the supported members of the "media-col" attribute.

941 The Printer **MUST NOT** return this attribute in the response to the Get-Printer-Attributes operation when the client
 942 requested the 'all' or 'printer-description' group names. Therefore the client must request this attribute explicitly in
 943 order to get the media collections. The reason for this recommendation is that the amount of data returned in the
 944 response would be very large when combined with all of the other attributes.

Comment [th21]: **ISSUE:** This attribute is a Status attribute and so should NOT have a -supported suffix.
 IPP WG agreed (8/18/09): Make a Status Set. It's current setting. Printer MAY change the value depending on implementation.
 Set-Printer-Attributes MUST NOT set this attribute.

Comment [th22]: **ISSUE:** It will confuse existing clients if a Printer did return the "media-col-database" (1setOf collection) in a Get-Printer-Attributes response for 'all' or for 'printer-description' groups.
 IPP WG agreed (8/18/09): Printer MUST NOT
 Client MUST request explicitly and Printer MUST support.

945 **7.7 printer-detailed-status-messages (1setOf text(MAX))**

946 This OPTIONAL attribute specifies additional detailed and technical information about the printer, in the same way
 947 "job-detailed-status-messages" provides additional information about a job. Printer-specific information such as fault
 948 and warning messages can be captured, and the 1setOf syntax supports multiple messages. The Printer NEED
 949 NOT localize the message(s), since they are intended for use by the system administrator or other experienced
 950 technical persons. Clients MUST NOT attempt to parse the value(s) of this attribute.

951 **7.8 which-jobs-supported (1setOf type2 keyword)**

952 This OPTIONAL attribute enables a client to query the printer for the set of values that can be used for the "which-
 953 jobs" operation attribute of the Get-Jobs operation. Current allowed values for "which-jobs" are 'completed' and 'not-
 954 completed', and the "which-jobs" extensions described above extend the values to include keywords corresponding to
 955 the symbolic names of all IPP "job-state" enum values. (See section 8.2)

956 If this attribute is supported, then the Printer MUST support both 'completed' and 'not-completed' as valid values.

957 **8 Additional Values and Semantics for Existing IPP**
 958 **Attributes**

959 This section defines additional values for existing attributes. Many of the existing attributes are specified by including
 960 the entire original description from [RFC2911] with the additions indicates with red revision marks and underlining. In
 961 some case, additional value from other approved documents are included with the source indicated as a reference.

962 **8.1 Additional values and semantics for the "pdl-override-supported" Printer Description**
 963 **attribute**

964 The additional values are represented by revisions to the original description for "pdl-override-supported" from
 965 [RFC2911].

966 **8.1.1 pdl-override-supported (type2 keyword)**

967 This REQUIRED Printer attribute expresses the ability for a particular Printer implementation to either attempt to
 968 override document data instructions with IPP Job attributes or not.

969 This attribute takes on the following keyword values:

- 970 • 'attempted': This value indicates that the Printer object attempts to make the IPP attribute
 971 values take precedence over embedded instructions in the document data, however there is
 972 no guarantee.
- 973 • 'not-attempted': This value indicates that the Printer object makes no attempt to make the
 974 IPP attribute values take precedence over embedded instructions in the document data.
- 975 • 'guaranteed': This value indicates that the Printer object:
 976 1) guarantees that the IPP Job Template attribute values take precedence over instructions of any
 977 form embedded anywhere in the document data.

Comment [th23]: **ISSUE**: How can the client relate the text messages to the corresponding keyword values of the "printer-state-reasons"? Should this be parallel to "printer-state-reasons"?

IPP WG Agreed (8/18/09): Yes. Same language as "natural-language-configured."

Printer MUST return a value for each one in the language configured.

- 978 2) and guarantees that no PDL instruction is performed that does not correspond to a current value
 979 in the corresponding "xxx-supported" Printer attribute. In such a situation, the Printer MAY (a)
 980 abort the job, (b) stop the Printer, (c) hold the job, or (d) substitute on the fly with one of the
 981 current values of its "xxx-supported" attribute. This choice MAY be fixed by the implementation
 982 or configurable by the system administrator and MAY depend on the attribute.
 983 3) provides the "queue override" semantics as described below, if the "xxx-supported" Printer
 984 attribute is configured with only a single value.

985 See [RFC2911] for a full description of how this attribute interacts with and affects other IPP attributes, especially the
 986 "ipp-attribute-fidelity" attribute.

987 **Additional semantics for 'guaranteed' value of "pdl-override-supported" attribute**

988 If a Printer's "pdl-override-supported" is 'guaranteed', then the Printer MUST follow these additional semantics for Job
 989 Creation requests and Get-Job-Attributes or Get-Jobs responses.

990 Whether or not the client supplied the "xxx" Job attribute in the Job Creation operation, the Printer MUST accept or
 991 reject the job based on "ipp-attribute-fidelity" as usual. However, if "ipp-attribute-fidelity" was 'false' and the supplied
 992 "xxx" value did not match any of the "xxx-supported" values, the Printer MUST accept the job as usual, but MUST
 993 NOT store that attribute on the Job object. The Printer MUST return an "xxx" Job attribute in subsequent Get-Job-
 994 Attributes and Get-Jobs responses according to the following rules:

995 (a) If the client did not supply the "xxx" Job attribute in the Job Creation operation and the current value of
 996 the Printer's "xxx-supported" attribute has only a single value (the so-called queue override case), then
 997 the Printer MUST return an "xxx" attribute with that current single value in a Get-Job-Attributes or Get-
 998 Jobs, response, as if the client had supplied "xxx" Job attribute with that value.

999 Rationale for this new behavior: because the printed result will be the same as if the client had supplied
 1000 the "xxx" Job attribute with that single value (since that value will override a corresponding PDL
 1001 instruction), the response should reflect those (new) semantics.

1002 (b) If the client did not supply the "xxx" Job attribute in the Job Creation operation and the current value of
 1003 the Printer's "xxx-supported" attribute has more than one value, then the Printer MUST NOT return that
 1004 "xxx" attribute in a Get-Job-Attributes or Get-Jobs response.

1005 Rationale: Same behavior as for the other values of "pdl-override-supported".

1006 (c) If the client did supply the "xxx" Job attribute in the Job Creation operation and the current value of the
 1007 Printer's "xxx-supported" attribute has only a single value (the so-called queue override case), then the
 1008 Printer MUST return that "xxx" Job attribute with the Printer's current "xxx-supported" value in a Get-Job-
 1009 Attributes or Get-Jobs, response, as if the client had supplied "xxx" with that value.

