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Internet Printing Protocol/1.1: Job and Printer Set Operations

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Abstract

This document specifies 3 additional OPTIONAL operations for use with the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1 [ipp-mod, ipp-pro]. The first is the Set-Printer-Attributes operation that operators/administrators may perform on a Printer object to change Printer attribute values. The second is the Set-Job-Attributes operation that end-users may perform on their jobs and operators/administrators may perform on any job, depending on circumstances. The operation changes the Job attribute values. The third is the ~~Get-Reset-Printer-Attributes~~Get-Printer-Supported-Values operation that operators/administrators may perform on a Printer object in order to ~~determine the values that Printer attributes would have after a Reset operation and to~~ determine acceptable values for ~~certain~~ setting "xxx-supported" attributes ~~in~~ using the Set-Printer-Attributes operation.

A Printer implementation can make the value of some attributes dependent on the document-format, e.g. "resolution-supported".

Two operation attributes: "printer-message-from-operator" (text) and "job-message-from-operator" (text) are included to set the corresponding IPP/1.1 Printer and Job Description attributes with the same names. A new out-of-band value 'any-name' is added. It can be the value of "xxx-supported" attributes whose

38 attribute syntaxes types includes both 'keyword' and 'name'. The value 'any-name' value matches any name

39 supplied by the client during validation.

40 New Printer Description attributes are added:

41   printer-settable-attributes-supported (1setOf type2 keyword)

42   job-settable-attributes-supported (1setOf type2 keyword)

43   printer-message-time (integer(MIN:MAX))

44   printer-message-date-time (dateTime)

45   document-format-varying-attributes (1setOf type2 keyword)

46   authentication-methods-supported (1setOf type2 keyword)

47   security-methods-supported (1setOf type2 keyword)

48 A new status code is added: 'client-error-attributes-not-settable'.

49 A 'default' out-of-band values is added for use by the client in Set-Job-Attributes, Job Creation, and

50 Validate-Job requests to indicate explicitly that the Printer is to apply its default value with the same

51 semantics and precedence (lower than the document content) as if the Job attribute were not present on the

52 Job object.

53 Finally, the 'not-settable' out-of-band attribute value is added for returning in the Set-Printer-Attributes and

54 Set-Job-Attributes operation responses.

55 The scope of IPP, is characterized in RFC2526 "Design Goals for an Internet Printing Protocol". It is not

56 the intent of this document to revise or clarify this scope or conjecture as to the degree of industry adoption

57 or trends related to IPP within printing systems. It is the intent of this document to extend the original set

58 of operations - in a similar fashion to the Set1 extensions which referred to IPP/1.0 and were later

59 incorporated into IPP/1.1.

60 This document is intended for registration following the registration procedures of IPP/1.0 [RFC2566] and

61 IPP/1.1 [ipp-mod]. This version contains only the Set-Printer-Attributes and Set-Job-Attributes operations

62 which have been removed from the Set2 operation document so that t

The full set of IPP documents includes:
> Design Goals for an Internet Printing Protocol [RFC2567]
> Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
> Internet Printing Protocol/1.1: Model and Semantics (this document)
> Internet Printing Protocol/1.1: Encoding and Transport [IPP-PRO]
> Internet Printing Protocol/1.1: Implementer's Guide [IPP-IIG]
> Mapping between LPD and IPP Protocols [RFC2569]

The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed printing functionality, and it enumerates real-life scenarios that help to clarify the features that need to be included in a printing protocol for the Internet. It identifies requirements for three types of users: end users, operators, and administrators. It calls out a subset of end user requirements that are satisfied in IPP/1.0. A few OPTIONAL operator operations have been added to IPP/1.1.

The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document describes IPP from a high level view, defines a roadmap for the various documents that form the suite of IPP specification documents, and gives background and rationale for the IETF working group's major decisions.

The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the abstract operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines the encoding rules for a new Internet MIME media type called "application/ipp". This document also defines the rules for transporting over HTTP a message body whose Content-Type is "application/ipp". This document defines a new scheme named 'ipp' for identifying IPP printers and jobs.

The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some of the considerations that may assist them in the design of their client and/or IPP object implementations. For example, a typical order of processing requests is given, including error checking. Motivation for some of the specification decisions is also included.

The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of gateways between IPP and LPD (Line Printer Daemon) implementations.

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1   Introduction

The Internet Printing Protocol (IPP) is an application level protocol that can be used for distributed printing using Internet tools and technologies. IPP version 1.1 (IPP/1.1) [ipp-mod, ipp-pro] focuses on end user functionality with a few administrative operations included. This document defines additional OPTIONAL end user, operator, and administrator Set-Job-Attributes and Set-Printer-Attributes operations used to modify Job objects and Printer objects. It also defines a third Get-Printer-Supported-Values operation that returns values that the Printer will accept for setting its "xxx-supported" attributes. The Get-Printer-Supported-Values operation MUST be supported, if the Set-Printer-Attributes operation is supported.

This document is a registration proposal for an extension to IPP/1.0 [RFC2565, RFC2566] and IPP/1.1 [ipp-mod, ipp-pro] following the registration procedures in those documents.

2   Terminology

This section defines terminology used throughout this document.

2.1   Conformance Terminology

Capitalized terms, such as MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY, NEED NOT, and OPTIONAL, have special meaning relating to conformance. These terms are defined in [ipp-mod] section 12.1 on conformance terminology, most of which is taken from RFC 2119 [RFC2119].

The following specialization of these terms apply to this document:

>   REQUIRED: if an implementation supports the extensions described in this document, it MUST
>   support a REQUIRED feature.
>   OPTIONAL: if an implementation supports the extensions described in this document, it MAY support
>   an OPTIONAL feature.

2.2   Other terminology

This document uses terms such as "attributes", "keywords", and "support". These terms have special meaning and are defined in the model terminology [ipp-mod] section 12.2.

3   Requirements and Use Cases

The following requirements and usage are intended to be met by the specification in this document cover only the Set operations.

1. The end-user and the operator need a way to modify a Job that is in the 'pending' or 'pending-held' state.

183 Usage: The end-user discovers that he/she forgot to include a print instruction, such as "finishings" =
184 'staple' after submitting a job. Rather than canceling the job and resubmitting it to the same Printer, the
185 end-user is able to modify the job on the Printer.

186 The operator needs to modify a job because it is requesting a particular kind of media for which there is
187 no more, but the policy is to print the job on a comparable medium.

188 2. The system administrator needs a way to re-configure or change the policy of the IPP Printer remotely.

189 Usage: The system administrator is adding additional media to the supported media list.

190 The system administrator is reducing the capability of the IPP Printer by removing one of the operations
191 from the supported operations list, such as Cancel-Job, because the policy is to run the IPP Printer like a
192 public FAX.

193 The system administrator is remotely configuring the Printer after installing it, and so is replacing the
194 Printer Description attributes that have the out-of-band 'no-value' value (see [ipp-mod] section 4.1) with
195 the proper values.

196 4   Definition of the Set operations

197 The Set-Printer-Attributes operation (as are all Printer operations) are directed at Printer objects. A client
198 MUST always supply the "printer-uri" operation attribute in order to identify the correct target of the
199 operation. These descriptions assume all of the common semantics of IPP/1.1 Model and Semantics
200 document [ipp-mod] section 3.1.

201 The Set-Job-Attributes operation (as are all Job operations) are directed at Job objects. A client MUST
202 always supply some means of identifying the Job object in order to identify the correct target of the
203 operation. That job identification MAY either be a single Job URI or a combination of a Printer URI with a
204 Job ID as defined in [ipp-mod]. The IPP object implementation MUST support both forms of identification
205 for every job. If possible, a client SHOULD use the Printer URIIR with a Job ID rather than a Job URI,
206 since the 32-bit "job-id" is more readily translated to and from other print protocols that MAY be serving as
207 gateways into or out of the IPP implementation.

208 The Set Printer operations are summarized in Table 1:

209 **Table 1 - Operation-Id assignments**

Operation Name	Operation-Id	Brief description
Set-Printer-Attributes	0x??	Sets attribute values of the target Printer object
Set-Job-Attributes	0x??	Sets attribute values of the target Job object
Get-Reset-Printer-AttributesGet-Printer-Supported-Values	0x??	Gets values that are valid for setting "xxx-supported" attributes using the Set-Printer-Attributes operationwould have after a Reset

210 **4.1   Set-Printer-Attributes Operation**

211 This OPTIONAL operation allows a client to set the values of the attributes of a Printer object.   In the
212 request, the client supplies the set of Printer attribute names and values that are to be set. In the response,
213 the Printer object returns success or rejects the entire request with indications of which attribute or
214 attributes could not be set.

