3 August 2009
Working Draft

The Printer Working Group

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

Status: Prototype Draft

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

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

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

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

ftp://ftp.pwg.org/pub/pwg/general/process/pwg-process30.pdf

This document is available electronically at:

ftp://ftp.pwg.org/pub/pwg/wd/wd-ippprodprintext10-20090803.pdf

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 reviwing 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 line I carry out the agreement with change tracking and re-post the next version of the draft.

Deleted: primarily

Deleted: primarily (but not limited) to production printers. These Job Template attributes

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72 The IEEE-ISTO is a not-for-profit corporation offering industry groups an innovative and flexible operational forum and
73 support services. The IEEE Industry Standards and Technology Organization member organizations include printer
74 manufacturers, print server developers, operating system providers, network operating systems providers, network
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76 develop standards, but also to facilitate activities that support the implementation and acceptance of standards in the
77 marketplace. The organization is affiliated with the IEEE (http://www.ieee.org/) and the IEEE Standards Association
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81
82 **About the Printer Working Group**

83 The Printer Working Group (or PWG) is a Program of the IEEE-ISTO. All references to the PWG in this document
84 implicitly mean "The Printer Working Group, a Program of the IEEE ISTO." The PWG is chartered to make printers
85 and the applications and operating systems supporting them work together better. In order to meet this objective, the
86 PWG will document the results of their work as open standards that define print related protocols, interfaces, data
87 models, procedures and conventions. Printer manufacturers and vendors of printer related software would benefit
88 from the interoperability provided by voluntary conformance to these standards.

89 In general, a PWG standard is a specification that is stable, well understood, and is technically competent, has
90 multiple, independent and interoperable implementations with substantial operational experience, and enjoys
91 significant public support.

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

102   http://www.pwg.org/mailhelp.html

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

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1 Introduction

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

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

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

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

254 # 2 Terminology

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

256 ## 2.1   Conformance Terminology

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

267 ## 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.

268

3 Semantics common to more than one attribute

3.1 Guaranteed Protocol Precedence Over the PDL and Queue Overrides

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

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

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

288 ## 3.2 Attribute Precedence

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

293 The attribute precedence model has the following features:

294   1) In principle, each defined attribute can occur at each of the precedence levels.

295   2) Attributes can be introduced and modified at different points in the job workflow, e.g., in the
296   application, print driver, submission client, protocol, and Printer:

297   • Attributes are supplied by different agents in the system: application, user, print driver,
298   administrator, operator, Printer object, and the output device hardware.

299   • Attributes are supplied at different points in time: PDL generation, job submission, job
300   acceptance, job pending, job processing.

301   3) Attributes can be introduced and modified at different points in the job workflow, e.g., in the
302   application, print driver, submission client, protocol, and Printer:

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

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

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

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

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

318   3. **protocol job object attribute** - The Job Template attribute submitted in the protocol (IPP, LPR, etc).
319   Set by the client when submitting a job in the protocol, or set by the user or operator after the job has
320   been accepted either using the Set-Job-Attributes operation, or by the operator using means local to
321   the Printer. Examples: "media" = 'na-letter' and "copies" = '2'.

322   4. **PDL document data** - an instruction in the PDL document data. Set by the application or print driver
323   that created the PDL. Example: PostScript setPageDevice specifying na-letter media.

324   5. **PDL Init File data** - a file that the Printer uses to initialize the PDL Interpreter before it starts
325   interpreting each document in a Job. See description of "pdl-init-file" Job Template attribute in Section
326   5.8 of this specification. It is immaterial how this file is specified, whether it be by a queue override, job
327   object attribute or printer default – the precedence of the contents of this file is at this level.

328   6. **printer default** - a Printer "xxx-default" attribute that is applied by the Printer provided that none of the
329   higher levels have supplied a value. The Printer implementation MUST supply values for all of the
330   Printer's "xxx-default" attributes that reflect the out-of-the-box action by the output device. For
331   example, if the output device will use media from the large-capacity input tray if not directed otherwise,
332   the implementation MUST supply the Printer's "media-default" attribute with the 'large-capacity'
333   keyword value without requiring the administrator to configure that value. The implementation MUST
334   allow the administrator to configure the Printer's "xxx-default" attributes to other values, if other value
335   are supported by the implementation. Example: The administrator changes the Printer's "media-
336   default" from 'large-capacity' to 'na-letter'.

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

340 3.3 Job Save and Reprint Capability

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

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

348 3.3.1 Reprinting Saved Jobs

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

350 3.3.1.1 Reprinting using the Print-URI operation

351 Job Reprint is accomplished by using the Print-URI operation. First a client requests the Printer to create a saved job
352 by supplying the "job-save-disposition" Job Template attribute in a Job Creation operation (see description in section
353 5.7) with a URI value for the "save-location" member attribute and a name value for the "save-name" member
354 attribute. To reprint the saved job, a client concatenates the original "save-location" and "save-name" values into a
355 URI reference value to the saved job using the "document-uri" (uri) operation attribute (in Group 1) of the Print-URI

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Deleted: <#>**document override programming** - A special "document-overrides" collection Job Template attribute that contains the attributes that are to have the document override status (see [PWG5100.6]). Set by the client when submitting a job either in the protocol, or set by the user or operator after the job has been accepted either using the Set-Job-Attributes operation, or by the operator using means local to the Printer. Example: "document-overrides" = {"document-number" = '5; "media" = 'transparency'}¶

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

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

378 # 4 Operation attributes

379 ## 4.1 job-password (octetString(255))

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

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

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

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

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

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

398 ## 4.2 job-password-encryption (type3 keyword | name(MAX))

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

402 The valid keyword values are the same as the valid values for the "job-password-encryption-supported" attribute (See
403 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 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) that 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 operaton 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 oeperation 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?

5 Job Template Attributes

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

5.1 feed-orientation (type3 keyword)

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

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

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.

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

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

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

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Deleted: and "document-overrides"

5.1.1 feed-orientation-default (type3 keyword)

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

436 **5.1.2 feed-orientation-supported (1setOf (type3 keyword))**

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

439 **5.2   font-name-requested (name(MAX))**

440 **5.2.1 font-name-requested-default (name(MAX))**

441 **5.2.2 font-name-requested-supported (1setOf name(MAX))**

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

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

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

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

462 **5.3   font-size-requested (integer (1:MAX))**

463 **5.3.1 font-size-requested-default (integer (1:MAX))**

464 **5.3.2 font-size-requested-supported (1setOf rangeOfInteger (1:MAX))**

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

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

479 The "font-size-requested" units are points, equivalent to $1/72^{nd}$ of an inch.

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

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

5.4   job-hold-until-time (dateTime)

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

489 Note: The client application has the choice to present the "job-hold-until-time" to the end user as either a delta time
490 (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
491 is represented using the appropriate time zone(s) (usually the client's time zone, or the Printer's time zone, or both if
492 the client is capable). See the description of "printer-current-time" in [RFC2911].