1010 Rationale for this behavior: because the behavior of the Printer is to enforce that "xxx" Job attribute
 1011 with the Printer's current single (override) value.

1012 (d) If the client did supply the "xxx" attribute in the Job Creation operation and the current value of the
 1013 Printer's "xxx-supported" attribute has more than one value and one of them match, then the Printer
 1014 MUST return that "xxx" Job attribute with the client-supplied value in a Get-Job-Attributes or Get-Jobs
 1015 response.

1016 Rationale: Same behavior as for the other values of "pdl-override-supported".

1017 (e) If the client did supply the "xxx" attribute in the Job Creation operation and the current value of the
 1018 Printer's "xxx-supported" attribute has more than one value but none of them match, then the Printer
 1019 MUST NOT return that "xxx" Job attribute with the client-supplied value in a Get-Job-Attributes or Get-

Jobs response. It MUST either (1) not return the attribute at all or return it with one of the supported values, depending on implementation.

Rationale: Same behavior as for the other values of "pdl-override-supported".

The above five cases are represented in Table 7.

Table 7 - Rules for 'guaranteed' value of "pdl-override-supported" attribute

Client supplies	Printer supports "xxx-supported"	Printer's response to Job query request	Queue override ?
omits "xxx"	'a'	"xxx" = 'a'	yes
omits "xxx"	'a', 'b'	nothing is returned	no
supplies "xxx" = ?	'a'	"xxx" = 'a'	yes
supplies "xxx" = 'a'	'a', 'b'	"xxx" = 'a'	no
supplies "xxx" = 'c'	'a', 'b'	either nothing is returned or "xxx" = one of the supported values, depending on implementation	no

Examples of queue override

The queue override extension allows an implementation to guarantee that only advertised supported attribute values are actually performed, and that unsupported values embedded as instructions in the document data, will not be performed. This extension is also a further step in making a Printer object indicate what it really supports in both the protocol and the PDL and what it does not, i.e., "truth in advertising". In other words, the absence of a value in the Printer's "xxx-supported" attribute indicates a guarantee that the value cannot be performed.

For example, an administrator that wants to force two sided printing could set the Printer's "sides-supported" to the two values: 'two-sided-long', 'two-sided-short' (see [RFC2911]). Thus a PDL that contained an embedded simplex (one-sided) instruction would be overridden in one of the following ways: (1) aborted, (2) held, or (3) automatically forced to two-sided, depending on implementation and/or site policy.

As another example, an administrator could set up an IPP Printer that always staples by setting the "finishings-supported" to 'staple' only, i.e. by removing the 'none' keyword value (see [RFC2911]). In order to allow jobs not to be stapled on the same physical piece of hardware, the administrator would use fan-in (if supported) to set up another IPP Printer that does include the 'none' keyword value in its "finishings-supported" attribute.

The values of the Printer's "xxx-supported" attribute are not only what the Printer will accept in the print protocol (e.g. IPP) as attributes, but also as corresponding values of embedded PDL instructions. If a value that is not in the "xxx-supported" list is encountered in either the print protocol or the PDL, it MUST NOT be performed (no matter what the value of "ipp-attribute-fidelity" is).

The four combinations of unsupported IPP attribute values and unsupported PDL instruction values are:

- (1) unsupported attribute value in the protocol and "ipp-attribute-fidelity" = 'false' (independent of "pdl-override-supported");

The Printer object MUST accept the Job with the unsupported attribute value. However, the Printer object will always return only one of its "xxx-supported" values in response to Get-Jobs or Get-Job-

1048 Attributes. Depending on implementation, the Printer can perform this substitution once at job
 1049 submission time, or each time the job is queried.

1050 (2) unsupported attribute value in the protocol and "ipp-attribute-fidelity" = 'true' (independent of "pdl-
 1051 override-supported"):

1052 The Printer MUST reject the job.

1053 (3) unsupported embedded instruction value in the PDL and "pdl-override-supported" = 'attempted' or 'not-
 1054 attempted' (and independent of "ipp-attribute-fidelity"):

1055 When an implementation encounters a value that is not in the "xxx-supported" list, it makes no special
 1056 action and allows it to be performed. See the definition of "Supports" in [RFC2911] that indicates that
 1057 performing a PDL instruction that is not supported in the protocol is an allowed behavior.

1058 (4) (new case) unsupported embedded instruction value in the PDL and "pdl-override-supported" =
 1059 'guaranteed' (and independent of "ipp-attribute-fidelity"):

1060 The unsupported embedded instruction value MUST NOT be performed. The behavior is
 1061 implementation-dependent if an unsupported embedded instruction value is encountered. For example,
 1062 the Printer MAY abort the job or substitute on the fly with one of the current values of its "xxx-supported"
 1063 attribute. This choice MAY be fixed by the implementation or configurable by the system administrator
 1064 and MAY depend on the Job Template attribute.

1065 **8.2 Additional values for the "which-jobs" Operation attribute and the "which-jobs-**
 1066 **supported" Printer Description attribute**

1067 This section defines additional values for the IPP "which-jobs" (type2 keyword) Operation attribute of the Get-Jobs
 1068 operation (see [RFC2911] section 3.2.6) and the "which-jobs-supported" (1setOf type2 keyword) Printer Description
 1069 attribute (see section 7.8) to include keywords corresponding to the symbolic names of all IPP "job-state" enum
 1070 values (see [RFC2911] section 4.3.7) and an 'all' value.

1071 The additional values are represented by revisions to the original description for "which-jobs" from [RFC2911]. The
 1072 [RFC2911] values for "which-jobs" are 'completed' and 'not-completed'.

1073 **8.2.1 which-jobs (type2 keyword)**

1074 The client OPTIONALLY supplies this attribute in the Get-Jobs operation. The Printer object MUST support this
 1075 attribute. It indicates which Job objects MUST be returned by the Printer object in the Get-Jobs Request.