215 The Printer object validates the client-supplied attributes in the Set-Printer-Attributes request . For an
216 attribute to validate it MUST meet all of the following rules:

217   o The Printer MUST support the attribute

218   o The attribute MUST NOT be read-only.

219   o The Printer MUST support the value according to the rules defined in Appendix A

220 If any of the supplied attributes does not validate, the Printer object MUST reject the entire operation; the
221 Printer object MUST NOT partially set some of the supplied attributes. In other words, after the operation,
222 all the supplied attributes MUST be set or none of them MUST be set.

223 The Printer MUST accept this operation in any state, i.e., for any of the values of the Printer object's
224 "printer-state", and "printer-state-reasons", and "printer-is-accepting-jobs" attributes, unless explicitly
225 defined otherwise in the definition of the values.

226 This operation MUST NOT change the value of attributes not specified in the operation unless this
227 document explicitly specifies such side-effects, e.g. when the operation sets "printer-message-from-
228 operator", it also sets "printer-message-time" and "printer-message-date-time". In particular, if this
229 operation changes an "xxx-default" attribute, the new value MUST be in the "xxx-supported" attribute or
230 the operation MUST contain a new value for "xxx-supported" which contains the new value for the "xxx-
231 default". Otherwise, the Printer MUST reject the operation.

232 **4.1.1   Settable and READ-ONLY Printer Description attributes**

233 If the Printer supports the Set-Printer-Attributes operation, then it SHOULD support setting of:

234   all Job Template Default ("xxx-default") attributes
235   all Job Template Supported ("xxx-supported") attributes
236   all Job Template Ready ("xxx-ready") attributes

237 that the implementation supports (see [ipp-mod] section 4.2 and extensions).

238 Some Printer Description attributes (see [ipp-mod] section 4.4) MUST NOT be settable, i.e., they are
239 READ-ONLY. An attribute marked as "read-only" in the Printer Description attribute table in Appendix A
240 is such an attribute. Printer Description attributes that are not marked as READ-ONLY"read-only" MAY
241 be settable using the Set-Printer-Attributes operation, depending on implementation.

242 Note: From now on, all extensions that define new object attributes will indicate whether or not they are
243 READ-ONLY, by including the "READ-ONLY" adjective in their descriptions and/or explicitly stating
244 whether they MAY be settable.

245 If "xxx-supported" Printer Description attribute are settable, then they MUST affect the behavior of the
246 implementation. If they are READ-ONLY then they reflect the implementation and cannot be changed
247 using the Set-Printer-Attributes operation. Consider the following examples:

248 For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
249 4.4.15) is settable in a particular implementation, then changing its value with a Set-Printer-
250 Attributes operation MUST affect the operations that the implementation accepts or rejects. Such
251 an implementation will need to be able to reject values for operations that it contains no code
252 support for. If the "operations-supported" Printer Description attribute is not settable in a particular
253 implementation, then that implementation MUST reject an attempt to set it with a Set-Printer-
254 Attributes operation and return the 'client-error-attributes-not-settable' status code (see section 7.1).

255 As another example, if the "ipp-versions-supported" Printer Description attribute (see [ipp-mod]
256 section 4.4.14) is settable in a particular implementation, then changing its value with a Set-Printer-
257 Attributes operation MUST affect the protocol versions that are accepted or rejected. Such an
258 implementation will need to be able to reject values for versions that it contains no code support for.

259 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
260 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5).

261 Most Printer attributes will require administrator privileges to set, such as "xxx-supported", while some will
262 require operator privileges only, such as "media-ready" and "printer-message-from-operator". Which
263 attributes require which privileges depends on implementation and MAY depend on site policy.

264 **4.1.2   Set-Printer-Attributes Request**

265 The following sets of attributes are part of the Set-Printer-Attributes Request:

266 Group 1: Operation Attributes

267 Natural Language and Character Set:
268 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
269 section 3.1.4.1.
270
271 Target:
272 The "printer-uri" (uri) operation attribute which is the target for this operation as described in [ipp-
273 mod] section 3.1.5.
274
275 Requesting User Name:
276 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
277 described in [ipp-mod] section 8.3.
278

279   "document-format" (mimeMediaType):
280   The client OPTIONALLY supplies this attribute. ~~The client SHOULD supply this attribute if the~~
281   ~~value of "document-format-varying-scope " is 'single-document-format'. If the value of "document-~~
282   ~~format-varying-scope " is 'all-document-formats', the Printer ignores this attribute and it SHOULD~~
283   ~~be omitted.~~ The Printer object MUST support this attribute. This attribute is useful for a client to
284   select the document-format to which the attribute modification should be applied. A Printer
285   implementation MAY allow some attributes to have different values for each document format that
286   it supports. See [ipp-mod] section 3.2.5.1 "Get-Printer-Attributes Request".
287
288   If the client includes this attribute, the Printer MUST change the supplied attributes for the
289   document format specified by this attribute. If a supplied attribute is a member of the "document-
290   format-varying-attributes" (i.e., the attribute varies by document format, see section 6.3), the Printer
291   MUST change the supplied attribute for the document format specified by this attribute, but not for
292   other document formats. If a supplied attribute isn't a member of the "document-format-varying-
293   attributes" (i.e. it doesn't vary by document format), the Printer MUST change the supplied attribute
294   for all document formats.
295
296   If the client omits this attribute, the Printer MUST change the supplied attributes for all document
297   formats whether they vary by document-format or not.
298   ~~If the client omits this "document-format" operation attribute when the value of "document-format-~~
299   ~~varying-scope" is 'single-document-format', the Printer object MUST respond as if the attribute had~~
300   ~~been supplied with the value of the Printer object's "document-format-default" attribute as it would~~
301   ~~be after the operation. It is recommended that the client always supply a value for "document-~~
302   ~~format", since the Printer object's "document-format-default" may be 'application/octet-stream', in~~
303   ~~which case the set attributes and values are for the union of the document formats that the Printer~~
304   ~~can automatically sense. Additionally, if the operation is setting "document-format-default", the~~
305   ~~operation must use that value if the "document-format" operation attribute is omitted. For more~~
306   ~~details, see the description of the 'mimeMediaType' attribute syntax in [ipp-mod] section 4.1.9.~~
307   ~~ISSUE 01 - MUST the client supply "document-format" when supplying "document-format-~~
308   ~~varying-scope " with a 'single-document-format' value? If yes, then this paragraph goes away.~~
309
310   If the client supplies a value for the "document-format" Operation attribute that is either
311   'application/octet-stream' or not supported by the Printer, i.e., is not among the values of the Printer
312   object's "document-format-supported" attribute, the Printer object MUST reject the operation and
313   return the 'client-error-document-format-not-supported' status code. Note: the document-format
314   'application/octet-stream' is the union of several document-formats (see [ipp-mod] section 3.2.5.1,
315   Get-Printer-Attributes) and is not a true document-format.
316   ~~"document-format-varying-scope " (type2 keyword):~~
317   ~~The client MUST supply this attribute. The Printer object MUST support this attribute. This~~
318   ~~attribute specifies whether the operation changes the value for all document formats or just the one~~
319   ~~that the client supplies in "document-format". The supported value of this attribute are:~~
320
321   ~~'all-document-formats': The operation changes the supplied attributes for all document formats~~
322   ~~whether they vary by document-format or not. The value of the "document-format" operation~~
323   ~~attribute, if present, is ignored.~~

324   'single-document-format': The operation changes the specified attributes for the document
325   format specified by the "document-format" attribute. If an attribute varies by document
326   format, it is changed for the specified document format, but not for other document formats.
327   If an attribute doesn't vary by document format, it is changed for all document formats.
328