493 If the Printer supports the "job-hold-until-time" attribute, the "job-hold-until" attribute MUST also be supported.
494 However, if the "job-hold-until" attribute is supported, the "job-hold-until-time" attribute NEED NOT be supported. If
495 the Printer supports the "job-hold-until-time" attribute, the "printer-current-time" (dateTime) Printer Description
496 attribute MUST also be supported.

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

500 1. reject the request and return the 'client-error-bad-request' status code (see [RFC2911]) or

501 2. use either the "job-hold-until" or the "job-hold-until-time" attribute, independent of the value of the "ipp-attribute-
502   fidelity" attribute supplied by the client.

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

507 1. rejects the request with the 'client-error-attributes-or-values-not-supported' status code (see [RFC2911]) if the
508   "ipp-attribute-fidelity" is 'true' or

509 2. accepts the request with the 'successful-ok-ignored-or-substituted-attributes', if the client-supplied "ipp-attribute-
510   fidelity" is 'false'. Also, the Printer MUST return the "job-hold-until-time" attribute and the client-supplied value in

511   the Unsupported Attributes group of the operation response. If the "job-hold-until-time" value is earlier than the
512   "printer-current-time" value plus the minimum value of "job-hold-until-time-supported", the Printer MUST set the
513   value of the Job's "job-hold-until-time" to the current dateTime plus the minimum time. Also, if the "job-hold-until-
514   time" value is later than the "printer-current-time" value plus the maximum value of "job-hold-until-time-
515   supported", the Printer MUST set the value of the Job's "job-hold-until-time" to the current dateTime plus the
516   maximum time.

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

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

526   5.4.1 Why there is no job-hold-until-time-default

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

529   5.4.2 job-hold-until-time-supported (rangeOfInteger(0:MAX))

530   A range of integer values of the "job-hold-until-supported" attribute specifies the span of relative amount of time in
531   seconds into the future that the printer supports keeping the submitted job in the 'pending-held' state. The Printer
532   MUST use the time range to validate a job that is submitted with a "job-hold-until-time" attribute.
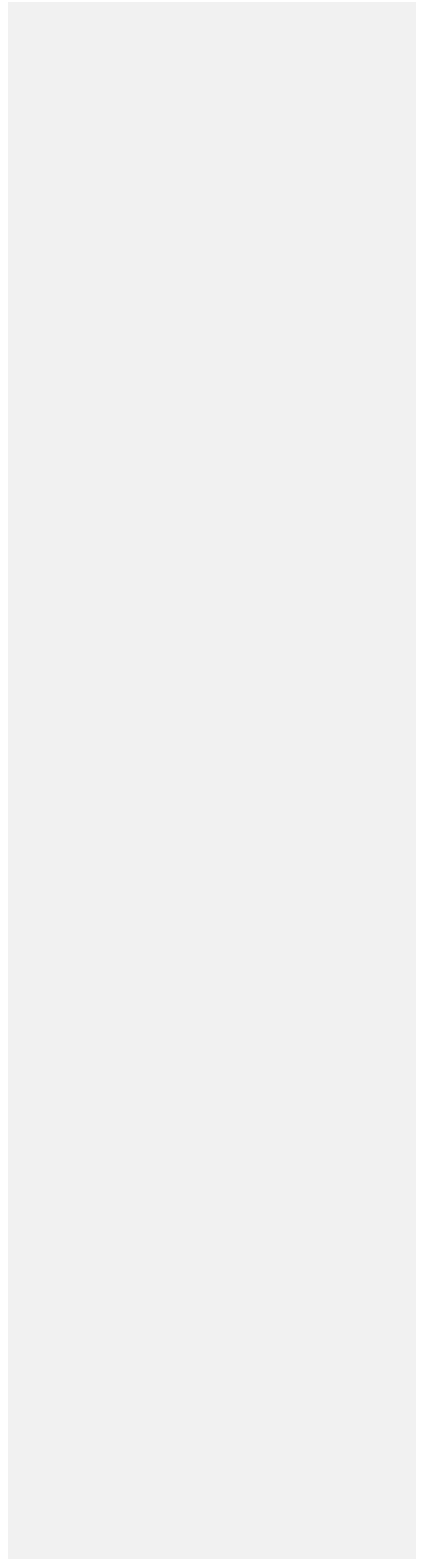
5.6   job-recipient-name (name(MAX))

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

5.6.2   job-recipient-name-supported (boolean)

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

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

5.7   job-save-disposition (collection)

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

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

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

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

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

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

5.7.1.1   save-disposition (type3 keyword)

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

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

570 Standard keyword values are:

Keyword	Description	Printer Support
'none'	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. If the print was 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.	MUST
'save-only'	The following constraints apply to the 'processing' of the job: • The job MUST NOT be printed. • The Document Data MUST be saved to the location specified by the "save-location" member attribute. 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 the job is in the 'processing' state (the job's "job-state" attribute is set to to 'processing'). Thus the Printer MUST move the job (typically from the 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. 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 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's "job-state-reasons" attribute. 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 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.	MUST
'print-save'	The following constraints apply to the 'processing' of the job: • The job MUST be printed. • The Document Data MUST be saved to the location specified by the "save-location" member attribute. 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 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	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 acconting 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 Savee 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 Pritner generated for the assocated Save Job object?

Comment [th14R13]: ISSUE: OK to add that the Printer MUST generat 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 Pritner generated for the assocated 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).

571 **5.7.1.1.1 save-disposition-supported (1setOf type3 keyword)**

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

574 **5.7.1.2 save-info (1setOf collection)**

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

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

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

590 **5.7.1.2.1 There is no save-info-default Printer attribute**

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

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

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

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

The "save-info" collection member attributes are:

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 altoghether and let the Printer decide where to store Saved Job objects?

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

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

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

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 the "save-location-supported" Printer attribute, the client supplies that sub-directory name as part of the "save-name" attribute (see "save-name" description below), not as part of the "save-location" member attribute.

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

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

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

636   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

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

643   **5.7.1.2.3.1.1   save-location-default (uri)**

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

646   **5.7.1.2.3.1.2   save-location-supported (1setOf uri)**

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

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

652

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

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

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

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

665 If the "save-name" attribute value in combination with the "save-location" attribute value specifies a handle that
666 already exists, the Printer MUST accept the job, return the 'successful-ok' status code, hold the job, and prompt an
667 administrator in an IMPLEMENTATION-DEFINED manner to change the job's "save-location" or "save-name"
668 attribute values before processing the job. The Printer MUST hold the job independent of the value of the "ipp-
669 attribute-fidelity" (since with operator assistance, the Printer is able to save the job) and whether or not the 'save-
670 name' keyword has been configured as a value of the Printer's "user-defined-values-supported" attribute. See Table
671 4 below entitled "Printer actions for various Job and Printer attribute values", at the end of the "job-save-disposition"
672 description. Note: A "job-save-disposition" member attribute to control the Printer's action (reject job, over write file,
673 hold job and prompt administrator, or auto-generate a non-conflicting name) to resolve any URI conflict may be a
674 desirable future extension.