1076 The values for this attribute are:

- 1077 **'completed'**: This includes any Job object whose state is 'completed', 'canceled', or 'aborted'.
- 1078 **'not-completed'**: This includes any Job object whose state is 'pending', 'processing', 'processing-
- 1079 **stopped', or 'pending-held'.**
- 1080 **'pending'**: This includes any Job object whose state is 'pending'. This value corresponds to the
- 1081 symbolic name of the corresponding value for the "job-state" attribute.
- 1082 **'pending-held'**: This includes any Job object whose state is 'pending-held'. This value corresponds to
- 1083 the symbolic name of the corresponding value for the "job-state" attribute.

1084 'processing': This includes any Job object whose state is 'processing'. This value corresponds to the
1085 symbolic name of the corresponding value for the "job-state" attribute.

1086 'processing-stopped': This includes any Job object whose state is 'processing-stopped'. This value
1087 corresponds to the symbolic name of the corresponding value for the "job-state" attribute.

1088 'canceled': This includes any Job object whose state is 'canceled'. This value corresponds to the
1089 symbolic name of the corresponding value for the "job-state" attribute.

1090 'aborted': This includes any Job object whose state is 'aborted'. This value corresponds to the
1091 symbolic name of the corresponding value for the "job-state" attribute.

1092 'all': This includes all Job objects, that is any Job object that is considered 'completed' or 'not-
1093 completed as defined by these values above.

1094 'saved': jobs that have been saved which are in the 'completed', 'canceled', or 'aborted' state.

1095 A Printer object MUST support both the 'completed' and 'not-completed' values. However, if the implementation does
1096 not keep jobs in the 'completed', 'canceled', and 'aborted' states, then it returns no jobs when the 'completed' value is
1097 supplied.

1098 If a client supplies some other value, the Printer object MUST copy the attribute and the unsupported value to the
1099 Unsupported Attributes response group, reject the request, and return the 'client-error-attributes-or-values-not-
1100 supported' status code.

1101 If the client does not supply this attribute, the Printer object MUST respond as if the client had supplied the attribute
1102 with a value of 'not-completed'.

1103 For the order that Jobs are returned, see the description of the Get-Jobs Response in [RFC2911].

1104 **8.3 Additional values and semantics for the "job-state-reasons" Job Description attribute**

1105 The additional values and semantics are represented by revisions to the original description for "job-state-reasons" in
1106 [RFC2911] section 4.3.8 and the values defined in [RFC3998], [PWG5100.3], and [PWG5100.6].

1107 **8.3.1 job-state-reasons (1setOf type2 keyword)**

1108 This REQUIRED attribute provides additional information about the job's current state, i.e., information that augments
1109 the value of the job's "job-state" attribute.

1110 These values MAY be used with any job state or states for which the reason makes sense. Some of these value
1111 definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when implemented, the Printer
1112 MUST return these values when the reason applies and MUST NOT return them when the reason no longer applies
1113 whether the value of the Job's "job-state" attribute changed or not. When the Job does not have any reasons for
1114 being in its current state, the value of the Job's "job-state-reasons" attribute MUST be 'none'.

1115 Note: While values cannot be added to the 'job-state' attribute without impacting deployed clients that take actions
1116 upon receiving "job-state" values, it is the intent that additional "job-state-reasons" values can be defined and
1117 registered without impacting such deployed clients. In other words, the "job-state-reasons" attribute is intended to be
1118 extensible.

1119 The following standard keyword values are defined. For ease of understanding, the values are presented in the order
1120 in which the reasons are likely to occur (if implemented), starting with the 'none' value:

- 1121 **'none'**: There are no reasons for the job's current state. This state reason is semantically equivalent to
1122 "job-state-reasons" without any value and MUST be used when there is no other value, since
1123 the 1setOf attribute syntax requires at least one value. [RFC2911]
- 1124 **'job-hold-until-specified'**: The value of the job's "job-hold-until" attribute was specified with a time
1125 period that is still in the future. The job MUST NOT be a candidate for processing until this
1126 reason is removed and there are no other reasons to hold the job. This value SHOULD be
1127 supported if the "job-hold-until" Job Template attribute is supported. [RFC2911]
- 1128 **'job-password-wait'**: The job is currently being held until the correct password is entered at the
1129 device. If the "job-password" Operation attribute (See section 4.1) is supported, this value
1130 MUST be supported.
- 1131 **'proof-print-wait'**: The job is currently being held until the operator verifies the output of the proof
1132 print and performs a Release-Job operation. If the "proof-print" Job Template attribute (See
1133 section 5.9) is supported, this value MUST be supported.
- 1134 **'resources-are-not-supported'**: At least one of the resources needed by the job, such as media, fonts,
1135 resource objects, etc., is not supported on any of the physical printers for which the job is a
1136 candidate. This condition MAY be detected when the job is accepted, or subsequently while
1137 the job is pending or processing, depending on implementation. The job may (1) remain in its
1138 current state, (2) be moved to the 'pending-held' state, depending on implementation and/or job
1139 scheduling policy, or (3) scheduled normally, but the Printer is put into the 'stopped' state when
1140 the job is attempted to be processed on the Printer. This value is intended for use with an
1141 implementation that supports the "user-defined-values-supported" Printer attribute (defined in
1142 [PWG5100.3]) which allows a job to be accepted with an unsupported 'name' value.
1143 [PWG5100.3]
- 1144 **'resources-are-not-ready'**: At least one of the resources needed by the job, such as media, fonts,
1145 resource objects, etc., is not ready on any of the physical printer's for which the job is a
1146 candidate. This condition MAY be detected when the job is accepted, or subsequently while
1147 the job is pending or processing, depending on implementation. The job may remain in its
1148 current state or be moved to the 'pending-held' state, depending on implementation and/or job
1149 scheduling policy. [RFC2911]
- 1150 **'job-incoming'**: Either (1) the Printer has accepted the Create-Job operation and is expecting
1151 additional Send-Document and/or Send-URI operations or (2) the Printer is
1152 retrieving/accepting document data as a result of a Print-Job, Print-URI, Send-Document or
1153 Send-URI operation. [RFC2911]
- 1154 **'job-spooling'**: Same as 'job-incoming' with the specialization that the Printer is spooling the
1155 document data before processing it. This value corresponds to the 'spool' or 'automatic' value
1156 of the "job-spooling-supported" Printer Description attribute.
- 1157 **'job-streaming'**: Same as 'job-incoming' with the specialization that the Printer is processing the
1158 document data as it is being received (that is, the job is not being spooled, but rather is being
1159 processed in chunks by the output device and is being imaged during reception). This value
1160 corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer
1161 Description attribute.