329   Group 2: Printer Attributes

330   The client MUST supply a set of Printer attributes with one or more values (including explicitly
331   allowed out-of-band values) as defined in [ipp-mod] section 4.2 Job Template Attributes ("xxx-
332   default", "xxx-supported", and "xxx-ready" attributes), section 4.4 Printer Description Attributes,
333   and any attribute extensions supported by the Printer. The value(s) of Eeach Printer attribute
334   supplied in Group 2 replaces the value(s) of the corresponding Printer attribute on the target Printer
335   object. For attributes that can have multiple values (1setOf), all values supplied by the client
336   replace all values of the corresponding Printer object attribute. If a Printer object attribute had not
337   been configured yet and so had the 'no-value' out-of-band value (see [ipp-mod] section 4.1), the
338   supplied value(s) replace the 'no-value' value.
339

4.1.3   Set-Printer-Attributes Response

341   The Printer object returns the following sets of attributes as part of the Get-Printer-Attributes Response:

342   Group 1: Operation Attributes

343   Status Message:
344   In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
345   includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
346   attribute as described in [ipp-mod] sections 13 and 3.1.6.
347

348   Natural Language and Character Set:
349   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
350   section 3.1.4.2.
351

352   Group 2: Unsupported Attributes

353   See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
354

355   If some of the attributes in the operation fail to validate, the Printer MUST reject the operation,
356   MUST NOT change any Printer attributes, and MUST return the 'client-error-attributes-not-settable'
357   status code. In this group, Tthe Printer MUST also return all attributes that fail to validate in this
358   group. The following are the reasons that an attribute fails to validate and the value returned for the
359   attribute:.

360   The Printer doesn't support the attribute: return the attribute with the "out-of-band" value
361   'unsupported' (see [ipp-mod] section 3.1.7 and [ipp-pro]).

362   The attribute is read-only: return the attribute with the "out-of-band" value 'not-settable' (see
363   section 8.1).

364   The Printer doesn't support the value: if the attribute in the operation has a single value
365   return it. If the attribute in the operation is multi-valued, return only those values in a 1setOf
366   that are not supported.

367

368   4.2   Set-Job-Attributes Operation

369   This OPTIONAL operation allows a client to set the values of the attributes of a Job object. In the request,
370   the client supplies the set of Job attribute names and values that are to be set. In the response, the IPP
371   object returns success or rejects the entire request with indications of which attribute or attributes could not
372   be set.

373   This operation is almost identical to the Set-Printer-Attributes operation (see section 4.1). The only
374   differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
375   there is no "document-format" operation attribute used when setting a Job object, and the validation is the
376   same as the create jobJob Creation operations (Print-Job, Print-URI, and Create-Job), i.e., depends on the
377   "xxx-supported" Printer Description attributes (see [ipp-mod] section 3.1).

378   The validation of the Set-Job-Attributes request is performed by the Printer as if the job had been submitted
379   originally with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes
380   MUST be supported along with the attributes not modified. If such a create jobJob Creation operation
381   would have been accepted, then the Set-Job-Attributes MUST be accepted. If such a Job Creationcreate job
382   operation would have been rejected, then the Set-Job-Attributes MUST be rejected and the Job MUST be
383   unchanged. In addition, if any of the supplied attributes are not supported, are not settable, or the values are
384   not supported, the Printer object MUST reject the entire operation; the Printer object MUST NOT partially
385   set some of the supplied attributes. In other words, after the operation, all the supplied attributes MUST be
386   set or none of them MUST be set.

387   If a client supplies a job attribute in a Set-Job-Attributes request that the Printer supports, and the job was
388   originally submitted without supplying that attribute, the Printer adds the attribute to the Job object. If the
389   attribute value is the "out-of-band" value 'default' (see section 8.2), then attribute is changed like any value,
390   but the Printer treats a Job attribute with the 'default' value as equivalent to the attribute not being present
391   on the Job, i.e. the Printer uses its defaulting mechanism. As when the Job attribute is not present, the
392   Printer MUST apply such default mechanism if the document does not contain any corresponding
393   instruction.

394   The job's current state MUST affect whether the IPP object accepts or rejects the request. In the case where
395   the operation creates a request for unavailable resources, the Job transitions to a new state. Table 2The
396   table below shows the allowed behaviors in each job state and the transitions.

397   **Table 2 - Job State Transition Table for the Set-Job-Attributes operation**

Current "job-state"	New "job-state"	IPP object's response status code and action:
'pending'	'pending'	'successful-ok'
'pending'	'pending-held'	'successful-ok' - needed resources are not ready
'pending-held'	'pending-held'	'successful-ok'
'pending-held'	'pending'	'successful-ok' - needed resources are ready
'processing'	'processing'	'successful-ok' or 'client-error-not-possible' depending on implementation, including the attributes being set, whether the job has started marking media, etc.
'processing-stopped'	'processing-stopped'	'successful-ok' or 'client-error-not-possible' depending on implementation, including the attributes being set, whether the job has started marking media, etc.
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

398

399   This operation MUST NOT change the value of attributes not specified in the operation unless this
400   document explicitly specifies such side-effects.

4.2.1   Settable and READ-ONLY Job Description attributes

402   If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
403   4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
404   then the Printer MUST set the "job-message-from-operator" Job attribute to this new value.

405   If the Printer supports the Set-Job-Attributes operation, then it SHOULD support setting of:

406   all Job Template job ("xxx") attributes (see [ipp-mod] section 4.2 and extensions)

407   that the implementation supports (see [ipp-mod] section 4.2 and extensions).

408   Some Job Description attributes (see [ipp-mod] section 4.3) MUST NOT be settable, i.e., they are READ-
409   ONLY. An attribute marked as "read-only" in the Job Description attribute table in Appendix A is such an
410   attribute. The attributes not marked as "read-only" MAY be settable using the Set-Job-Attributes operation,
411   depending on implementation.

412   Note: From now on, all extensions that define new object attributes will indicate whether or not they are
413   READ-ONLY, by including the "READ-ONLY" adjective in their descriptions and/or explicitly stating
414   whether they MAY be settable. If "READ-ONLY" is omitted, it is assumed that the attribute MAY be
415   settable by the appropriate Set-Xxx operation.

416   *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
417   the job owner (as determined in the Job Creation operation) or an operator or administrator of the Printer
418   object (see [ipp-mod] Sections 1 and 8.5).

419   **4.2.2   Set-Job-Attributes Request**

420   The following sets of attributes are part of the Set-Job-Attributes Request:

421   Group 1: Operation Attributes

422   Natural Language and Character Set:
423   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
424   section 3.1.4.1.

425

426   Target:
427   Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
428   attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.

429

430   Requesting User Name:
431   The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
432   described in [ipp-mod] section 8.3.

433

434

435   Group 2: Job Attributes

436   The client MUST supply a set of Job attributes with one or more values (including explicitly
437   allowed out-of-band values) as defined in [ipp-mod] section 4.2 Job Template Attributes ("xxx"
438   attributes), section 4.3 Job Description Attributes, and any attribute extensions supported by the
439   Printer. The value(s) of Eeach Job attribute supplied in Group 2 replaces the value(s) of the
440   corresponding Job attribute on the target Job object. For attributes that can have multiple values
441   (1setOf), all values supplied by the client replace all values of the corresponding Job object
442   attribute. If the client supplies an "xxx" attribute with the 'default' out-of-band value (see section
443   8.2), the effect is as if the "xxx" attribute had not been submitted with the job in the Job Creation
444   operation, i.e., the Printer applies its "xxx-default" value if the document content contains no
445   corresponding print instruction. However, the "xxx" attribute is returned in subsequent Get-Job-
446   Attributes and Get-Job responses with the "xxx" attribute with the explicit 'default' out-of-band
447   value (rather than being removed from the Job object).

448

449   **4.2.3   Set-Job-Attributes Response**

450   The Printer object returns the following sets of attributes as part of the Set-Job-Attributes Response:

451   Group 1: Operation Attributes

452   Status Message:
453   In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
454   includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
455   attribute as described in [ipp-mod] sections 13 and 3.1.6.

456

457   Natural Language and Character Set:
458   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
459   section 3.1.4.2.
460

461   Group 2: Unsupported Attributes

462   See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
463

464   If some of the attributes in the operation fail to validate, the Printer MUST reject the operation,
465   MUST NOT change any Job attributes, and MUST return the 'client-error-attributes-not-settable'
466   status code. In this group, Tthe Printer MUST also return all attributes that fail to validate in this
467   group. The following are the reasons that an attribute fails to validate and the value returned for the
468   attribute:.