> **Comment [th17]:** ISSUE: Now that each Saved Job object is separately identified by a "job-id" integer(1:MAX) value, insead 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?

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

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

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

5.7.1.2.3.2.2   save-name-supported (boolean)

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

688

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

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

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

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

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

704 If the saved job is submitted to a different make-and-model printer that supports the same document-format (i.e., the
705 same value of the "document-format" operation attribute in the Document Creation request), then the Printer MUST
706 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.

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

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

714 **5.7.1.2.3.3.1 save-document-format-default (mimeMediaType)**

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

717 **5.7.1.2.3.3.2 save-document-format-supported (1setOf mimeMediaType)**

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

720 If a Printer supports this Job Save & Reprint Capability, the Printer SHOULD be able to accept all of the formats for
721 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.,
722 the mimeMediaType values of the Printer's "document-format-supported" Printer Description attribute SHOULD be a
723 superset of the values of the Printer's "save-document-format-supported" attribute. For example, if a Printer supports
724 the 'application/X-single-page-tiff' format for saving jobs, it SHOULD also accept and support 'application/X-single-
725 page-tiff' format in a Printer-URI operation as indicated by the 'application/X-single-page-tiff' also being a value of the
726 Printer's "document-format-supported" Printer Description attribute (along with PDL mimeMediaType values, such as
727 'application/postscript').

728

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

| Deleted: "document-overrides" and |
| Deleted: s |

734   The possible Printer actions are (see above descriptions of "save-location" and "save-name" for details):

735   1. reject: The Printer rejects the Job Creation request, returns the 'client-error-attributes-or-values-not-
736   supported' status code and the "job-save-disposition" attribute and value in the Unsupported Attributes group.

737   2. accept-save: The Printer accepts the Job Creation request, returns the 'successful-ok' status code, and
738   attempts to create all necessary files and sub-directories.

739   3. accept-substitute: The Printer accepts the Job Creation request, returns the 'successful-ok-ignored-or-
740   substituted-attributes' status code and the "job-save-disposition" attribute and value in the Unsupported
741   Attributes group, and, DEPENDING ON IMPLEMENTATION: (1) ignores the attribute and does not perform
742   the save, (2) puts the job in the 'held' state and let the operator fix the problem, either by changing the job's
743   "save-location" attribute value or adding the value to the Printer's "save-location-supported" attribute, or (3)
744   substitutes the job's "save-location" value with one of the values of the Printer's "save-location-supported"
745   values.

746   4. accept-hold: The Printer accepts the Job Creation request, returns the 'successful-ok' status code, and holds
747   the job for the operator to resolve the conflict so that the job can be saved.

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

750   **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

751   **5.7.2 job-save-disposition-default (collection)**

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

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

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

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

766 5.7.3 job-save-disposition-supported (1setOf type2 keyword)

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

771 5.8 pdl-init-file (1setOf collection)

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

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

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

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

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

791 5.8.1 Member Attributes for the "pdl-init-file" Job Template Attribute

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

795   **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

796   **5.8.1.1   pdl-init-file-location (uri)**

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

801   **5.8.1.1.1   pdl-init-file-location-supported (1setOf uri)**

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

805   **5.8.1.2   pdl-init-file-name (name(MAX))**

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

808 A well-formed request MUST include at least the name of the initialization file to be used (i.e. the "pdl-init-file-
809 location" or directory containing the initialization file need not be supplied by the client and in fact, might not be known
810 to the client). The client can supply a "pdl-init-file-name" attribute value that is either a simple file name or a relative
811 path where each component of the path is separated by a "/" character. The "pdl-init-file-name" member attribute
812 value concatenated with the "pdl-init-file-location" attribute value (supplying a "/" between them, if necessary)
813 specifies a Virtual File Name (see definition in Section 2.2) that will be associated with the saved job. For example, if
814 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'.

815   **5.8.1.2.1   pdl-init-file-name-supported (1setOf name(MAX))**

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

818   **5.8.1.3   pdl-init-file-entry (name(MAX))**

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

821 **5.8.1.3.1 pdl-init-file-entry-supported (1setOf name(MAX))**

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

824 ## 5.8.2 pdl-init-file-default (1setOf collection)

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

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

832 ## 5.8.3 pdl-init-file-supported (1setOf type2 keyword)

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

836 ## 5.9   proof-print (collection)

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

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.

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

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

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

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

853 ### 5.9.1 Member Attributes for the "proof-print" Job Template Attribute

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

855   **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

856   **5.9.1.1   proof-print-copies (integer (0:MAX))**

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

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

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

867   **5.9.1.2   media (type3 keyword | name(MAX)) or media-col (collection)**

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

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

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

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

885 **5.9.2 proof-print-default (collection)**

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

889 **5.9.3 proof-print-supported (1setOf type2 keyword)**

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

892 # 6 Job Description Attributes

893 **6.1 job-save-printer-make-and-model (text(127))**

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

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

904 # 7 Printer Description Attributes

905 **7.1 job-creation-attributes-supported (1setOf type2 keyword)**

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

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

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

911 • all Job Template attributes that may be supplied by the client at the job level

912 • all operation attributes that are written to the job object as job description attributes (e.g.,
913 "job-name") at the job level

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

915 • collection member attribute names

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

918   • operation attributes that are not job attributes

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

929 7.2 job-password-supported (integer(0:255))

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

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

935 7.3 job-password-encryption-supported (1setOf (type3 keyword | name(MAX)))

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

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

939 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.

941   **7.4   job-spooling-supported (type2 keyword)**

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

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

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

950   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.

951   **7.5   max-save-info-supported (integer(1:MAX))**

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

959   **7.6   media-col-database (1setOf collection)**

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

965   The Printer MUST NOT return this attribute in the response to the Get-Printer-Attributes operation when the client
966   requested the 'all' or 'printer-description' group names. Therefore the client must request this attribute explicitly in
967   order to get the media collections. The reason for this recommendation is that the amount of data returned in the
968   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 depeinding on implementation.

Set-Printer-Attributes MUST NOT set this attribute.

Deleted: This attribute does not describe when resources or OPI images are fetched. Printers MUST pre-scan and fetch resources and OPI images according to the "resource-pre-scan", "opi-image-pre-scan", and "opi-image-insertion" Job Template attributes (see descriptions in [pwg-color-imaging]) which is independent from the "job-spooling-supported" Printer Description attribute. This attribute does not describe when the Printer fetches images that are references from within a document.¶

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-'printer-description' groups.
IPP WG agreed (8/18/09): Printer MUST NOT

Client MUST request exiplicitly and Printer MUST support.

Deleted: SHOULD

981 **7.7 printer-detailed-status-messages (1setOf text(MAX))**

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

987 **7.8 which-jobs-supported (1setOf type2 keyword)**

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

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

993 # 8 Additional Values and Semantics for Existing IPP
994 Attributes

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

998 **8.1 Additional values and semantics for the "pdl-override-supported" Printer Description**
999 **attribute**

1000 The additional values are represented by revisions to the original description for "pdl-override-supported" from
1001 [RFC2911].

