INTERNET-DRAFT <mark>- 3 ISSUES are numbered and highlighted like this</mark>   Carl Kugler
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Internet Printing Protocol/1.1: Job and Printer Set Operations

Status of this Memo

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 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 attributes in 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 syntax types includes both 'keyword' and 'name'. The value 'any-name' matches any name supplied by the
39 client during validation.

40 New Printer Description attributes are added:
41   printer-settable-attributes (1setOf type2 keyword)
42   job-settable-attributes (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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141   **Table of Tables**

149 1   Introduction

150 The Internet Printing Protocol (IPP) is an application level protocol that can be used for distributed printing
151 using Internet tools and technologies. IPP version 1.1 (IPP/1.1) focuses on end user functionality with a
152 few administrative operations included. This document defines additional OPTIONAL end user, operator,
153 and administrator Set-Job-Attributes and Set-Printer-Attributes operations used to modify Job objects and
154 Printer objects. This document is a registration proposal for an extension to IPP/1.0 and IPP/1.1 following
155 the registration procedures in those documents.

156 2   Terminology

157 This section defines terminology used throughout this document.

158 2.1   Conformance Terminology

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

162 The following specialization of these terms apply to this document:

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

167 2.2   Other terminology

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

170 3   Requirements and Use Cases

171 The following requirements and usage cover only the Set operations.

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

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

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

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

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

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

183   The system administrator is remotely configuring the Printer after installing it, and so is replacing the
184   Printer Description attributes that have the out-of-band 'no-value' value with the proper values.

185   4   Definition of the Set operations

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

190   The Set-Job-Attributes operation (as are all Job operations) are directed at Job objects. A client MUST
191   always supply some means of identifying the Job object in order to identify the correct target of the
192   operation. That job identification MAY either be a single Job URI or a combination of a Printer URI with a
193   Job ID as defined in [ipp-mod]. The IPP object implementation MUST support both forms of identification
194   for every job.

195   The Set Printer operations are summarized in Table 1:

196   **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-Attributes	0x??	Gets values that attributes would have after a Reset

197   4.1   Set-Printer-Attributes Operation

198   This OPTIONAL operation allows a client to set the values of the attributes of a Printer object.   In the
199   request, the client supplies the set of Printer attribute names and values that are to be set. In the response,
200   the Printer object returns success or rejects the request with indications of which attribute or attributes
201   could not be set.

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

204   o The Printer MUST support the attribute

205   o The attribute MUST NOT be read-only.

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

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

210   The Printer MUST accept this operation in any state, i.e., for any of the values of the Printer object's
211   "printer-state" and "printer-state-reasons" attributes, unless explicitly defined otherwise in the definition of
212   the values.

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

219   4.1.1   Settable and READ-ONLY Printer Description attributes

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

221   all Job Template Default ("xxx-default") attributes
222   all Job Template Supported ("xxx-supported") attributes
223   all Job Template Ready ("xxx-ready") attributes

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

225   Some Printer Description attributes (see [ipp-mod] section 4.4) MUST NOT be settable, i.e., they are
226   READ-ONLY. An attribute marked as "read-only" in the Printer Description attribute table in Appendix A
227   is such an attribute.

228   Note: From now on, all extensions that define new object attributes will indicate whether or not they are
229   READ-ONLY, by including the "READ-ONLY" adjective in their descriptions or whether they MAY be
230   settable.

231   Printer Description attributes that are not READ-ONLY MAY be settable using the Set-Printer-Attributes
232   operation, depending on implementation. If "xxx-supported" Printer Description attribute are settable, then
233   they MUST affect the behavior of the implementation. If they are READ-ONLY then they reflect the
234   implementation and cannot be changed using the Set-Printer-Attributes operation. Consider the following
235   examples:

236   For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
237   4.4.15) is settable in a particular implementation, then changing its value with a Set-Printer-
238   Attributes operation MUST affect the operations that the implementation accepts or rejects. Such
239   an implementation will need to be able to reject values for operations that it contains no code

240 support for. If the "operations-supported" Printer Description attribute is not settable in a particular
241 implementation, then that implementation MUST reject an attempt to set it with a Set-Printer-
242 Attributes operation and return the 'client-error-attributes-not-settable' status code (see section 7.1).