- 1162 **'job-data-insufficient'**: The Create-Job operation has been accepted by the Printer, but the Printer is
1163 expecting additional document data before it can move the job into the 'processing' state. If a
1164 Printer starts processing before it has received all data, the Printer removes the 'job-data-
1165 insufficient' reason, but the 'job-incoming' remains. If a Printer starts processing after it has
1166 received all data, the Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at
1167 the same time. [RFC2911]
- 1168 **'unsupported-compression'**: The job was aborted by the system because the Printer determined while
1169 attempting to decompress the document-data's that the compression is actually not among those
1170 supported by the Printer. This value **MUST** be supported, since "compressions is a
1171 REQUIRED operation attribute. [RFC2911]
- 1172 **'compression-error'**: The job was aborted by the system because the Printer encountered an error in
1173 the document-data while decompressing it. If the Printer posts this reason, the document-data
1174 has already passed any tests that would have led to the 'unsupported-compression' job-state-
1175 reason. [RFC2911]
- 1176 **'document-access-error'**: After accepting a Print-URI or Send-URI request, the Printer could not
1177 access one or more documents passed by reference. This reason is intended to cover any file
1178 access problem, including file does not exist and access denied because of an access control
1179 problem. The Printer **MAY** also indicate the document access error using the "job-document-
1180 access-errors" Job Description attribute (see the description of "job-document-access-errors"
1181 above). Whether the Printer aborts the job and moves the job to the 'aborted' job state or prints
1182 all documents that are accessible and moves the job to the 'completed' job state and adds the
1183 'completed-with-errors' value in the job's "job-state-reasons" attribute depends on
1184 implementation and/or site policy. This value **SHOULD** be supported if the Print-URI or
1185 Send-URI operations are supported. [RFC2911]
- 1186 **'unsupported-document-format'**: The job was aborted by the system because the document-data's
1187 document-format is not among those supported by the Printer. If the client specifies the
1188 document-format as 'application/octet-stream', the printer **MAY** abort the job and post this
1189 reason even though the format is a member of the "document-format-supported" printer
1190 attribute, but not among the auto-sensed document-formats. This value **MUST** be supported,
1191 since "document-format" is a REQUIRED operation attribute. [RFC2911]
- 1192 **'document-format-error'**: The job was aborted by the system because the Printer encountered an
1193 error in the document-data while processing it. If the Printer posts this reason, the document-
1194 data has already passed any tests that would have led to the 'unsupported-document-format'
1195 job-state-reason. [RFC2911]
- 1196 **'submission-interrupted'**: The job was not completely submitted for some unforeseen reason, such
1197 as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or the
1198 document transfer method has crashed in some non-recoverable way before the document data
1199 was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the
1200 time-out period. See the description of the "multiple-operation-time-out" Printer Description
1201 attribute in [RFC2911] section 4.3.31. [RFC2911]
- 1202 **'job-outgoing'**: The Printer is transmitting the job to the output device. [RFC2911]

- 1203 **'job-scheduling'**: The printer is in the process of scheduling the processing for the job.
- 1204 **'job-queued'**: Job is in the 'processing' state, but more specifically, the Printer has queued the
1205 document data. [RFC2911]
- 1206 **'job-transforming'**: Job is in the 'processing' state, but more specifically, the Printer is interpreting
1207 document data and producing another electronic representation. [RFC2911]
- 1208 **'job-interpreting'**: Job is in the 'processing' state, but more specifically, the Printer is interpreting the
1209 document data. [RFC2911]
- 1210 **'job-queued-for-marker'**: Job is in any of the 'pending-held', 'pending', or 'processing' states, but
1211 more specifically, the Printer has completed enough processing of the document to be able to
1212 start marking and the job is waiting for the marker. Systems that require human intervention to
1213 release jobs using the Release-Job operation, put the job into the 'pending-held' job state.
1214 Systems that automatically select a job to use the marker put the job into the 'pending' job state
1215 or keep the job in the 'processing' job state while waiting for the marker, depending on
1216 implementation. All implementations put the job into (or back into) the 'processing' state when
1217 marking does begin. [RFC2911]
- 1218 **'job-printing'**: The output device is marking media. This value is useful for Printers which spend a
1219 great deal of time processing (1) when no marking is happening and then want to show that
1220 marking is now happening or (2) when the job is in the process of being canceled or aborted
1221 while the job remains in the 'processing' state, but the marking has not yet stopped so that
1222 impression or sheet counts are still increasing for the job. [RFC2911]
- 1223 **'printer-stopped-partly'**: The value of the Printer's "printer-state-reasons" attribute contains the
1224 value 'stopped-partly'. [RFC2911]
- 1225 **'printer-stopped'**: The value of the Printer's "printer-state" attribute is 'stopped'. [RFC2911]
- 1226 **'job-suspending'**: The printer is in the process of moving the job from a processing condition to a
1227 suspended condition where other jobs can be processed.
- 1228 **'job-suspended'**: The job has been suspended while processing using the Suspend-Current-Job
1229 operation and other jobs can be processed on the Printer. The Job can be resumed using the
1230 Resume-Job operation which removes this value. [RFC3998]
- 1231 **'job-suspended-by-operator'**: The job has been indefinitely suspended by the printer operator.
- 1232 **'job-suspended-by-user'**: The job has been indefinitely suspended by the user.
- 1233 **'job-suspended-by-system'**: The job has been indefinitely suspended by the Printer's system software
1234 during normal processing of the job.
- 1235 **'job-resuming'**: The printer is in the process of moving the job from a suspended condition to a
1236 candidate for processing.
- 1237 **'job-canceled-by-user'**: The job was canceled by the owner of the job using the Cancel-Job request,
1238 i.e., by a user whose authenticated identity is the same as the value of the originating user that
1239 created the Job object, or by some other authorized end-user, such as a member of the job
1240 owner's security group. This value SHOULD be supported. [RFC2911]