469   The Printer doesn't support the attribute: return the attribute with the "out-of-band" value
470   'unsupported' (see [ipp-mod] section 3.1.7 and [ipp-pro]).

471   The attribute is read-only: return the attribute with the "out-of-band" value 'not-settable' (see
472   section 8.1).

473   The Printer doesn't support the value: if the attribute in the operation has a single value
474   return it. If the attribute in the operation is multi-valued, return only those values in a 1setOf
475   that are not supported.

476   **1.34.3   Get-Reset-Printer-Supported-ValuesAttributes Operation**

477   This OPTIONAL operation allows a client to request the values that the Printer allows in the Set-Printer-
478   Attributes operation for "xxx-supported" attributes. of the attributes of a Printer object as they would be
479   after a Reset operation. If the Printer supports the Set-Printer-Attributes operation, then it MUST also
480   support this operation. This operation has identical request /response attributes to the 'Get-Printer-
481   Attributes' operation in IPP/1.1 [ipp-mod]. The operation also behaves identically to the 'Get-Printer-
482   Attributes' operation in IPP/1.1 [ipp-mod] except fowith the following rexceptions:

483   o Get-Printer-Supported-Values supports only "xxx-supported" attributes.

484   o 'Get-Printer-Attributes' returns the current value of specified attributes and 'Get-Reset-Printer-
485   AttributesGet-Printer-Supported-Values' returns values that allowpermit a client to determine what
486   values of "xxx-supported" attributes the Printer supports are allowed in the Set-Printer-Operation. the
487   value that 'Get-Printer-Attributes' would return after a "Reset" operation. The "Reset" operation MAY
488   be a Reset-Printer operation (see [ipp-set2]) or a reset performed locally to the Printer.

489   o Get-Printer-Supported-Values does not return any 'name' attribute syntax values for any "xxx-
490   supported" attributes. Instead, if the Set-Printer-Attributes operation will accept (any) name value for
491   an "xxx-supported" attribute, then the Get-Printer-Supported-Values operation returns the 'any-value'
492   out-of-band value (see section 8.3) as one of the values of the "xxx-supported" attribute. In other
493   words, the 'any-name' out-of-band value indicates that the Printer implementation supports clients

494   setting 'name' attribute syntax values for "xxx-supported" attributes that are defined with the 'name'
495   attribute syntax as one of their attribute syntaxes.

496   For example, if the Get-Printer-Supported-Values operation returns several keywords foras the value of
497   thean "media-supported" attribute, then the Set-Printer-Attributes operation allowsMUST accept any of
498   these keywords as values for the "media-supported" attribute. If the Get-Printer-Supported-Values
499   operation returns an value 'any-name' out-of-band value as one of the values for the of the "media-
500   supported" attribute, then the Set-Printer-Attributes operation MUST allowsaccept any value whose
501   attribute syntax type is 'name' as values for the "media-supported" attribute.

502   See Appendix B for a full list of values returned by this operation.

503   o 'Get-Reset-Printer-Attributes' does not return attributes the Printer leaves unchanged during a Reset
504   operation. The attributes that are not returned are:

505   printer-uri-supported
506   printer-name
507   printer-location
508   printer-info
509   printer-state
510   printer-state-reasons
511   printer-state-message
512   printer-is-accepting-jobs
513   queued-job-count
514   printer-up-time
515   printer-current-time
516
517   A client can determine the allowed values for "xxx-supported" attributes in the Set-Printer-Attributes
518   operation by retrieving the value of "xxx-supported" with the Get-Reset-Printer-Attributes operation.
519
520   ISSUE 02: There could be a separate operation Get-Allowed-Printer-Attributes for determining allowed
521   values. This operation would return the same value as Get-Reset-Printer-Attributes for "xxx-supported", but
522   would return allowed values rather than the Reset value for other attributes. We have not yet seen a need
523   for such an operation because the spec provides rules for inferring the allowed values except for "xxx-
524   supported" values.

5   New Operation attributes

527   This section defines new operation attributes for use with the IPP/1.1 operations indicated. As new
528   operations are defined they will also indicate explicitly whether these operation attributes are defined for
529   use with them.

5.1   "printer-message-from-operator" (text(127))

The Printer SHOULD support this Operation attribute in following operations if it supports the corresponding "printer-message-from-operator" Printer Description attribute.

> Pause-Printer
> Resume-Printer
> Purge-Jobs

The client OPTIONALLY supplies this attribute in the above operations. The value of this attribute is a message from the operator about the Printer object on which the operator is performing the operation. If this operation attribute is supported, the Printer copies the value to its "printer-message-from-operator" Printer Description attribute (see [ipp-mod] section 4.4.25) even if this Operation attribute is a zero-length text value or consists solely of white space. In addition, the Printer automatically copies:

> 1. the value of its "printer-up-time" attribute (see [ipp-mod] section 4.4.29) to its "printer-message-time" attribute,

> 2. the value of its printer-current-time" (dateTime) attribute (see [ipp-mod] section 4.4.30) to its "printer-message-date-time" attribute, if supported.

If the client omits this operation attribute, the Printer does not change the value of its "printer-message-from-operator", "printer-message-time" and "printer-message-time" Printer Description attributes.

The "printer-message-from-operator" operation attribute MUST NOT be supported as an operation attribute for the Set-Printer-Attributes operation. If the operator wants to set the Printer's "printer-message-from-operator" Printer Description attribute when issuing the Set-Printer-Attributes operation, the client supplies the "printer-message-from-operator" explicitly with its new value as one of the Printer Description attributes in Group 2 in the request. The Printer also updates its "printer-message-time" and "printer-message-date-time" Printer Description attributes. If the client does not explicitly supply the "printer-message-from-operator" with its new value, the Printer leaves the value of the Printer's "printer-message-from-operator" Printer Description attribute unchanged.

5.2   "job-message-from-operator" (text(127))

The Printer SHOULD support this Operation attribute in following operations if it supports the corresponding "job-message-from-operator" Job Description attribute.

> Cancel-Job
> Hold-Job
> Release-Job
> Restart-Job

The client OPTIONALLY supplies this attribute in the above operations. The value of this attribute is a message from the operator about the Job object on which the operator has just performed an operation. If

564 supported, the Printer copies the value to the Job's "job-message-from-operator" Job Description attribute
565 (see [ipp-mod] section 4.3.16) (even if this Operation attribute is a zero-length text value or consists solely
566 of white space).

567 If the client omits this attribute, the Printer does not change the value of its "job-message-from-operator"
568 Job Description attribute.

569 Note: There are no corresponding 'job-message-time" and "job-message-date-time" Job Description
570 attributes, since the usual lifetime of a job is limited.

571 The "job-message-from-operator" operation attribute MUST NOT be supported as an operation attribute for
572 the Set-Job-Attributes operation. If the operator wants to set the Job's "job-message-from-operator" Job
573 Description attribute when issuing the Set-Job-Attributes operation, the client MUST supply the "job-
574 message-from-operator" with its new value as one of the Job Description attributes in Group 2 in the
575 request. Otherwise, the Printer leaves the value of the Job's "job-message-from-operator" Job Description
576 attribute unchanged by not explicitly setting the attribute.

577 6   New Printer Description Attributes

578 The following new Printer Description attributes are needed to support the new operations defined in this
579 document.

580 1.16.1   printer-settable-attributes-supported (1setOf type2 keyword)

581 This READ-ONLY Printer attribute identifies the Printer object attributes that are settable in this
582 implementation, i.e., that are settable using the Set-Printer-Attributes operations (see section 4.1). This
583 attribute MUST be supported if the Set-Printer-Attributes operations is supported. The Printer MUST
584 reject attempts to set any Printer attributes that are not one of the values of this attribute, returning the
585 'client-error-attributes-not-settable' status code (see section 7.1). The value of this attribute MAY depend
586 on the value of the "document-format" operation attribute supplied in the Get-Printer-Attributes operation
587 (see [ipp-mod] section 3.2.5.1).

588 Standard keyword values are:

589   'none': There are no settable Printer attributes.
590   'xxx': Where 'xxx' is any of the keyword attribute names allowed by section 4.1.1

591 1.26.2   job-settable-attributes-supported (1setOf type2 keyword)

592 This READ-ONLY Printer attribute identifies the Job object attributes that are settable in this
593 implementation, i.e., that are settable using the Set-Job-Attributes operation (see section 4.2). This attribute
594 MUST be supported if the Set-Job-Attributes operations is supported. The Printer MUST reject attempts to
595 set any Job attributes that are not one of the values of this attribute, returning the 'client-error-attributes-not-
596 settable' status code (see section 7.1).