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

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

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

252 4.1.2   Set-Printer-Attributes Request

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

254 Group 1: Operation Attributes

255 Natural Language and Character Set:
256   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
257   section 3.1.4.1.

258

259 Target:
260   The "printer-uri" (uri) operation attribute which is the target for this operation as described in [ipp-
261   mod] section 3.1.5.

262

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

266

267 "document-format" (mimeMediaType):
268   The client SHOULD supply this attribute if the value of "document-format-varying-scope " is
269   'single-document-format'. If the value of "document-format-varying-scope " is 'all-document-
270   formats', the Printer ignores this attribute and it SHOULD be omitted. The Printer object MUST
271   support this attribute. This attribute is useful for a client to select the document-format to which the
272   attribute modification should be applied. A Printer implementation MAY allow some attributes to
273   have different values for each document format that it supports. See [ipp-mod] section 3.2.5.1 "Get-
274   Printer-Attributes Request".

275

276   If the client omits this "document-format" operation attribute when the value of "document-format-
277   varying-scope" is 'single-document-format', the Printer object MUST respond as if the attribute had
278   been supplied with the value of the Printer object's "document-format-default" attribute as it would

279 be after the operation. It is recommended that the client always supply a value for "document-
280 format", since the Printer object's "document-format-default" may be 'application/octet-stream', in
281 which case the set attributes and values are for the union of the document formats that the Printer
282 can automatically sense. Additionally, if the operation is setting "document-format-default", the
283 operation must use that value if the "document-format" operation attribute is omitted. For more
284 details, see the description of the 'mimeMediaType' attribute syntax in [ipp-mod] section 4.1.9.
285 ISSUE 01 - MUST the client supply "document-format" when supplying "document-format-
286 varying-scope " with a 'single-document-format' value? If yes, then this paragraph goes away.

290 If the Printer object does not distinguish between different sets of supported values for each
291 different document format when validating jobs in the create and Validate-Job operations (the same
292 rule as for Get-Printer-Attributes), it MUST NOT distinguish between different document formats
293 in the Set-Printer-Attributes operation. If the Printer object does distinguish between different sets
294 of supported values for each different document format specified by the client, this specialization
295 applies only to the same Printer attributes as the Get-Printer-Attributes operation (see [ipp-mod]
296 section 3.2.5.1).
297 If the client supplies a value for the "document-format" Operation attribute that is not supported by
298 the Printer, i.e., is not among the values of the Printer object's "document-format-supported"
299 attribute, the Printer object MUST reject the operation and return the 'client-error-document-format-
300 not-supported' status code.

302 "document-format-varying-scope " (type2 keyword):
303 The client MUST supply this attribute. The Printer object MUST support this attribute. This
304 attribute specifies whether the operation changes the value for all document formats or just the one
305 that the client supplies in "document-format". The supported value of this attribute are:

307 'all-document-formats': The operation changes the supplied attributes for all document formats
308 whether they vary by document-format or not. The value of the "document-format" operation
309 attribute, if present, is ignored.
310 'single-document-format': The operation changes the specified attributes for the document
311 format specified by the "document-format" attribute. If an attribute varies by document
312 format, it is changed for the specified document format, but not for other document formats.
313 If an attribute doesn't vary by document format, it is changed for all document formats.

316 Group 2: Printer Attributes

317 The client MUST supply a set of Printer attributes as defined in [ipp-mod] section 4.2 Job Template
318 Attributes ("xxx-default", "xxx-supported", and "xxx-ready" attributes), section 4.4 Printer
319 Description Attributes, and any attribute extensions supported by the Printer. Each Printer attribute
320 supplied in Group 2 replaces the value(s) of the corresponding Printer attribute on the target Printer
321 object. For attributes that can have multiple values (1setOf), all values supplied by the client
322 replace all values of the corresponding Printer object attribute. If a Printer object attribute had not

323   been configured yet and so had the 'no-value' out-of-band value (see [ipp-mod] 4.1), the supplied
324   value(s) replace the 'no-value' value.
325

326   4.1.3   Set-Printer-Attributes Response

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

328   Group 1: Operation Attributes

329   Status Message:
330   In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
331   includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
332   attribute as described in [ipp-mod] sections 13 and 3.1.6.
333
334   Natural Language and Character Set:
335   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
336   section 3.1.4.2.
337

338   Group 2: Unsupported Attributes

339   See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
340
341   If some of the attributes in the operation fail to validate, the Printer MUST reject the operation, and
342   return the 'client-error-attributes-not-settable' status code. The Printer MUST also return all
343   attributes that fail to validate in this group. The following are the reasons that an attribute fails to
344   validate and the value returned for the attribute.