1002 **8.1.1 pdl-override-supported (type2 keyword)**

1003 This REQUIRED Printer attribute expresses the ability for a particular Printer implementation to either attempt to
1004 override document data instructions with IPP Job attributes or not.

1005 This attribute takes on the following keyword values:

1006   • 'attempted': This value indicates that the Printer object attempts to make the IPP attribute
1007   values take precedence over embedded instructions in the document data, however there is
1008   no guarantee.

1009   • 'not-attempted': This value indicates that the Printer object makes no attempt to make the IPP
1010   attribute values take precedence over embedded instructions in the document data.

1011   • 'guaranteed': This value indicates that the Printer object:
1012   1) guarantees that the IPP Job Template attribute values take precedence over instructions of any
1013   form embedded anywhere in the document data.

2)   and guarantees that no PDL instruction is performed that does not correspond to a current value in the corresponding "xxx-supported" Printer attribute. In such a situation, the Printer MAY (a) abort the job, (b) stop the Printer, (c) hold the job, or (d) substitute on the fly with one of the current values of its "xxx-supported" attribute. This choice MAY be fixed by the implementation or configurable by the system administrator and MAY depend on the attribute.

3)   provides the "queue override" semantics as described below, if the "xxx-supported" Printer attribute is configured with only a single value.

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

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

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

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

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

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

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

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

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

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

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

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

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

1056   Jobs response. It MUST either (1) not return the attribute at all or return it with one of the supported
1057   values, depending on implementation.

1058   Rationale: Same behavior as for the other values of "pdl-override-supported".

1059   The above five cases are represented in Table 7.

1060   **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

1061   **Examples of queue override**

1062   The queue override extension allows an implementation to guarantee that only advertised supported attribute values
1063   are actually performed, and that unsupported values embedded as instructions in the document data, will not be
1064   performed. This extension is also a further step in making a Printer object indicate what it really supports in both the
1065   protocol and the PDL and what it does not, i.e., "truth in advertising". In other words, the absence of a value in the
1066   Printer's "xxx-supported" attribute indicates a guarantee that the value cannot be performed.

1067   For example, an administrator that wants to force two sided printing could set the Printer's "sides-supported" to the
1068   two values: 'two-sided-long', 'two-sided-short' (see [RFC2911]). Thus a PDL that contained an embedded simplex
1069   (one-sided) instruction would be overridden in one of the following ways: (1) aborted, (2) held, or (3) automatically
1070   forced to two-sided, depending on implementation and/or site policy.

1071   As another example, an administrator could set up an IPP Printer that always staples by setting the "finishings-
1072   supported" to 'staple' only, i.e. by removing the 'none' keyword value (see [RFC2911]). In order to allow jobs not to be
1073   stapled on the same physical piece of hardware, the administrator would use fan-in (if supported) to set up another
1074   IPP Printer that does include the 'none' keyword value in its "finishings-supported" attribute.

1075   The values of the Printer's "xxx-supported" attribute are not only what the Printer will accept in the print protocol (e.g.
1076   IPP) as attributes, but also as corresponding values of embedded PDL instructions. If a value that is not in the "xxx-
1077   supported" list is encountered in either the print protocol or the PDL, it MUST NOT be performed (no matter what the
1078   value of "ipp-attribute-fidelity" is).

1079   The four combinations of unsupported IPP attribute values and unsupported PDL instruction values are:

1080   (1) unsupported attribute value in the protocol and "ipp-attribute-fidelity" = 'false' (independent of "pdl-
1081   override-supported"):

1082   The Printer object MUST accept the Job with the unsupported attribute value. However, the Printer
1083   object will always return only one of its "xxx-supported" values in response to Get-Jobs or Get-Job-

1084   Attributes. Depending on implementation, the Printer can perform this substitution once at job
1085   submission time, or each time the job is queried.

1086 (2) unsupported attribute value in the protocol and "ipp-attribute-fidelity" = 'true' (independent of "pdl-
1087   override-supported"):

1088   The Printer MUST reject the job.

1089 (3) unsupported embedded instruction value in the PDL and "pdl-override-supported" = 'attempted' or 'not-
1090   attempted' (and independent of "ipp-attribute-fidelity"):

1091   When an implementation encounters a value that is not in the "xxx-supported" list, it makes no special
1092   action and allows it to be performed. See the definition of "Supports" in [RFC2911] that indicates that
1093   performing a PDL instruction that is not supported in the protocol is an allowed behavior.

1094 (4) (new case) unsupported embedded instruction value in the PDL and "pdl-override-supported" =
1095   'guaranteed' (and independent of "ipp-attribute-fidelity"):

1096   The unsupported embedded instruction value MUST NOT be performed. The behavior is
1097   implementation-dependent if an unsupported embedded instruction value is encountered. For example,
1098   the Printer MAY abort the job or substitute on the fly with one of the current values of its "xxx-supported"
1099   attribute. This choice MAY be fixed by the implementation or configurable by the system administrator
1100   and MAY depend on the Job Template attribute.

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

1103 This section defines additional values for the IPP "which-jobs" (type2 keyword) Operation attribute of the Get-Jobs
1104 operation (see [RFC2911] section 3.2.6) and the "which-jobs-supported" (1setOf type2 keyword) Printer Description
1105 attribute (see section 7.8) to include keywords corresponding to the symbolic names of all IPP "job-state" enum
1106 values (see [RFC2911] section 4.3.7) and an 'all' value.

1107 The additional values are represented by revisions to the original description for "which-jobs" from [RFC2911]. The
1108 [RFC2911] values for "which-jobs" are 'completed' and 'not-completed'.

8.2.1 which-jobs (type2 keyword)

1110 The client OPTIONALLY supplies this attribute in the Get-Jobs operation. The Printer object MUST support this
1111 attribute. It indicates which Job objects MUST be returned by the Printer object in the Get-Jobs Request.

1112 The values for this attribute are:

1113 **'completed'**: This includes any Job object whose state is 'completed', 'canceled', or 'aborted'.

1114 **'not-completed'**: This includes any Job object whose state is 'pending', 'processing', 'processing-
1115   stopped', or 'pending-held'.

1116 **'pending'**: This includes any Job object whose state is 'pending'. This value corresponds to the
1117   symbolic name of the corresponding value for the "job-state" attribute.

1118 **'pending-held'**: This includes any Job object whose state is 'pending-held'. This value corresponds to
1119   the symbolic name of the corresponding value for the "job-state" attribute.

1120 **'processing'**: This includes any Job object whose state is 'processing'. This value corresponds to the
1121   symbolic name of the corresponding value for the "job-state" attribute.

1122 **'processing-stopped'**: This includes any Job object whose state is 'processing-stopped'. This value
1123   corresponds to the symbolic name of the corresponding value for the "job-state" attribute.

1124 **'canceled'**: This includes any Job object whose state is 'canceled'. This value corresponds to the
1125   symbolic name of the corresponding value for the "job-state" attribute.