597 Standard keyword values are:

598   'none': There are no settable Job attributes.

599   'xxx':   Where 'xxx' is any of the keyword attribute names allowed by section 4.2.1.

600 **~~1.3~~6.3   document-format-varying-attributes (1setOf type2 keyword)**

601 This READ-ONLY Printer Description attribute contains a set of attribute names. This attribute SHOULD
602 be supported by a Printer object, if the Printer object has Printer attributes whose value vary depending on
603 document format (see [ipp-mod] Get-Printer-Attributes operation). This attribute specifies which attribute
604 values can vary by document-format. If an attribute's name "xxx" is a member of this attribute and ~~its~~ the
605 value of attribute "xxx" is changed with the Set-Printer-Attributes operation that included ~~and~~ the ~~Operation~~
606 ~~attribute~~ "document-format" ~~is presen~~operation attribute~~t~~, then the Printer MUST change the value for the
607 specified document format and no other document formats (see section 4.1.2). If an attribute's name "xxx"
608 is not a member of this attribute and ~~its~~ the value of attribute "xxx" is changed with the Set-Printer-
609 Attributes operation, then the attribute is changed for all document formats (whether or not the client
610 supplied the "document-format" operation attribute).

611 **6.4   printer-message-time (integer(MIN:MAX))**

612 This READ-ONLY Printer Description attribute contains the time that the Printer's "printer-message-from-
613 operator" was changed by the operator using any operation where the client supplied the "printer-message-
614 from-operator" operation attribute (see section 5.1) or was explicitly set using the Set-Printer-Attributes
615 operation (see section 4.1~~0~~). This attribute allows the users to know when the "printer-message-from-
616 operator" attribute was last set.

617 The Printer sets the value of this attribute by copying the value of the Printer's "printer-up-time" attribute
618 (see [ipp-mod] section 4.3.14). If the Printer resets its "printer-up-time" attribute to 1 on power-up, then it
619 MUST change the value of the "printer-message-time" to 0 or a negative number as specified in [ipp-mod]
620 section 4.3.14.

621 Note: This attribute helps users better understand the context for the "printer-message-from-operator"
622 message.

623 ~~"document-format-varying-attributes" (1setOf type2 keyword) to list those~~
624 ~~Printer attributes ("xxx-supported", "xxx-default", etc) that can vary for~~
625 ~~different document formats.~~

626 **6.5   printer-message-date-time (dateTime)**

627 This READ-ONLY Printer Description attribute contains the date and time that the Printer's "printer-
628 message-from-operator" was changed by the operator using any operation where the client supplied the
629 "printer-message-from-operator" operation attribute (see section 5.1) or was explicitly set using the Set-
630 Printer-Attributes operation (see section 4.1~~0~~). This attribute allows the users to know when the "printer-
631 message-from-operator" attribute was last set.

632 This attribute MUST be supported if the Printer supports both the "printer-message-time" and the "printer-
633 current-time" (dateTime) attributes (see [ipp-mod] section 4.4.30).

634 Note: This attribute helps users better understand the context for the "printer-message-from-operator"
635 message.

636 **1.6authentication-methods-supported (1setOf type2 keyword)**

637 This Printer Description attribute contains a set of authentication methods supported by the Printer. This
638 attribute specifies the allowed values of the "uri-authentication-supported" Printer Description attribute.

639 This attribute MUST be supported if the Printer allows the Set-Printer-Attributes operation to set the "uri-
640 authentication-supported" attribute.

641 **1.7security-methods-supported (1setOf type2 keyword)**

642 This Printer Description attribute contains a set of authentication methods supported by the Printer. This
643 attribute specifies the allowed values of the "uri-security-supported" Printer Description attribute.

644 This attribute MUST be supported if the Printer allows the Set-Printer-Attributes operation to set the "uri-
645 security-supported attribute".

646 **7   Additional status codes**

647 This section defines new status codes used by the operations defined in this document.

648 **7.1   'client-error-attributes-not-settable' (0x0413)**

649 If the Set-Printer-Attributes or Set-Job-Attributes operation fails because one of the specified attributes
650 cannot be set for any of the three reasons given in Unsupported Attributes group of sections 4.1.3 and 4.2.3,
651 the Printer MUST return this error code and it MUST return in the Unsupported Attributes Group(see [ipp-
652 mod] section 3.1.7) all of the attributes that could not be set. When the Printer returns this status, it MUST
653 NOT change any of the attributes specified in the operation.

654 **8   Additional out-of-band values**

655 This section defines additional out-of-band values that can be used with any attribute in principle. See the
656 beginning of [ipp-mod] section 4.1.

657 **8.1   'not-settable' out-of-band value**

658 The 'not-settable' out-of-band value is used by the IPP Printer in the Unsupported Attributes group of a Set-
659 Job-Attributes or Set-Printer-Attributes response to indicate that an attribute (supplied by the client) is
660 READ-ONLY..

661 The encoding of the out-of-band value is TBD (see [ipp-pro]).

662 **8.2   'default' out-of-band value**

663 The 'default' out-of-band values is used by the client in Set-Job-Attributes, Job Creation (Create-Job, Print-
664 Job, Print-URI), and Validate-Job requests to indicate explicitly that the Printer is to apply its default value
665 with the same semantics and precedence (lower than the document content) as if the Job attribute were not
666 present on the Job object. The semantic effect of the client supplying the 'default' value in a Set-Job-
667 Attributes operation is as if the attribute were to be removed from the Job object. However, if the resulting
668 Job is queried by the Get-Job-Attributes or Get-Jobs operations, the Printer MUST return any attributes
669 with the 'default' value that the client had supplied with the 'default' value, rather than not returning the
670 attributes at all. In other words, the Printer MUST NOT remove any attribute from the Job object for which
671 the client supplies the 'default' out-of-band value. In addition, any attributes that had not been supplied by
672 the client in the Job Creation operation MUST NOT be returned with the 'default' value.

673 The encoding of the out-of-band value is reserved for this purpose (see [ipp-pro]).

674 **8.3   'any-name' out-of-band value**

675 The 'any-name' out-of-band value is used by the IPP Printer as a new value ~~allowed~~ returned by Get-Printer-
676 Supported-Values operation. It is a possible value for an ~~in "xxx-supported"~~ attribute~~s~~ which allow~~s~~ the
677 'name' attribute syntax ~~type~~. Its presence indicates that the Set-Printer-Attributes operation allows the
678 attribute to have values whose attribute syntax ~~type~~ is 'name'.
679
680 ~~To supported this value, the syntax type of the following three attributes is changed from "1setOf type3~~
681 ~~keyword | name (MAX))" to "1setOf type3 keyword | name (MAX)) | any-name":~~ The Get-Printer-
682 Supported-Values MAY return the 'any-name' for any of the following IPP/1.1 attributes.
683
684   media-supported
685   job-hold-until-supported
686   job-sheets-supported
687
688 If the value 'any-name' is one of the values of an attribute returned from the Get-Reset-Printer-Attributes,
689 then the Printer MUST allow the Set-Printer-Attributes operation for that attribute to contain ~~the 'any-name'~~
690 ~~value or~~ any value whose attribute syntax ~~type~~ is 'name'~~value~~. If the value 'any-name' is not one of the
691 values of an attribute returned from the Get-Reset-Printer-Attributes, then the Printer MUST NOT allow the
692 Set-Printer-Attributes operation for that attribute to contain a value whose attribute syntax ~~type~~ is 'name'~~the~~
693 ~~'any-name' value or a name value~~.

694
695 Furthermore, if any of the above three attributes has the 'any-name' value or any name values,. the Reset
696 operation MUST not remove them.
697
698 If the value 'any-name' is one of the values of an attribute returned from the Get-Printer-Attributes, then the
699 Printer MUST validate any name value for that attribute. If the job is accepted, it is put into the pending-
700 held state. If the value 'any-name' is not one of the values of an attribute returned from the Get-Printer-
701 Attributes, then the Printer MUST NOT validate a name value for that attribute unless the name is
702 explicitly is in the corresponding "xxx-supported" attribute.
703

704 The encoding of the out-of-band value is TBD (see [ipp-pro]).

705 ISSUE 03: Should the 'any-name' value be a keyword with special behavior or a new type of value, such as
706 an out-of-band value? This document has been written as an out-of-band value.