- 1241 **'job-canceled-by-operator'**: The job was canceled by the operator using the Cancel-Job request, i.e.,
1242 by a user who has been authenticated as having operator privileges (whether local or remote).
1243 If the security policy is to allow anyone to cancel anyone's job, then this value may be used
1244 when the job is canceled by other than the owner of the job. For such a security policy, in
1245 effect, everyone is an operator as far as canceling jobs is concerned. This value SHOULD be
1246 supported if the implementation permits canceling by other than the owner of the job.
1247 [RFC2911]
- 1248 **'job-canceled-at-device'**: The job was canceled by an unidentified local user, i.e., a user at a console
1249 at the device. This value SHOULD be supported if the implementation supports canceling jobs
1250 at the console. [RFC2911]
- 1251 **'aborted-by-system'**: The job (1) is in the process of being aborted, (2) has been aborted by the
1252 system and placed in the 'aborted' state, or (3) has been aborted by the system and placed in the
1253 'pending-held' state, so that a user or operator can manually try the job again. This value
1254 SHOULD be supported. [RFC2911]
- 1255 **'processing-to-stop-point'**: The requester has issued a Cancel-Job operation or the Printer object has
1256 aborted the job, but is still performing some actions on the job until a specified stop point
1257 occurs or job termination/cleanup is completed.
1258 If the implementation requires some measurable time to cancel the job in the 'processing' or
1259 'processing-stopped' job states, the IPP object MUST use this value to indicate that the Printer
1260 object is still performing some actions on the job while the job remains in the 'processing' or
1261 'processing-stopped' state. After all the job's job description attributes have stopped
1262 incrementing, the Printer object moves the job from the 'processing' state to the 'canceled' or
1263 'aborted' job states. [RFC2911]
- 1264 **'service-off-line'**: The Printer is off-line and accepting no jobs. All 'pending' jobs are put into the
1265 'pending-held' state. This situation could be true if the service's or document transform's input
1266 is impaired or broken. [RFC2911]
- 1267 **'job-warnings-detected'**: If the Printer supports the value 'job-warnings-detected', the Printer MUST
1268 add it to "job-state-reasons" when it generates the first warning message. That is, a single
1269 occurrence of this value is present in the "job-state-reasons" if the Printer has generated one or
1270 more warnings. [PWG5100.6]
- 1271 **'job-completed-successfully'**: The job completed successfully. There were no warnings or errors in
1272 printing and no errors in saving. This value SHOULD be supported. [RFC2911]
- 1273 **'job-completed-with-warnings'**: The print part of the job completed with warnings (whether or not
1274 there were save errors). This value SHOULD be supported if the implementation detects
1275 warnings. [RFC2911]
- 1276 **'job-completed-with-errors'**: The print part of the job completed with errors (and possibly warnings
1277 too) (whether or not there were save errors). This value SHOULD be supported if the
1278 implementation detects errors. [RFC2911]
- 1279 'job-saving': The printer is transmitting the job to the save location. This is similar to the 'job-printing'
1280 value.

1281 **'job-saved-successfully'**: The job was successfully saved.

1282 **'job-save-error'**: The job did not save successfully (whether or not it was printed successfully, printed
1283 with warnings, printed with errors, or not printed). The Printer MUST ensure that none of the
1284 saved job is accessible, if it was unable to successfully save all of the job.

1285 **'job-restartable'**: This job is retained (see the description of "job-state" above, specifically
1286 "Partitioning of Job States") and is currently able to be restarted using the Restart-Job operation
1287 (see [RFC2911]). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then
1288 IPP object MUST accept a Restart-Job operation for that job. This value SHOULD be
1289 supported if the Restart-Job operation is supported. [RFC2911]

1290 **'queued-in-device'**: The job has been forwarded to a device or print system that is unable to send back
1291 status. The Printer sets the job's "job-state" attribute to 'completed' and adds the 'queued-in-
1292 device' value to the job's "job-state-reasons" attribute to indicate that the Printer has no
1293 additional information about the job and never will have any better information. See the
1294 description of the "job-state" attribute above, specifically the portion on "Forwarding Servers".
1295 [RFC2911]

1296 **NOTE**: The semantics of this attribute or the set of valid values may be different for different document formats.

1297 **Additional Semantics for "job-state-reasons" attribute for Job Save and Reprint Capability**

1298 This section defines additional values that are defined in support of the Job Save and Reprint Capability (see section
1299 3.3, and the description of the "job-save-disposition" attribute in section 5.7).

1300 Many of the existing "job-state-reasons" attribute values can apply to a 'save-only' job as well as a job submitted for
1301 printing. If the value of the "job-disposition" attribute is 'save-only', the "job-state-reasons" attribute MAY be set with
1302 existing values such as 'job-incoming', 'resources-are-not-ready' (such as a font), 'job-interpreting', and 'job-queued'.
1303 Likewise, errors that occur on a saved job MAY have existing "job-state-reasons" attribute values such as 'job-data-
1304 insufficient', 'document-access-error', 'submission-interrupted', 'job-canceled-by-user', 'aborted-by-system', etc.

1305 There are also new two new "job-state-reasons" keyword values required that support a saved job -- 'job-saving' and
1306 'job-save-error' -- and these have been added to the list defined above. The existing 'job-completed-successfully',
1307 'job-completed-with-warnings', and 'job-completed-with-errors' values are also clarified in the list above for
1308 implementations that support the Job Save and Reprint Capability, in such a way that these values remain compatible
1309 with Printers and clients that do not support job saving.

1310 Table 8 enumerates the possible combinations of print and save success, warning, and error conditions. Note that
1311 two values occur only when there are print warnings/errors and a save error.

1312 **Table 8 - Values of "job-state-reasons" attribute for various job conditions**

	Not saving	Save was successful	Save was unsuccessful
Not printing	_____	'job-completed-successfully'	'job-save-error'
Print successful	'job-completed-successfully'	'job-completed-successfully'	'job-save-error'
Print warnings	'job-completed-with-warnings'	'job-completed-with-warnings'	'job-completed-with-warnings', 'job-save-error'

Comment [th24]: ISSUE: Since the IPP WG agreed that the Printer MUST create a separate job (and "job-id") for the Saved Job, then these 3 values on the original job are not so necessary.
OK to leave them in the draft, so that the client can tell from the Printer Job, whether the corresponding Save Job was completed successfully or not?

Print errors	'job-completed-with-errors'	'job-completed-with-errors'	'job-completed-with-errors', 'job-save-error'
Print warnings and errors	'job-completed-with-errors'	'job-completed-with-errors'	'job-completed-with-errors', 'job-save-error'

1313

1314 **8.4 Additional semantics for the IPP "media-col" Job Template Attribute**

1315 The following member attributes in Table 9 and their semantic descriptions have been added to the existing IPP
 1316 "media-col" Job Template attribute.