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

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

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

352
353

354   4.2   Set-Job-Attributes Operation

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

358 This operation is almost identical to the Set-Printer-Attributes operation (see section 4.1). The only
359 differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
360 there is no "document-format" operation attribute used when setting a Job object, and the validation is the
361 same as the create job operations, i.e., depends on the "xxx-supported" Printer Description attributes.

362 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
363 with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes MUST be
364 supported along with the attributes not modified. If such a create job operation would have been accepted,
365 then the Set-Job-Attributes MUST be accepted. If such a create job operation would have been rejected,
366 then the Set-Job-Attributes MUST be rejected and the Job MUST be unchanged. In addition, if any of the
367 supplied attributes are not supported, are not settable, or the values are not supported, the Printer object
368 MUST reject the entire operation; the Printer object MUST NOT partially set some of the supplied
369 attributes. In other words, after the operation, all the supplied attributes MUST be set or none of them
370 MUST be set.

371 If a client supplies a job attribute in a Set-Job-Attributes request that the Printer supports, and the job was
372 originally submitted without supplying that attribute, the Printer adds the attribute to the Job object. If the
373 attribute value is the "out-of-band" value 'default' (see section 8.3), then attribute is changed like any value,
374 but the Printer treats a Job attribute with the 'default' value as equivalent to the attribute not being present
375 on the Job, i.e. the Printer uses its defaulting mechanism. As when the Job attribute is not present, the
376 Printer MUST apply such default mechanism if the document does not contain any corresponding
377 instruction.

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

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'

381

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

384   4.2.1   Settable and READ-ONLY Job Description attributes

385   If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
386   4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
387   then the Printer MUST set the "job-message-from-operator" Job attribute to this new value.

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

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

390   that the implementation supports.

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

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

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

401   4.2.2   Set-Job-Attributes Request

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

403   Group 1: Operation Attributes
404   Natural Language and Character Set:
405   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
406   section 3.1.4.1.
407
408   Target:
409   Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
410   attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.
411
412   Requesting User Name:
413   The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
414   described in [ipp-mod] section 8.3.
415
416
417   Group 2: Job Attributes

418   The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
419   Attributes ("xxx" attributes), section 4.3 Job Description Attributes, and any attribute extensions
420   supported by the Printer. Each Job attribute supplied in Group 2 replaces the value(s) of the
421   corresponding Job attribute on the target Job object. For attributes that can have multiple values
422   (1setOf), all values supplied by the client replace all values of the corresponding Job object
423   attribute.

424

425   4.2.3   Set-Job-Attributes Response

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

427 Group 1: Operation Attributes

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

432

433   Natural Language and Character Set:
434   The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
435   section 3.1.4.2.

436

437 Group 2: Unsupported Attributes

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

439

440   If some of the attributes in the operation fail to validate, the Printer MUST reject the operation, and
441   return the 'client-error-attributes-not-settable' status code. The Printer MUST also return all
442   attributes that fail to validate in this group. The following are the reasons that an attribute fails to
443   validate and the value returned for the attribute.

444   The Printer doesn't support the attribute: return the attribute with the "out-of-band" value
445   'unsupported' (see [ipp-pro]).