1126 **'aborted'**: This includes any Job object whose state is 'aborted'. This value corresponds to the
1127   symbolic name of the corresponding value for the "job-state" attribute.

1128 **'all'**: This includes all Job objects, that is any Job object that is considered 'completed' or 'not-
1129   completed as defined by these values above.

1130 **'saved'**: jobs that have been saved which are in the 'completed', 'canceled', or 'aborted' state.

1131 A Printer object MUST support both the 'completed' and 'not-completed' values. However, if the implementation does
1132 not keep jobs in the 'completed', 'canceled', and 'aborted' states, then it returns no jobs when the 'completed' value is
1133 supplied.

1134 If a client supplies some other value, the Printer object MUST copy the attribute and the unsupported value to the
1135 Unsupported Attributes response group, reject the request, and return the 'client-error-attributes-or-values-not-
1136 supported' status code.

1137 If the client does not supply this attribute, the Printer object MUST respond as if the client had supplied the attribute
1138 with a value of 'not-completed'.

1139 For the order that Jobs are returned, see the description of the Get-Jobs Response in [RFC2911].

1140 ## 8.3   Additional values and semantics for the "job-state-reasons" Job Description attribute

1141 The additional values and semantics are represented by revisions to the original description for "job-state-reasons" in
1142 [RFC2911] section 4.3.8 and the values defined in [RFC3998], [PWG5100.3], and [PWG5100.6].

1143 ### 8.3.1   job-state-reasons (1setOf type2 keyword)

1144 This REQUIRED attribute provides additional information about the job's current state, i.e., information that augments
1145 the value of the job's "job-state" attribute.

1146 These values MAY be used with any job state or states for which the reason makes sense. Some of these value
1147 definitions indicate conformance requirements; the rest are OPTIONAL. Furthermore, when implemented, the Printer
1148 MUST return these values when the reason applies and MUST NOT return them when the reason no longer applies
1149 whether the value of the Job's "job-state" attribute changed or not. When the Job does not have any reasons for
1150 being in its current state, the value of the Job's "job-state-reasons" attribute MUST be 'none'.

1151 Note: While values cannot be added to the 'job-state' attribute without impacting deployed clients that take actions
1152 upon receiving "job-state" values, it is the intent that additional "job-state-reasons" values can be defined and
1153 registered without impacting such deployed clients. In other words, the "job-state-reasons" attribute is intended to be
1154 extensible.

1155 The following standard keyword values are defined. For ease of understanding, the values are presented in the order
1156 in which the reasons are likely to occur (if implemented), starting with the 'none' value:

1157   **'none'**: There are no reasons for the job's current state. This state reason is semantically equivalent to
1158   "job-state-reasons" without any value and MUST be used when there is no other value, since
1159   the 1setOf attribute syntax requires at least one value. [RFC2911]

1160   **'job-hold-until-specified'**: The value of the job's "job-hold-until" attribute was specified with a time
1161   period that is still in the future. The job MUST NOT be a candidate for processing until this
1162   reason is removed and there are no other reasons to hold the job. This value SHOULD be
1163   supported if the "job-hold-until" Job Template attribute is supported. [RFC2911]

1164   **'job-password-wait'**: The job is currently being held until the correct password is entered at the
1165   device. If the "job-password" Operation attribute (See section 4.1) is supported, this value
1166   MUST be supported.

1167   **'proof-print-wait'**: The job is currently being held until the operator verifies the output of the proof
1168   print and performs a Release-Job operation. If the "proof-print" Job Template attribute (See
1169   section 5.9) is supported, this value MUST be supported.

1170   **'resources-are-not-supported'**: At least one of the resources needed by the job, such as media, fonts,
1171   resource objects, etc., is not supported on any of the physical printers for which the job is a
1172   candidate. This condition MAY be detected when the job is accepted, or subsequently while
1173   the job is pending or processing, depending on implementation. The job may (1) remain in its
1174   current state, (2) be moved to the 'pending-held' state, depending on implementation and/or job
1175   scheduling policy, or (3) scheduled normally, but the Printer is put into the 'stopped' state when
1176   the job is attempted to be processed on the Printer. This value is intended for use with an
1177   implementation that supports the "user-defined-values-supported" Printer attribute (defined in
1178   [PWG5100.3]) which allows a job to be accepted with an unsupported 'name' value.
1179   [PWG5100.3]

1180   **'resources-are-not-ready'**: At least one of the resources needed by the job, such as media, fonts,
1181   resource objects, etc., is not ready on any of the physical printer's for which the job is a
1182   candidate. This condition MAY be detected when the job is accepted, or subsequently while
1183   the job is pending or processing, depending on implementation. The job may remain in its
1184   current state or be moved to the 'pending-held' state, depending on implementation and/or job
1185   scheduling policy. [RFC2911]

1186   **'job-incoming'**: Either (1) the Printer has accepted the Create-Job operation and is expecting
1187   additional Send-Document and/or Send-URI operations or (2) the Printer is retrieving/accepting
1188   document data as a result of a Print-Job, Print-URI, Send-Document or Send-URI operation.
1189   [RFC2911]

1190   **'job-spooling'**: Same as 'job-incoming' with the specialization that the Printer is spooling the document
1191   data before processing it. This value corresponds to the 'spool' or 'automatic' value of the "job-
1192   spooling-supported" Printer Description attribute.

1193   **'job-streaming'**: Same as 'job-incoming' with the specialization that the Printer is processing the
1194   document data as it is being received (that is, the job is not being spooled, but rather is being
1195   processed in chunks by the output device and is being imaged during reception). This value
1196   corresponds to the 'stream' or 'automatic' value of the "job-spooling-supported" Printer
1197   Description attribute.

1198 **'job-data-insufficient'**: The Create-Job operation has been accepted by the Printer, but the Printer is
1199   expecting additional document data before it can move the job into the 'processing' state. If a
1200   Printer starts processing before it has received all data, the Printer removes the 'job-data-
1201   insufficient' reason, but the 'job-incoming' remains. If a Printer starts processing after it has
1202   received all data, the Printer removes the 'job-data-insufficient' reason and the 'job-incoming' at
1203   the same time. [RFC2911]

1204 **'unsupported-compression'**: The job was aborted by the system because the Printer determined while
1205   attempting to decompress the document-data's that the compression is actually not among those
1206   supported by the Printer. This value MUST be supported, since "compressions is a
1207   REQUIRED operation attribute. [RFC2911]

1208 **'compression-error'**: The job was aborted by the system because the Printer encountered an error in
1209   the document-data while decompressing it. If the Printer posts this reason, the document-data
1210   has already passed any tests that would have led to the 'unsupported-compression' job-state-
1211   reason. [RFC2911]