707 ## 9   Conformance Requirements

708 This section specifies the conformance requirements for clients and IPP objects.

709 Both the Set-Job-Attributes and the Set-Printer-Attributes operations defined in the document are
710 OPTIONAL for an IPP object to support. Either one MAY be supported without the other or both MAY be
711 supported. However, if the Set-Printer-Attributes operation is supported, then the Get-Printer-Supported-
712 Values operation MUST be supported. Otherwise, the Get-Printer-Supported-Values operation is
713 OPTIONAL for an IPP Printer to support.

714 If the Set-Printer-Attributes operation is supported, then the Printer MUST support the following additional
715 items:

716   1.   the Get-Printer-Supported-Values operation (see section 4.3)

717   2.   the "printer-settable-attributes-supported" Printer Description attribute (see section 6.1) and Get-
718   Reset-Printer-AttributesGet-Printer-Supported-Values operation MUST be supported.
719   Otherwise, the Get-Reset-Printer-AttributesGet-Printer-Supported-Values operation is
720   OPTIONAL for an IPP Printer to support.

721   3.   If the Set-Printer-Attributes operation is supported, then the 'not-settable' out-of-band value (see
722   section 8.1)

723   4.   and the 'client-error-not-settable' status code MUST be supported. (see section 7.1)

724 If the Set-Printer-Attributes operation is supported and the Printer allows the Set-Printer-Attributes
725 operation to set the "uri-authentication-supported" Printer Description attribute, then the Printer MUST also
726 support the "security-methods-supported" Printer Description attribute.

727 If the Set-Printer-Attributes operation is supported and the Printer allows the Set-Printer-Attributes
728 operation to set the "uri-security-supported attribute" Printer Description attribute, then the Printer MUST
729 also support the "security-methods-supported" Printer Description attribute.

730   5.   If the Set-Printer-Attributes operation is supported and the 'name' attribute syntax type is
731   supported for any "xxx-supported" attribute, then the 'any-name' out-of-band value MUST be
732   supported (see section 8.3).

733   6.   If the Set-Printer-Attributes operation and the "printer-message-from-operator" Printer
734   Description attribute are is supported (see [ipp-mod] section 4.4.25), then the latterit MUST be
735   settable.

736 If the Set-Job-Attributes operation is supported, then the Printer MUST support the following additional
737 items:

738   1.   If the Set-Job-Attributes operation is supported, then the "job-settable-attributes-supported "
739   Printer Description attribute (see section 6.2)

740   2.   and the 'default' out-of-band value MUST be supported. (see section 8.2)

741   3.   If the Set-Job-Attributes operation and the "job-message-from-operator" Printer Description
742   attribute are is supported (see [ipp-mod] 4.3.16), then the latterit MUST be settable.

743 It is OPTIONAL for the Printer object to support the "printer-message-time" (integer) and "printer-
744 message-date-time" (dateTime). If both the "printer-message-time" (integer) and the "printer-current-time"
745 (dateTime) (see [ipp-mod] section 4.4.30) Printer Description attributes are supported, then the "printer-
746 message-date-time" (dateTime) attribute MUST be supported.

747 **10   IANA Considerations**

748 The operations and attributes in this registration proposal will be published by IANA according to the
749 procedures in RFC 2566 [rfc2566] section 6.4 for operations with the following URL:

750   ftp.isi.edu/iana/assignments/ipp/operations/set.txt

751 **11   Internationalization Considerations**

752 This document has the same localization considerations as the [ipp-mod].

753 **12   Security Considerations**

754 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
755 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
756 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism

757 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
758 mechanism for protecting operations from eavesdropping.

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15   Change History

This section summarizes the changes. Each sub-section is in reverse chronological order. Adding or removing ISSUES that don't change the document are not listed here.

15.1   Changes to the January 20, 2000 version to make the January 30, 2000 version

The following changes to the January 20, 2000 version to make the January 30, 2000 version as a result of the IPP WG telecons and mailing list discussion:

1. Deleted the "document-format-varying-scope" operation attribute from the Set-Printer-Attributes operation and made whether or not the "document-format" operation was present determine whether one or all document formats are affected, respectively.

2. Renamed the Get-Reset-Printer-Attributes operation to Get-Printer-Supported-Values, so that it only returns "xxx-supported" values. Relegate obtaining reset values to another operation to be paired with the Reset-Printer operation in the Set2 [ipp-set2] document.

3. Added "-supported" to the names of the "printer-settable-attributes" and "job-settable-attributes" Printer Description attributes, so that they could be returned in Get-Printer-Supported-Values and could be set by Set-Printer-Attributes.

827 4. Deleted "authentication-methods-supported" (1setOf type2 keyword) and "security-methods-supported"
828   (1setOf type2 keyword) and clarified that "uri-authentication-supported" (1setOf type2 keyword) and
829   "uri-security-supported" (1setOf type2 keyword) can return multiple keywords of the same value in a
830   Get-Printer-Supported-Values operation.

831 **15.2 Changes to the January 4, 2000 version to make the January 20, 2000 version**

832 The following changes to the January 4, 2000 version to make the January 4, 2000 version as a result of the
833 IPP WG telecons and mailing list discussion:

834 1. Replaced the "factory-settings" operation attribute proposed to be added to the Get-Printer-Attributes
835   operation with the Get-Rest-Printer-Attributes operation which returns the reset values and the possible
836   "xxx-supported" values.

837 2. Added the out-of-band 'any-name' value to be used with "xxx-supported" attributes with attribute syntax
838   'type3 keyword | name' to indicate that any name will be accepted in a Job Creation operation for
839   configurations that support such a concept.

840 3. Added authentication-methods-supported (1setOf type2 keyword) and security-methods-supported
841   (1setOf type2 keyword) Printer Description attributes so that clients can discover the possible values for
842   use in Set-Printer-Attributes to set "uri-authentication-supported" and "uri-security-supported"
843   attributes, since the Reset-Printer operation doesn't change them.

844 4. Added validation rules that the Printer MUST use to validate a Set-Printer-Attributes request.

845 5. Clarified that the Set-Printer-Attributes operation MUST NOT have any side effects on other attributes,
846   unless explicitly specified in this document.

847 6. Moved the specification of the attributes that MUST be READ-ONLY to Appendix A.

848 7. Added the "document-format-varying-attributes" (1setOf type2 keyword)

849 8. Added the REQUIRED "document-format-varying-scope" operation attribute to Set-Printer-Attributes
850   in order to control whether one or all document formats are affected for those attributes that vary by
851   document format.

852 9. Clarified that the Printer returns the 'client-error-attributes-not-settable' status code in a Set-Printer-
853   Attributes response whether the attribute is READ-ONLY, the attribute is not supported, or the value is
854   not supported.

855 10. Added the out-of-band 'default' value for use with Set-Job-Attributes and Job Creation operations.

856 11. Deleted the "printer-message-operation" Printer Description attribute.

857 12. Made the "Get-Reset-Printer-Attributes" operation, along with the "authentication-methods-supported"
858   and the "security-methods-supported" Printer Description attributes REQUIRED, if the Set-Printer-
859   Attributes operation is supported.

860 13. Made the 'not-settable' out-of-band value and the 'client-error-not-settable' status code REQUIRED, if
861   the Set-Printer-Attributes operation is supported.

862 14. Made the 'default' out-of-band value REQUIRED, if the Set-Job-Attributes operation is supported.

863 15. Removed the requirement that "xxx-supported" Printer Description attributes that contain only one
864   value be read-only.

15.3 Changes to the December 8, 1999 version to make the January 4, 2000 version

866 The following changes to the December 8, 1999 version to make the January 4, 2000 version as a result of
867 the IPP WG telecons and mailing list discussion:

868 1. Removed the Set operations and related items from the Set2 specification [ipp-set2] to create this Set
869   specification.

870 2. Added that an attribute that can only be set to one fixed value SHOULD NOT be included in the
871   "printer-settable-attributes" or "job-settable-attributes" attributes.

872 3. Indicated that the encoding of the 'not-settable' out-of-band value is TBD.

873 4. Added that Set-Job-Attributes operation adds an attribute to the Job object if it wasn't already there

874 5. Added the conformance section to make it easy to understand the conformance requirements.