1317

1318

Table 9 – Additional "media-col" member attributes

Member Attribute Name	Attribute Syntax	Request	Printer Support
media-tooth	type3 keyword name(MAX)	MAY	MAY
media-grain	type3 keyword name(MAX)	MAY	MAY
media-material	type3 keyword name(MAX)	MAY	MAY
media-thickness	integer(1:MAX)	MAY	MAY

1319 The "media-col" collection member attributes definitions are:

1320 **8.4.1 media-tooth (type3 keyword | name(MAX))**

1321 The "media-tooth" member attribute indicates the desired tooth (or roughness) of the media being specified. The
 1322 source for this attribute is DPA.

1323 The tooth of a medium is particularly important for those marking engines that use pens (e.g. plotters) to mark the
 1324 medium. The type of pen used shall match the tooth of the medium for best resolution.

1325 Standard keyword values for "media-tooth" are:

Keyword	Description
'fine'	The specified media should have a fine tooth or smooth finish.
'medium'	The specified media should have a medium tooth or regular finish.
'coarse'	The specified media should have a coarse tooth or rough finish.

1326 The Administrator can define a custom media tooth using the 'name' (MAX) attribute syntax of the "media-tooth-
 1327 supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member
 1328 attributes, the user can also supply user-defined tooth names that are not among the values of the "media-tooth-
 1329 supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported" attribute
 1330 (see [PWG5100.3]) to contain the 'media-tooth' attribute keyword value.

Comment [th25]: **ISSUE:** What is the JDF equivalent?

Answer: The Media Resource has a Texture attribute with the following keyword (NMTOKEN) (NMTOKEN) values:

- Rougher than vellum surface.
- Extra smooth or polished, uncoated paper.
- Texture of coarse woven cloth.
- Fine pebble finish.
- Rough, unpolished and uncoated papers. [New in JDF 1.2](#)
- Slightly rough surface.

Comment [th26R25]: **ISSUE:** Now that we know what the JDF equivalent is, what do we want to do?

1331 **8.4.1.1 media-tooth-supported (1setOf (type3 keyword | name(MAX)))**

1332 The "media-tooth-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this
 1333 "media-tooth" member attribute that the Printer supports, i.e., the media tooth supported.

1334 **8.4.2 media-grain (type3 keyword | name(MAX))**

1335 The "media-grain" member attribute indicates the desired grain of the media being specified. The source for this
 1336 attribute is DPA.

1337 Grain affects the curl and the folding of the medium. Some marking engines are sensitive to the resulting curl.

1338 Standard keyword values for "media-grain" are:

Keyword	Description
'x-direction'	The direction of the paper fibers is in the short dimension (i.e. the x-direction) of the medium.
'y-direction'	The direction of the paper fibers is in the long dimension (i.e. the y-direction) of the medium.

1339 See section 2.4 of [PWG5100.3] regarding the coordinate system.

1340 The Administrator can define a custom media grain using the 'name' (MAX) attribute syntax of the "media-grain-
 1341 supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member
 1342 attributes, the user can also supply user-defined grain names that are not among the values of the "media-grain-
 1343 supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported" attribute
 1344 (see [PWG5100.3]) to contain the 'media-grain' attribute keyword value.

1345 **8.4.2.1 media-grain-supported (1setOf (type3 keyword | name(MAX)))**

1346 The "media-grain-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this
 1347 "media-grain" member attribute that the Printer supports, i.e., the media grain supported.

1348 **8.4.3 media-material (type3 keyword | name(MAX))**

1349 The "media-material" member attribute indicates the desired material of the media being specified. The source for
 1350 this attribute is JDF v1.0.

1351 Standard keyword values for "media-material" are:

Keyword	Description
'aluminum'	The specified media should be aluminum.
'dry-film'	The specified media should be dry film.
'paper'	The specified media should be paper.
'polyester'	The specified media should be polyester.
'wet-film'	The specified media should be wet film.

1352 Note: The standard keyword values for the "media-material" attribute are the JDF standard values .

Comment [th27]: ISSUE: What is the JDF equivalent?

Answer: JDF has MediaType and MediaTypeDetails.

MediaType has keyword (NMToken) values:

- CD or DVD disc to be printed on.
- end board used in the

Process.

- gravure cylinder.
- reusable direct imaging

cylinder in a press.

- for flexo plate mounting tape.
- not one of the defined values.

- used for Screen Printing.

- for flexo sleeves

MediaTypeDetails has keyword (NMToken) values:

- Conventional or CtP press plate.

- CD disc to be printed on.
 Continuously connected
 Sheets of an opaque material connected along the long edge.

Continuously connected
 Sheets of an opaque material connected along the short edge.

- Double wall corrugated board
- DVD disc to be printed on.

- Envelopes that can be used for conventional mailing purposes.

- Envelopes that are not preprinted and have no windows.
- Envelopes that have windows for addressing purposes.

- For the base layer of flexo plates.
- For the photopolymer

layer of flexo plates.

- Flute layer of a corrugated board
- Media with a tab that runs the

full length of the medium so that only one tab is visible extending out beyond the edge of non-tabbed media.

- Contact paper as replacement for film.

- Label stock, (e.g., a Sheet of peel-off labels).

- Separately cut Sheets of an opaque material including a letterhead.

Comment [th28R27]: ISSUE: Now that we know what the JDF equivalent is, what do we want to do?

1353 The Administrator can define custom media materials using the 'name' (MAX) attribute syntax of the "media-material-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member
 1354 attributes, the user can also supply user-defined material names that are not among the values of the "media-
 1355 material-supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported"
 1356 attribute (see [PWG5100.3]) to contain the 'media-material' attribute keyword value.
 1357

1358 **8.4.3.1 media-material-supported (1setOf (type3 keyword | name(MAX)))**

1359 The "media-material-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this
 1360 "media-material" member attribute that the Printer supports, i.e., the media materials supported.

1361 **8.4.4 media-thickness (integer(1:MAX))**

1362 The "media-thickness" member attribute indicates the thickness of the media being specified. The source for this
 1363 attribute is JDF v1.0.

1364 The unit of measure for the "media-thickness" member attribute is one hundredth of a millimeter. This unit is
 1365 equivalent to 1/2540 th of an inch resolution.