1212 **'document-access-error'**: After accepting a Print-URI or Send-URI request, the Printer could not
1213   access one or more documents passed by reference. This reason is intended to cover any file
1214   access problem, including file does not exist and access denied because of an access control
1215   problem. The Printer MAY also indicate the document access error using the "job-document-
1216   access-errors" Job Description attribute (see the description of "job-document-access-errors"
1217   above). Whether the Printer aborts the job and moves the job to the 'aborted' job state or prints
1218   all documents that are accessible and moves the job to the 'completed' job state and adds the
1219   'completed-with-errors' value in the job's "job-state-reasons" attribute depends on
1220   implementation and/or site policy. This value SHOULD be supported if the Print-URI or Send-
1221   URI operations are supported. [RFC2911]

1222 **'unsupported-document-format'**: The job was aborted by the system because the document-data's
1223   document-format is not among those supported by the Printer. If the client specifies the
1224   document-format as 'application/octet-stream', the printer MAY abort the job and post this
1225   reason even though the format is a member of the "document-format-supported" printer
1226   attribute, but not among the auto-sensed document-formats. This value MUST be supported,
1227   since "document-format" is a REQUIRED operation attribute. [RFC2911]

1228 **'document-format-error'**: The job was aborted by the system because the Printer encountered an error
1229   in the document-data while processing it. If the Printer posts this reason, the document-data has
1230   already passed any tests that would have led to the 'unsupported-document-format' job-state-
1231   reason. [RFC2911]

1232 **'submission-interrupted'**: The job was not completely submitted for some unforeseen reason, such
1233   as: (1) the Printer has crashed before the job was closed by the client, (2) the Printer or the
1234   document transfer method has crashed in some non-recoverable way before the document data
1235   was entirely transferred to the Printer, (3) the client crashed or failed to close the job before the
1236   time-out period. See the description of the "multiple-operation-time-out" Printer Description
1237   attribute in [RFC2911] section 4.3.31. [RFC2911]

1238 **'job-outgoing'**: The Printer is transmitting the job to the output device. [RFC2911]

1239   **'job-scheduling'**: The printer is in the process of scheduling the processing for the job.

1240   **'job-queued'**: Job is in the 'processing' state, but more specifically, the Printer has queued the
1241   document data. [RFC2911]

1242   **'job-transforming'**: Job is in the 'processing' state, but more specifically, the Printer is interpreting
1243   document data and producing another electronic representation. [RFC2911]

1244   **'job-interpreting'**: Job is in the 'processing' state, but more specifically, the Printer is interpreting the
1245   document data. [RFC2911]

1246   **'job-queued-for-marker'**: Job is in any of the 'pending-held', 'pending', or 'processing' states, but more
1247   specifically, the Printer has completed enough processing of the document to be able to start
1248   marking and the job is waiting for the marker. Systems that require human intervention to
1249   release jobs using the Release-Job operation, put the job into the 'pending-held' job state.
1250   Systems that automatically select a job to use the marker put the job into the 'pending' job state
1251   or keep the job in the 'processing' job state while waiting for the marker, depending on
1252   implementation. All implementations put the job into (or back into) the 'processing' state when
1253   marking does begin. [RFC2911]

1254   **'job-printing'**: The output device is marking media. This value is useful for Printers which spend a
1255   great deal of time processing (1) when no marking is happening and then want to show that
1256   marking is now happening or (2) when the job is in the process of being canceled or aborted
1257   while the job remains in the 'processing' state, but the marking has not yet stopped so that
1258   impression or sheet counts are still increasing for the job. [RFC2911]

1259   **'printer-stopped-partly'**: The value of the Printer's "printer-state-reasons" attribute contains the value
1260   'stopped-partly'. [RFC2911]

1261   **'printer-stopped'**: The value of the Printer's "printer-state" attribute is 'stopped'. [RFC2911]

1262   **'job-suspending'**: The printer is in the process of moving the job from a processing condition to a
1263   suspended condition where other jobs can be processed.

1264   **'job-suspended'**: The job has been suspended while processing using the Suspend-Current-Job
1265   operation and other jobs can be processed on the Printer. The Job can be resumed using the
1266   Resume-Job operation which removes this value. [RFC3998]

1267   **'job-suspended-by-operator'**: The job has been indefinitely suspended by the printer operator.

1268   **'job-suspended-by-user'**: The job has been indefinitely suspended by the user.

1269   **'job-suspended-by-system'**: The job has been indefinitely suspended by the Printer's system software
1270   during normal processing of the job.

1271   **'job-resuming'**: The printer is in the process of moving the job from a suspended condition to a
1272   candidate for processing.

1273   **'job-canceled-by-user'**: The job was canceled by the owner of the job using the Cancel-Job request,
1274   i.e., by a user whose authenticated identity is the same as the value of the originating user that
1275   created the Job object, or by some other authorized end-user, such as a member of the job
1276   owner's security group. This value SHOULD be supported. [RFC2911]

1277 **'job-canceled-by-operator'**: The job was canceled by the operator using the Cancel-Job request, i.e.,
1278   by a user who has been authenticated as having operator privileges (whether local or remote).
1279   If the security policy is to allow anyone to cancel anyone's job, then this value may be used
1280   when the job is canceled by other than the owner of the job. For such a security policy, in
1281   effect, everyone is an operator as far as canceling jobs is concerned. This value SHOULD be
1282   supported if the implementation permits canceling by other than the owner of the job.
1283   [RFC2911]

1284 **'job-canceled-at-device'**: The job was canceled by an unidentified local user, i.e., a user at a console
1285   at the device. This value SHOULD be supported if the implementation supports canceling jobs
1286   at the console. [RFC2911]

1287 **'aborted-by-system'**: The job (1) is in the process of being aborted, (2) has been aborted by the
1288   system and placed in the 'aborted' state, or (3) has been aborted by the system and placed in the
1289   'pending-held' state, so that a user or operator can manually try the job again. This value
1290   SHOULD be supported. [RFC2911]

1291 **'processing-to-stop-point'**: The requester has issued a Cancel-Job operation or the Printer object has
1292   aborted the job, but is still performing some actions on the job until a specified stop point
1293   occurs or job termination/cleanup is completed.
1294   If the implementation requires some measurable time to cancel the job in the 'processing' or
1295   'processing-stopped' job states, the IPP object MUST use this value to indicate that the Printer
1296   object is still performing some actions on the job while the job remains in the 'processing' or
1297   'processing-stopped' state. After all the job's job description attributes have stopped
1298   incrementing, the Printer object moves the job from the 'processing' state to the 'canceled' or
1299   'aborted' job states. [RFC2911]

1300 **'service-off-line'**: The Printer is off-line and accepting no jobs. All 'pending' jobs are put into the
1301   'pending-held' state. This situation could be true if the service's or document transform's input
1302   is impaired or broken. [RFC2911]

1303 **'job-warnings-detected'**: If the Printer supports the value 'job-warnings-detected', the Printer MUST
1304   add it to "job-state-reasons" when it generates the first warning message. That is, a single
1305   occurrence of this value is present in the "job-state-reasons" if the Printer has generated one or
1306   more warnings. [PWG5100.6]

1307 **'job-completed-successfully'**: The job completed successfully. There were no warnings or errors in
1308   printing and no errors in saving. This value SHOULD be supported. [RFC2911]

1309 **'job-completed-with-warnings'**: The print part of the job completed with warnings (whether or not
1310   there were save errors). This value SHOULD be supported if the implementation detects
1311   warnings. [RFC2911]

1312 **'job-completed-with-errors'**: The print part of the job completed with errors (and possibly warnings
1313   too) (whether or not there were save errors). This value SHOULD be supported if the
1314   implementation detects errors. [RFC2911]

1315 **'job-saving'**: The printer is transmitting the job to the save location. This is similar to the 'job-printing'
1316   value.