16   Appendix A: Allowed Values for Set-Printer-Attributes

876 This appendix is a normative part of this document and contains a table of all IPP/1.1 attributes. Each row
877 contains

878   An attribute and

880   The values allowed in the Set-Printer-Attributes operation for the attribute. The entry in each cell is
881   the name (first few words) of each item below 1, 2, 3, and 4a-g, and 5.

882 The allowed values include the following cases:

883 1. Read-only: the Set-Printer-Attributes operation cannot change this attribute

884 2. Any of "*xxx*-supported": the Set-Printer-Attributes operation accepts values that are allowed
885   according to the IPP/1.1 rules for the "xxx-supported" attribute (see section 3.1.2.3 of the "Internet
886   Printing Protocol/1.1: Implementer's Guide" [ipp-iig]). The 'xxx-supported' attribute value is
887   obtained from a 'Get-Printer-Attributes' response.

888 3. Any of Reset "*xxx*-supported":From Get-Printer-Supported-Values: the Set-Printer-Attributes
889   operation accepts values that are allowed according to the IPP/1.1 rules for the "xxx-supported"
890   attribute (see section 3.1.2.3 of the "Internet Printing Protocol/1.1: Implementer's Guide" [ipp-iig]).

891 The "xxx-supported" attribute value is obtained from ~~Get-Reset-Printer-Attributes~~a Get-Printer-
892 Supported-Values response (see Appendix B: Attributes returned from Get-Printer-Supported-
893 Values below~~below~~).

4. Any value of the proper attribute syntax ~~type~~: the Set-Printer-Attributes accepts any value of the
895 specified attribute syntax ~~type~~. The attribute syntaxes ~~types~~ supported are enumerated below.

   a. Any text(127)
   b. Any name(127)
   c. Any uri
   d. Any boolean
   e. Any positive integer
   f. Any ~~datetime~~dateTime
   g. 1setOf any uri

5. Combination of 'Any of ~~Reset~~ "*xxx*-supported"' or 'Any name'.

904 If a Printer implementation doesn't want to allow setting values indicated in this Appendix as "any xxx"~~of~~
905 ~~any syntax type~~, it can make the value be read-only. For example, for a monochrome printer the attribute
906 "color-supported" is "false" and ~~must~~ MUST be read-only. Otherwise an admin istrator could set it to "true"
907 because the value can have "any boolean" according to the rules in Table 6 below.

Table 3 - Values allowed for Job Template Attributes in the Set-Job-Attributes Operation

Job Template Attributes	Values allowed for Set
job-priority (integer(1:100))	Any of "xxx-supported"
job-hold-until (type3 keyword	name (MAX))	Any of "xxx-supported"
job-sheets (type3 keyword	name(MAX))	Any of "xxx-supported"
multiple-document-handling (type2 keyword)	Any of "xxx-supported"
copies (integer(1:MAX))	Any of "xxx-supported"
finishings (1setOf type2 enum)	Any of "xxx-supported"
page-ranges (1setOf rangeOfInteger (1:MAX))	Any of "xxx-supported"
sides (type2 keyword)	Any of "xxx-supported"
number-up (integer(1:MAX))	Any of "xxx-supported"
orientation-requested (type2 enum)	Any of "xxx-supported"
media (type3 keyword	name(MAX))	Any of "xxx-supported"
printer-resolution (resolution)	Any of "xxx-supported"
print-quality (type2 enum)	Any of "xxx-supported"

909

Table 4 - Values allowed for Job Description Attributes in the Set-Job-Attributes Operation

Job Description Attributes	Values allowed for Set
job-uri (uri)	~~read-only~~Read-only
job-id (integer(1:MAX))	~~read-only~~Read-only
job-printer-uri (uri)	~~read-only~~Read-only

Job Description Attributes	Values allowed for Set
job-more-info (uri)	~~read only~~Read-only
job-name (name(MAX))	Any name(MAX)
job-originating-user-name (name(MAX))	~~read only~~Read-only
job-state (type1 enum)	~~read only~~Read-only
job-state-reasons (1setOf type2 keyword)	~~read only~~Read-only
job-state-message (text(MAX))	~~read only~~Read-only
job-detailed-status-messages (1setOf text(MAX))	~~read only~~Read-only
job-document-access-errors (1setOf text(MAX))	~~read only~~Read-only
number-of-documents (integer(0:MAX))	~~read only~~Read-only
output-device-assigned (name(127))	~~read only~~Read-only
time-at-creation (integer(MIN:MAX))	~~read only~~Read-only
time-at-processing (integer(MIN:MAX))	~~read only~~Read-only
time-at-completed (integer(MIN:MAX))	~~read only~~Read-only
job-printer-up-time (integer(1:MAX))	~~read only~~Read-only
date-time-at-creation (dateTime)	~~read only~~Read-only
date-time-at-processing (dateTime)	~~read only~~Read-only
date-time-at-completed (dateTime)	~~read only~~Read-only
number-of-intervening-jobs (integer(0:MAX))	~~read only~~Read-only
job-message-from-operator (text(127))	Any text(127)
job-k-octets (integer(0:MAX))	~~read only~~Read-only
job-impressions (integer(0:MAX))	~~read only~~Read-only
job-media-sheets (integer(0:MAX))	~~read only~~Read-only
job-k-octets-processed (integer(0:MAX))	~~read only~~Read-only
job-impressions-completed (integer(0:MAX))	~~read only~~Read-only
job-media-sheets-completed (integer(0:MAX))	~~read only~~Read-only
attributes-charset (charset)	~~read only~~Read-only
attributes-natural-language (naturalLanguage)	~~read only~~Read-only

911

912 **Table 5 - Values allowed for Printer Job Template Attributes in the Set-Printer-Attributes Operation**

Printer Job Template Attributes	Values allowed for Set
job-priority-default (integer(1:100))	Any of "xxx-supported"
job-hold-until-default (type3 keyword	name (MAX))	Any of "xxx-supported"
job-sheets-default (type3 keyword	name(MAX))	Any of "xxx-supported"
multiple-document-handling-default (type2 keyword)	Any of "xxx-supported"
copies-default (integer(1:MAX))	Any of "xxx-supported"
finishings-default (1setOf type2 enum)	Any of "xxx-supported"
sides-default (type2 keyword)	Any of "xxx-supported"
number-up-default (integer(1:MAX))	Any of "xxx-supported"
orientation-requested-default (type2 enum)	Any of "xxx-supported"
media-default (type3 keyword	name(MAX))	Any of "xxx-supported"

Printer Job Template Attributes	Values allowed for Set
printer-resolution-default (resolution)	Any of "xxx-supported"
print-quality-default (type2 enum)	Any of "xxx-supported"
job-priority-supported (integer(1:100))	From Get-Printer-Supported-Values
job-hold-until-supported (1setOf(type3 keyword | name (MAX)))	From Get-Printer-Supported-Values
job-sheets-supported (1setOf(type3 keyword | name(MAX)))	From Get-Printer-Supported-Values
multiple-document-handling-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
copies-supported (rangeOfInteger(1:MAX))	From Get-Printer-Supported-Values
finishings-supported (1setOf type2 enum)	From Get-Printer-Supported-Values
page-ranges-supported (boolean)	From Get-Printer-Supported-Values
sides-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
number-up-supported (1setOf (integer(1:MAX) | rangeOfInteger(1:MAX)))	From Get-Printer-Supported-Values
orientation-requested-supported (1setOf type2 enum)	From Get-Printer-Supported-Values
media-supported (1setOf (type3 keyword | name(MAX)))	From Get-Printer-Supported-Values
printer-resolution-supported (1setOf resolution)	From Get-Printer-Supported-Values
print-quality-supported (1setOf type2 enum)	From Get-Printer-Supported-Values
media-ready (type3 keyword | name(MAX))	From Get-Printer-Supported-Values

913

914   **Table 6 - Values allowed for Printer Description Attributes in the Set-Printer-Attributes Operation**