1366 **8.4.4.1 media-thickness-supported (rangeOfInteger(1:MAX))**

1367 The "media-thickness-supported" (rangeOfInteger(1:MAX)) Printer attribute identifies the values of this "media-
 1368 thickness" member attribute that the Printer supports.

1369 **9 Conformance Requirements**

1370 This section summarizes the Conformance Requirements detailed in the definitions in this document for clients and
 1371 Printer objects (servers or devices).

1372 **9.1 Conformance Requirements for Printer objects**

1373 In general each of the attributes defined in this document are OPTIONAL for a Printer to support, so that Printer
 1374 implementers MAY implement any combination of attributes. Only the following conditional conformance
 1375 requirements are defined:
 1376

If the Printer supports:	then the Printer MUST also support (but vice-versa is OPTIONAL):
"job-hold-until-time"	"job-hold-until" (see [RFC2911] section 4.2.2)

1377
 1378 Each of the collection attribute definitions indicate which member attributes are REQUIRED and which are
 1379 OPTIONAL for a Printer to support and is not repeated here.

1380 If a Printer supports the 'collection' attribute syntax of a Job Template attribute , then it MUST support the
 1381 distinguished none value defined for that collection. See section 2.7 of [PWG5100.3].

1382 Support of the 'name' attribute syntax for Job Template attributes and collection member attributes is OPTIONAL, as
 1383 in IPP/1.1 [RFC2911].

Comment [th29]: ISSUE: What is the JDF equivalent?
 Answer: JDF has Media/@Thickness which is measured in microns, i.e., micro meters and uses the double data type. IPP consistently uses one hundredth of a millimeter for sizes with the integer data type.

Comment [th30R29]: ISSUE: OK to leave IPP using integer one hundredth of a millimeter?

1384 **9.2 Conformance Requirements for clients**

1385 Clients that support two Job Template attributes that control the same aspect, such as "job-hold-until" and "job-hold-until-time", MUST NOT supply both in a Job Creation request as indicated in the definitions of these attributes.

1387 Clients that support a "xxx" collection Job Template attribute SHOULD use the Get-Printer-Attributes request to obtain the "xxx-default" collection and display that to the user, so that the user can make any changes before submitting the Job. Then the client submits values for all member attributes, rather than depending on the Printer's defaulting for omitted member attributes, since such defaulting is implementation dependent and will vary from Printer to Printer.

1391 **9.3 Conformance Requirements for the Job Save and Reprint Capability**

1392 This section specifies the conformance requirements for Printers and clients pertaining to the Job Save and Reprint Capability. It also defines the conformance requirements for Job Save Format specifications.

1394 **9.3.1.1 Client Conformance Requirements for Job Save and Reprint Capability**

1395 Conforming clients:

- 1396 1. MUST support the "job-save-disposition" (collection) attribute according to the description in section 5.7, including the member attributes as required by Table 2.
- 1397
- 1398 2. MUST support the "save-info" (collection) member attribute according to the "job-save-disposition" attribute description in section 5.7, including the member attributes as required by Table 3.
- 1399
- 1400 3. MUST support the Print-URI operation for printing saved jobs according to section 3.3.1.1 above.

1401 **9.3.1.2 Printer Conformance Requirements for Job Save and Reprint Capability**

1402 Conforming Printers:

- 1403 1. MUST support the "job-save-disposition" (collection) Job Template attribute according to the description in section 5.7, including the member attributes as required by Table 2 and the "job-save-disposition-default" attribute and the "job-save-disposition-supported" attribute.
- 1404
- 1405
- 1406 2. MUST support all of the "save-disposition" member attribute values defined in the "job-save-disposition" description section 5.7.
- 1407
- 1408 3. MUST support the "save-info" (collection) member attribute according to the "job-save-disposition" attribute description in section 5.7, including the member attributes as required by Table 3 and the "save-location-supported", "save-name-supported", "save-document-format-supported", and "save-info-supported" Printer attributes.
- 1409
- 1410
- 1411
- 1412 4. SHOULD support the "file:" and "ftp:" schemes for use in the "save-location" member attribute as defined in the "job-save-disposition" attribute description in section 5.7.
- 1413
- 1414 5. MUST support at least one "save-document-format" (mimeMediaType) attribute value, as defined in the "job-save-disposition" attribute description in section 5.7, for use in both the "save-document-format" member attribute and "document-format" operation attribute in the Print-URI operation as described in section 3.3.1.1.
- 1415
- 1416
- 1417 6. SHOULD support a superset of the values of the Printer's "save-document-format-supported" attribute as the values of the Printer's "document-format-supported" attribute.
- 1418

Comment [th31]: **ISSUE**: What about http?
IPP WG agreed (8/18/09): Add http

Comment [th32R31]: **ISSUE**: What does it mean for a saved job to be saved using http?

- 1419 7. MUST support the 'job-saving' and 'job-save-error' values of the "job-state-reasons" Job Description attribute
1420 as defined in the "job-state-reasons" attribute description in section 8.3.
- 1421 8. MUST support the Print-URI operation that references saved jobs as defined in section 3.3.1.1.

1422 **9.3.1.3 Job Save Format Specification Conformance Requirements**

1423 Documents that define a Job Save format MUST contain the following information:

- 1424 1. MUST specify the mimeType value that identifies the Job Save Format, e.g., 'application/X-single-page-
1425 tiff'.
- 1426 2. MUST define the representation for PDL data.
- 1427 3. MUST specify the formats of the document content and how the Job Save Format file references the
1428 document content, e.g., using Relative URI value (see [RFC2396]) to reference the document content in the
1429 "document-uri" operation attribute.
- 1430 4. MUST define whether or not Printers with differing values of their "printer-make-and-model" Printer attributes
1431 are expected to print saved jobs with the same appearance, i.e., whether or not a Printer MUST omit the "job-
1432 printer-make-and-model" Job Description attribute when saving the job in the defined format (see the "job-
1433 printer-make-and-model" attribute description in section 6.1).