1317   **'job-saved-successfully'**: The job was successfully saved.

1318   **'job-save-error'**: The job did not save successfully (whether or not it was printed successfully, printed
1319   with warnings, printed with errors, or not printed). The Printer MUST ensure that none of the
1320   saved job is accessible, if it was unable to successfully save all of the job.

> **Comment [th24]:** <mark>ISSUE</mark>: 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 Printerd Job, whether the corresponding Save Job was completed successfully or not?

1321   **'job-restartable'**: This job is retained (see the description of "job-state" above, specifically
1322   "Partitioning of Job States") and is currently able to be restarted using the Restart-Job operation
1323   (see [RFC2911]). If 'job-restartable' is a value of the job's "job-state-reasons" attribute, then the
1324   IPP object MUST accept a Restart-Job operation for that job. This value SHOULD be
1325   supported if the Restart-Job operation is supported. [RFC2911]

1326   **'queued-in-device'**: The job has been forwarded to a device or print system that is unable to send back
1327   status. The Printer sets the job's "job-state " attribute to 'completed' and adds the 'queued-in-
1328   device' value to the job's "job-state-reasons" attribute to indicate that the Printer has no
1329   additional information about the job and never will have any better information. See the
1330   description of the "job-state" attribute above, specifically the portion on "Forwarding Servers".
1331   [RFC2911]

1332 NOTE: The semantics of this attribute or the set of valid values may be different for different document formats.

1333 **Additional Semantics for "job-state-reasons" attribute for Job Save and Reprint Capability**

1334 This section defines additional values that are defined in support of the Job Save and Reprint Capability (see section
1335 3.3, and the description of the "job-save-disposition" attribute in section 5.7).

1336 Many of the existing "job-state-reasons" attribute values can apply to a 'save-only' job as well as a job submitted for
1337 printing. If the value of the "job-disposition" attribute is 'save-only', the "job-state-reasons" attribute MAY be set with
1338 existing values such as 'job-incoming', 'resources-are-not-ready' (such as a font), 'job-interpreting', and 'job-queued'.
1339 Likewise, errors that occur on a saved job MAY have existing "job-state-reasons" attribute values such as 'job-data-
1340 insufficient', 'document-access-error', 'submission-interrupted', 'job-canceled-by-user', 'aborted-by-system', etc.

1341 There are also new two new "job-state-reasons" keyword values required that support a saved job -- 'job-saving' and
1342 'job-save-error' -- and these have been added to the list defined above. The existing 'job-completed-successfully',
1343 job-completed-with-warnings', and 'job-completed-with-errors' values are also clarified in the list above for
1344 implementations that support the Job Save and Reprint Capability, in such a way that these values remain compatible
1345 with Printers and clients that do not support job saving.

1346 Table 8 enumerates the possible combinations of print and save success, warning, and error conditions. Note that
1347 two values occur only when there are print warnings/errors and a save error.

1348   **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'

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'

1349

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

1350

1351 The following member attributes in Table 9 and their semantic descriptions have been added to the existing IPP
1352 "media-col" Job Template attribute.

1353

1354   **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

1355 The "media-col" collection member attributes definitions are:

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

1356

1357 The "media-tooth" member attribute indicates the desired tooth (or roughness) of the media being specified. The
1358 source for this attribute is DPA.

1359 The tooth of a medium is particularly important for those marking engines that use pens (e.g. plotters) to mark the
1360 medium. The type of pen used shall match the tooth of the medium for best resolution.

1361 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.

1362 The Administrator can define a custom media tooth using the 'name' (MAX) attribute syntax of the "media-tooth-
1363 supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member
1364 attributes, the user can also supply user-defined tooth names that are not among the values of the "media-tooth-
1365 supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported" attribute
1366 (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?

1367   **8.4.1.1   media-tooth-supported (1setOf (type3 keyword | name(MAX)))**

1368   The "media-tooth-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this
1369   "media-tooth" member attribute that the Printer supports, i.e., the media tooth supported.

1370   ## 8.4.2   media-grain (type3 keyword | name(MAX))

1371   The "media-grain" member attribute indicates the desired grain of the media being specified. The source for this
1372   attribute is DPA.

1373   Grain affects the curl and the folding of the medium. Some marking engines are sensitive to the resulting curl.

1374   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.

1375   See section 2.4 of [PWG5100.3] regarding the coordinate system.

1376   The Administrator can define a custom media grain using the 'name' (MAX) attribute syntax of the "media-grain-
1377   supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member
1378   attributes, the user can also supply user-defined grain names that are not among the values of the "media-grain-
1379   supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported" attribute
1380   (see [PWG5100.3]) to contain the 'media-grain' attribute keyword value.

1381   **8.4.2.1   media-grain-supported (1setOf (type3 keyword | name(MAX)))**

1382   The "media-grain-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this
1383   "media-grain" member attribute that the Printer supports, i.e., the media grain supported.

1384   ## 8.4.3   media-material (type3 keyword | name(MAX))

1385   The "media-material" member attribute indicates the desired material of the media being specified. The source for
1386   this attribute is JDF v1.0.

1387   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.

1388   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?

1389 The Administrator can define custom media materials using the 'name' (MAX) attribute syntax of the "media-material-
1390 supported" (1setOf (type3 keyword | name(MAX))) Printer attribute. Note: as with other Job Template and member
1391 attributes, the user can also supply user-defined material names that are not among the values of the "media-
1392 material-supported" Printer attribute, if the Administrator has configured the Printer's "user-defined-values-supported"
1393 attribute (see [PWG5100.3]) to contain the 'media-material' attribute keyword value.

1394 **8.4.3.1   media-material-supported (1setOf (type3 keyword | name(MAX)))**

1395 The "media-material-supported" (1setOf (type3 keyword | name(MAX))) Printer attribute identifies the values of this
1396 "media-material" member attribute that the Printer supports, i.e., the media materials supported.

1397 **8.4.4   media-thickness (integer(1:MAX))**

1398 The "media-thickness" member attribute indicates the thickness of the media being specified. The source for this
1399 attribute is JDF v1.0.

1400 The unit of measure for the "media-thickness" member attribute is one hundredth of a millimeter. This unit is
1401 equivalent to 1/2540 th of an inch resolution.