Printer Description Attributes	Values allowed for Set
printer-uri-supported (1setOf uri)	From Get-Printer-Supported-Values
uri-authentication-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
uri-security-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
printer-name (name(127))	Any name(127)
printer-location (text(127))	Any text(127)
printer-info (text(127))	Any text(127)
printer-more-info (uri)	Any uri
printer-driver-installer (uri)	Any uri
printer-make-and-model (text(127))	Any text(127)
printer-more-info-manufacturer (uri)	Any uri
printer-state (type1 enum)	*Read-only*
printer-state-reasons (1setOf type2 keyword)	*Read-only*
printer-state-message (text(MAX))	*Read-only*
ipp-versions-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
operations-supported (1setOf type2 enum)	From Get-Printer-Supported-Values
multiple-document-jobs-supported (boolean)	From Get-Printer-Supported-Values
charset-configured (charset)	Any of "xxx-supported"
charset-supported (1setOf charset)	From Get-Printer-Supported-Values
natural-language-configured (naturalLanguage)	Any of "xxx-supported", use generated-natural-language-

Printer Description Attributes	Values allowed for Set
	supported
generated-natural-language-supported (1setOf naturalLanguage)	From Get-Printer-Supported-Values
document-format-default (mimeMediaType)	Any of "xxx-supported"
document-format-supported (1setOf mimeMediaType)	From Get-Printer-Supported-Values
printer-is-accepting-jobs (boolean)	*Read-only*Read-only
queued-job-count (integer(0:MAX))	*Read-only*Read-only
printer-message-from-operator (text(127))	Any text(127)
color-supported (boolean)	From Get-Printer-Supported-Values
reference-uri-schemes-supported (1setOf uriScheme)	From Get-Printer-Supported-Values
pdl-override-supported (type2 keyword)	From Get-Printer-Supported-Values
printer-up-time (integer(1:MAX))	*Read-only*
printer-current-time (dateTime)	Any dateTime
multiple-operation-time-out (integer(1:MAX))	any positive integer
compression-supported (1setOf type3 keyword)	From Get-Printer-Supported-Values
job-k-octets-supported (rangeOfInteger(0:MAX))	From Get-Printer-Supported-Values
job-impressions-supported (rangeOfInteger(0:MAX))	From Get-Printer-Supported-Values
job-media-sheets-supported (rangeOfInteger(0:MAX))	From Get-Printer-Supported-Values
pages-per-minute (integer(0:MAX))	*Read-only*Read-only
pages-per-minute-color (integer(0:MAX))	*Read-only*Read-only
printer-settable-attributes-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
job-settable-attributes-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
document-format-varying-attributes (1setOf type2 keyword)	*Read-only*Read-only
printer-message-time (integer(MIN:MAX))	*Read-only*Read-only
printer-message-date-time(dateTime)	*Read-only*Read-only
authentication-methods-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values
security-methods-supported (1setOf type2 keyword)	From Get-Printer-Supported-Values

915

17 Appendix B: Attributes returned from Get-Printer-Supported-Values

917 For the following attributes, the value allowed by the Set-Printer-Attributes operation MUST be a single
918 integer value in the range specified by the value returned by the Get-Printer-Supported-Values operation.

919   **Table 7 - Printer Job Template Attributes returned from Get-Printer-Supported-Values**

Printer Job Template Attributes	Values Returned
job-priority-supported (integer(1:100))	RrangeOfInteger(1:100)

920

For the following attributes, the value allowed by the Set-Printer-Attributes operation MUST be a single rangeOfInteger value whose bounds do not exceed those of the range specified by the value returned by the Get-Printer-Supported-Values operation.

Table 8 - Printer Job Template Attributes returned from Get-Printer-Supported-Values

Printer Job Template Attributes	Values Returned
copies-supported (rangeOfInteger(1:MAX))	RrangeOfInteger(1:MAX)

The following table has the same criteria as the last, but is for Printer Description attributes.

Table 9 - Printer Description Attributes returned from Get-Printer-Supported-Values

Printer Description Attributes	Values allowed for Set
job-k-octets-supported (rangeOfInteger(0:MAX))	rangeOfInteger(0:MAX)
job-impressions-supported (rangeOfInteger(0:MAX))	rangeOfInteger(0:MAX)
job-media-sheets-supported (rangeOfInteger(0:MAX))	rangeOfInteger(0:MAX)

For the following attributes, the value allowed by the Set-Printer-Attributes operation MUST be one or more integers and rangeOfInteger values, such that the integer values described by these integers and rangeOfIntegers is the same as or a subset of the integers described by the integers and rangeOf Integers of value returned by the Get-Printer-Supported-Values operation.

Table 10 - Printer Job Template Attributes returned from Get-Printer-Supported-Values

Printer Job Template Attributes	Values Returned
number-up-supported (1setOf (integer(1:MAX) | rangeOfInteger(1:MAX)))	1setOf (integer(1:MAX) | rangeOfInteger(1:MAX))

For the following attributes, the value allowed by the Set-Printer-Attributes operation MUST be one or more values, where each such value matches a value returned by the Get-Printer-Supported-Values operation. A keyword, enum, boolean, charset, naturalLanguage, uriScheme, mimeMediaType or resolution value matches if it is equal. A name matches the 'any-name' out-of-band value.

Table 11 - Printer Job Template Attributes returned from Get-Printer-Supported-Values

Printer Job Template Attributes	Values Returned
job-hold-until-supported (1setOf(type3 keyword | name (MAX)))	1setOf(type3 keyword | any name)
job-sheets-supported (1setOf(type3 keyword | name(MAX)))	1setOf(type3 keyword | any name)
multiple-document-handling-supported (1setOf type2 keyword)	1setOf type2 keyword
finishings-supported (1setOf type2 enum)	1setOf type2 enum

Printer Job Template Attributes	Values Returned
page-ranges-supported (boolean)	1setOf(boolean)
sides-supported (1setOf type2 keyword)	1setOf type2 keyword
orientation-requested-supported (1setOf type2 enum)	1setOf type2 enum
media-supported (1setOf (type3 keyword	name(MAX)))	1setOf(type3 keyword | any name)
printer-resolution-supported (1setOf resolution)	1setOf resolution
print-quality-supported (1setOf type2 enum)	1setOf type2 enum

940

941 The following table has the same criteria as the last, but is for Printer Description attributes. Note that the
942 first two attributes in the table below follow the rules for allowed values in the Set-Printer-Attributes, but
943 unlike other attributes, there can be more than one occurrence of each value because the i-th value of these
944 attributes specifies the authentication or security for the i-th printer in "printer-uri-supported".

945   **Table 12 - Printer Description Attributes returned from Get-Printer-Supported-Values**

Printer Description Attributes	Values allowed for Set
uri-authentication-supported (1setOf type2 keyword)	1setOf type2 keyword
uri-security-supported (1setOf type2 keyword)	1setOf type2 keyword
ipp-versions-supported (1setOf type2 keyword)	1setOf type2 keyword
operations-supported (1setOf type2 enum)	1setOf type2 keyword
multiple-document-jobs-supported (boolean)	1setOf boolean
charset-supported (1setOf charset)	1setOf charset
generated-natural-language-supported (1setOf naturalLanguage)	1setOf naturalLanguage
document-format-supported (1setOf mimeMediaType)	1setOf mimeMediaType
color-supported (boolean)	1setOf boolean
reference-uri-schemes-supported (1setOf uriScheme)	1setOf uriScheme
compression-supported (1setOf type3 keyword)	1setOf type3 keyword
printer-settable-attributes-supported (1setOf type2 keyword)	1setOf type2 keyword
job-settable-attributes-supported (1setOf type2 keyword)	1setOf type2 keyword

946

947 For the following attributes, the value allowed by the Set-Printer-Attributes operation MUST be a single
948 value that matches one of the values returned by the Get-Printer-Supported-Values operation. A keyword,
949 enum, boolean, charset, naturalLanguage, uriScheme, mimeMediaType or resolution value matches if it is
950 equal. A name matches the 'any-name' out-of-band value.

951

952   **Table 13 - Printer Description Attributes returned from Get-Printer-Supported-Values**

Printer Description Attributes	Values allowed for Set
pdl-override-supported (type2 keyword)	1 setOf type2 keyword

953

For the following attributes, the Set-Printer-Attributes operation MUST NOT return a value. The IPP
Model document [ipip-mod] document specifies the allowed values.

956

Table 14 - Printer Description Attributes returned from Get-Printer-Supported-Values

Printer Description Attributes	Values allowed for Set
printer-uri-supported (1setOf uri)	any uri

958

18 Appendix C: Full Copyright Statement

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976