1434 **10IANA Considerations**



1438 **10.1 Attribute Registration**

1439 The attributes defined in this document will be published by IANA according to the procedures in RFC 2911
1440 [RFC2911] section 6.2 in the following file:

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1442 The registry entry will contain the following information:

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10.2 Attribute Value Registration

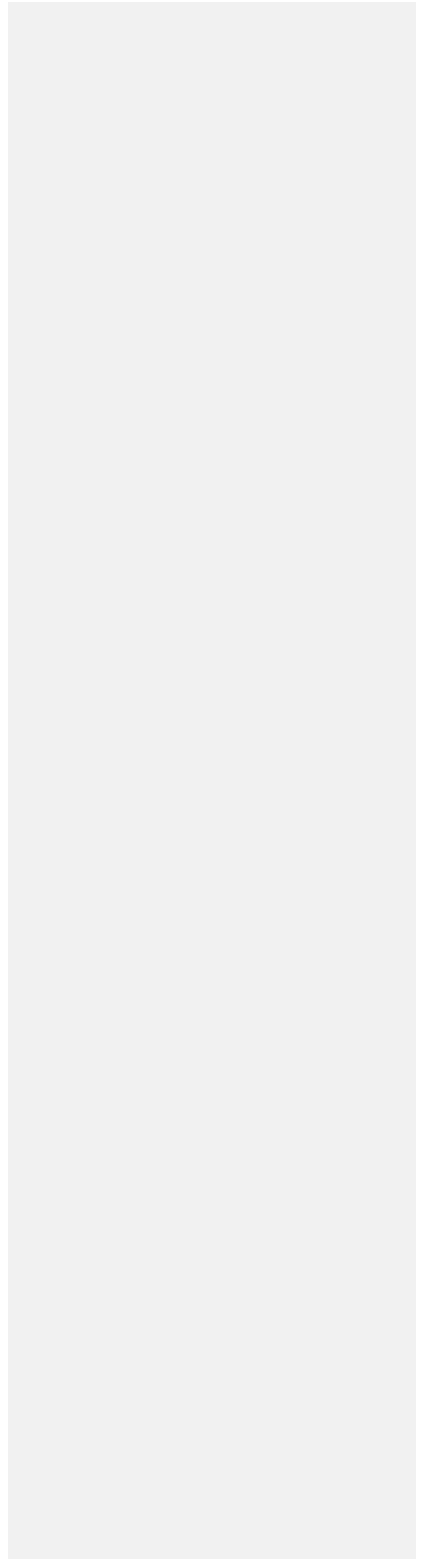
1497 The “document-format” mimeType attribute values, the “pdl-override-supported” type2, “which-jobs” type2, and
1498 “job-state-reasons” type2 keyword attribute values defined in this document will be published by IANA according to
1499 the procedures in RFC 2911 [RFC2911] section 6.1 in the following file:

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1501 The registry entries will contain the following information:

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1593 **11 Internationalization Considerations**

1594 The IPP extensions defined in this document require the same internationalization considerations as any of the Job
1595 Template attributes defined in IPP/1.1 [RFC2911].

1596 **12 Security Considerations**

1597 The IPP extensions defined in this document require the same security considerations as any of the Job Template
1598 attributes defined in IPP/1.1 [RFC2911].

1599 **13 References**

1600 **13.1 Normative References**

1601 This section lists references to documents whose implementation are required in order to conform to this
1602 specification.

1603 [PWG5100.3]

1604 Ocke, K., and T. Hastings, "Internet Printing Protocol (IPP): Production Printing Attributes – Set 1", PWG
1605 5100.3-2001, February 12, 2001, <ftp://ftp.pwg.org/pub/pwg/candidates/cs-ippprodprint10-20010212-5100.3.pdf>.

1607 [RFC2119]

1608 S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119 , March 1997

1609 [RFC2910]

1610 Herriot, R., Butler, S., Moore, P., Turner, R., and J. Wenn, "Internet Printing Protocol/1.1: Encoding and
1611 Transport", RFC 2910, September 2000.

1612 [RFC2911]

1613 Hastings, T., Herriot, R., deBry, R., Isaacson, S., and P. Powell, "Internet Printing Protocol/1.1: Model and
1614 Semantics", RFC 2911, September 2000.

1615 [RFC3382]
1616 deBry, R., , Hastings, T., Herriot, R., Ocke, K., and P. Zehler, "Internet Printing Protocol (IPP): The 'collection'
1617 attribute syntax", RFC 3382, September 2002.

1618 13.2 Informative References

1619 This section lists references to documents that provide information, but whose implementation is not required in order
1620 to conform to this specification.

1621 [PWG5100.6]
1622 Zehler, P., Herriot, R., Ocke, K., "Internet Printing Protocol (IPP): Page Overrides", IEEE-ISTO 5100.6-2003,
1623 <ftp://ftp.pwg.org/pub/pwg/candidates/cs-ipppageoverride10-20031031-5100.6.pdf>, October 31, 2003.

1624 [RFC2565]
1625 Herriot, R., Butler, S., Moore, P., and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport",
1626 RFC 2565, April 1999.

1627 [RFC2566]
1628 deBry, R., , Hastings, T., Herriot, R., Isaacson, S., Powell, P., "Internet Printing Protocol/1.0: Model and
1629 Semantics", RFC 2566, April 1999.

1630 [RFC3380]
1631 Hastings, T., Herriot, R., Kugler, C., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Set
1632 Operations", RFC 3380, September 2002.

1633 [RFC3998]
1634 Kugler, C, Hastings, T., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Administrative
1635 Operations", RFC 3998, March 2005.

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1653 Send comments to the PWG IPP Mailing List:

1654 ipp@pwg.org (subscribers only)

1655 To subscribe, see the PWG web page:

1656

1657 Implementers of this specification document are encouraged to join IPP Mailing List in order to participate in any
1658 discussions of clarification issues and review of registration proposals for additional attributes and values.

1659

1660

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1661

1662 **15 Appendix X - Change Log**

1663 **[[[PWG Secretary: Delete this section before publication as a Candidate Standard]]]**

1664 3 August 2009 (v0.2)

1665 - Changes made to create Prototype Draft - Tom Hastings

1666 • Referenced [PWG5100.3] Production Printing Attributes - Set 1 in the Abstract to show the relationship of this
1667 document to that document.

1668 • Formatted the boiler plate to follow current PWG practices

1669 • Added line numbers

1670 • Updated the cross references to current documents - no change tracking

1671 • Added Figure 1 caption to Figure 1 and added Table of Figures

1672 • Added the missing IANA Registrations - using change tracking

1673 • Updated Editors' addresses and phone numbers.

1674 • Removed Summary of other IPP documents

1675 21 August 2002 [sic] (v0.1)

1676 - Initial Draft - Tom Hastings and Don Fullman

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1678