1402 **8.4.4.1   media-thickness-supported (rangeOfInteger(1:MAX))**

1403 The "media-thickness-supported" (rangeOfInteger(1:MAX)) Printer attribute identifies the values of this "media-
1404 thickness" member attribute that the Printer supports.

1405 # 9 Conformance Requirements

1406 This section summarizes the Conformance Requirements detailed in the definitions in this document for clients and
1407 Printer objects (servers or devices).

1408 ## 9.1   Conformance Requirements for Printer objects

1409 In general each of the attributes defined in this document are OPTIONAL for a Printer to support, so that Printer
1410 implementers MAY implement any combination of attributes.   Only the following conditional conformance
1411 requirements are defined:

1412

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)

1413

1414 Each of the collection attribute definitions indicate which member attributes are REQUIRED and which are
1415 OPTIONAL for a Printer to support and is not repeated here.

1416 If a Printer supports the 'collection' attribute syntax of a Job Template attribute , then it MUST support the
1417 distinguished none value defined for that collection. See section 2.7 of [PWG5100.3].

1418 Support of the 'name' attribute syntax for Job Template attributes and collection member attributes is OPTIONAL, as
1419 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 consistencly uses one hundredth of a millimeter for sizes with with the integer data type.

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

9.2   Conformance Requirements for clients

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.

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.

9.3   Conformance Requirements for the Job Save and Reprint Capability

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.

9.3.1.1   Client Conformance Requirements for Job Save and Reprint Capability

Conforming clients:

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.

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.

3. MUST support the Print-URI operation for printing saved jobs according to section 3.3.1.1 above.

9.3.1.2   Printer Conformance Requirements for Job Save and Reprint Capability

Conforming Printers:

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.

2. MUST support all of the "save-disposition" member attribute values defined in the "job-save-disposition" description section 5.7.

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.

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.

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.

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.

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?

Deleted: both

1456   7. MUST support the 'job-saving' and 'job-save-error' values of the "job-state-reasons" Job Description attribute
1457   as defined in the "job-state-reasons" attribute description in section 8.3.

1458   8. MUST support the Print-URI operation that references saved jobs as defined in section 3.3.1.1.

1459 **9.3.1.3   Job Save Format Specification Conformance Requirements**

1460 Documents that define a Job Save format MUST contain the following information:

1461   1. MUST specify the mimeMediaType value that identifies the Job Save Format, e.g., 'application/X-single-page-
1462   tiff'.

1463   2. MUST define the representation for PDL data.

1464   3. MUST specify the formats of the document content and how the Job Save Format file references the
1465   document content, e.g., using Relative URI value (see [RFC2396]) to reference the document content in the
1466   "document-uri" operation attribute.

1467   4. MUST define whether or not Printers with differing values of their "printer-make-and-model" Printer attributes
1468   are expected to print saved jobs with the same appearance, i.e., whether or not a Printer MUST omit the "job-
1469   printer-make-and-model" Job Description attribute when saving the job in the defined format (see the "job-
1470   printer-make-and-model" attribute description in section 6.1).

1471 # 10 IANA Considerations

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1474

1475 **10.1 Attribute Registration**

1476 The attributes defined in this document will be published by IANA according to the procedures in RFC 2911
1477 [RFC2911] section 6.2 in the following file:

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1479 The registry entry will contain the following information:
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10.2 Attribute Value Registration

1536 The "document-format" mimeMediaType attribute values, the "pdl-override-supported" type2, "which-jobs" type2, and
1537 "job-state-reasons" type2 keyword attribute values defined in this document will be published by IANA according to
1538 the procedures in RFC 2911 [RFC2911] section 6.1 in the following file:

1539

1540 The registry entries will contain the following information:

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11 Internationalization Considerations

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

12 Security Considerations

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

13 References

13.1 Normative References

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

[PWG5100.3]
   Ocke, K., and T. Hastings, "Internet Printing Protocol (IPP): Production Printing Attributes – Set 1", PWG 5100.3-2001, February 12, 2001, ftp://ftp.pwg.org/pub/pwg/candidates/cs-ippprodprint10-20010212-5100.3.pdf.

[RFC2119]
   S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119 , March 1997

[RFC2910]
   Herriot, R., Butler, S., Moore, P., Turner, R., and J. Wenn, "Internet Printing Protocol/1.1: Encoding and Transport", RFC 2910, September 2000.

[RFC2911]
   Hastings, T., Herriot, R., deBry, R., Isaacson, S., and P. Powell, "Internet Printing Protocol/1.1: Model and Semantics", RFC 2911, September 2000.

1670 [RFC3382]
1671   deBry, R., , Hastings, T., Herriot, R., Ocke, K., and P. Zehler, "Internet Printing Protocol (IPP): The 'collection'
1672   attribute syntax", RFC 3382, September 2002.

13.2 Informative References

1674 This section lists references to documents that provide information, but whose implementation is not required in order
1675 to conform to this specification.

1676 [PWG5100.6]
1677   Zehler, P., Herriot, R., Ocke, K., "Internet Printing Protocol (IPP): Page Overrides", IEEE-ISTO 5100.6-2003,
1678   ftp://ftp.pwg.org/pub/pwg/candidates/cs-ipppageoverride10-20031031-5100.6.pdf, October 31, 2003.

1679 [RFC2565]
1680   Herriot, R., Butler, S., Moore, P., and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport",
1681   RFC 2565, April 1999.

1682 [RFC2566]
1683   deBry, R., , Hastings, T., Herriot, R., Isaacson, S., Powell, P., "Internet Printing Protocol/1.0: Model and
1684   Semantics", RFC 2566, April 1999.

1685 [RFC3380]
1686   Hastings, T., Herriot, R., Kugler, C., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Set
1687   Operations", RFC 3380, September 2002.

1688 [RFC3998]
1689   Kugler, C, Hastings, T., Lewis, H., "Internet Printing Protocol (IPP): Job and Printer Administrative
1690   Operations", RFC 3998, March 2005.

14 Author's Addresses

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1722   To subscribe, see the PWG web page:

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1724   Implementers of this specification document are encouraged to join IPP Mailing List in order to participate in any
1725   discussions of clarification issues and review of registration proposals for additional attributes and values.

1726
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1728

15 Appendix X - Change Log

1729

1730   [[[PWG Secretary: Delete this section before publication as a Candidate Standard]]]

1731   3 August 2009 (v0.2)

1732   - Changes made to create Prototype Draft - Tom Hastings

1733   • Referenced [PWG5100.3] Production Printing Attributes - Set 1 in the Abstract to show the relationship of this
1734   document to that document.

1735   • Formatted the boiler plate to follow current PWG practices

1736   • Added line numbers

1737   • Updated the cross references to current documents - no change tracking

1738   • Added Figure 1 caption to Figure 1 and added Table of Figures

1739   • Added the missing IANA Registrations - using change tracking

1740   • Updated Editors' addresses and phone numbers.

1741   • Removed Summary of other IPP documents

1742   21 August 2002 [sic] (v0.1)

1743   - Initial Draft - Tom Hastings and Don Fullman

1744

1745