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

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

451   4.3   Get-Reset-Printer-Attributes Operation

452 This OPTIONAL operation allows a client to request the values of the attributes of a Printer object as they
453 would be after a Reset operation. If the Printer supports the Set-Printer-Attributes operation, then it MUST

454 also support this operation. This operation has identical request /response attributes to the 'Get-Printer-
455 Attributes' operation in IPP/1.1 [ipp-mod]. The operation also behaves identically to the 'Get-Printer-
456 Attributes' operation in IPP/1.1 [ipp-mod] except for:

457   o 'Get-Printer-Attributes' returns the current value of specified attributes and 'Get-Reset-Printer-
458   Attributes' returns the value that 'Get-Printer-Attributes' would return after a "Reset" operation. The
459   "Reset" operation MAY be a Reset-Printer operation (see [ipp-set2]) or a reset performed locally to the
460   Printer.

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

463   printer-uri-supported
464   printer-name
465   printer-location
466   printer-info
467   printer-state
468   printer-state-reasons
469   printer-state-message
470   printer-is-accepting-jobs
471   queued-job-count
472   printer-up-time
473   printer-current-time
474
475 A client can determine the allowed values for "xxx-supported" attributes in the Set-Printer-Attributes
476 operation by retrieving the value of "xxx-supported" with the Get-Reset-Printer-Attributes operation.
477
478 ISSUE 02: There could be a separate operation Get-Allowed-Printer-Attributes for determining allowed
479 values. This operation would return the same value as Get-Reset-Printer-Attributes for "xxx-supported", but
480 would return allowed values rather than the Reset value for other attributes. We have not yet seen a need
481 for such an operation because the spec provides rules for inferring the allowed values except for "xxx-
482 supported" values.

483

484 5   New Operation attributes

485 This section defines new operation attributes for use with the IPP/1.1

486 5.1   "printer-message-from-operator" (text(127))

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

489   Pause-Printer
490   Resume-Printer
491   Purge-Jobs

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

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

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

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

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

511 5.2   "job-message-from-operator" (text(127))

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

514   Cancel-Job
515   Hold-Job
516   Release-Job
517   Restart-Job

518 The client OPTIONALLY supplies this attribute in the above operations. The value of this attribute is a
519 message from the operator about the Job object on which the operator has just performed an operation. If
520 supported, the Printer copies the value to the Job's "job-message-from-operator" Job Description attribute
521 (see [ipp-mod] section 4.3.16) (even if this Operation attribute is a zero-length text value or consists solely
522 of white space).

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

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

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

533 6   New Printer Description Attributes

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

536 6.1   printer-settable-attributes (1setOf type2 keyword)

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

544 Standard keyword values are:

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

547 6.2   job-settable-attributes (1setOf type2 keyword)

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

553 Standard keyword values are:

554   'none': There are no settable Job attributes.
555   'xxx': Where 'xxx' is any of the keyword attribute names allowed by section 4.2.1.

556   6.3   printer-message-time (integer(MIN:MAX))

557   This READ-ONLY Printer Description attribute contains the time that the Printer's "printer-message-from-
558   operator" was changed by the operator using any operation where the client supplied the "printer-message-
559   from-operator" operation attribute (see section 5.1) or was explicitly set using the Set-Printer-Attributes
560   operation (see section 4.1). This attribute allows the users to know when the "printer-message-from-
561   operator" attribute was last set.

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

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

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

571   6.4   printer-message-date-time (dateTime)

572   This READ-ONLY Printer Description attribute contains the date and time that the Printer's "printer-
573   message-from-operator" was changed by the operator using any operation where the client supplied the
574   "printer-message-from-operator" operation attribute (see section 5.1) or was explicitly set using the Set-
575   Printer-Attributes operation (see section 4.1). This attribute allows the users to know when the "printer-
576   message-from-operator" attribute was last set.

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

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

581

582   6.5   document-format-varying-attributes (1setOf type2 keyword)

583   This READ-ONLY Printer Description attribute contains a set of attribute names. This attribute SHOULD
584   be supported by a Printer object, if the Printer object has Printer attributes whose value vary depending on
585   document format (see [ipp-mod] Get-Printer-Attributes operation). This attribute specifies which attribute
586   values can vary by document-format. If an attribute's name is a member of this attribute and its value is
587   changed with the Set-Printer-Attributes operation and the Operation attribute "document-format-varying-
588   scope " has the value 'single-document-format', then the Printer MUST change the value for the specified
589   document format and no other document formats. If an attribute's name is not a member of this attribute

590 and its value is changed with the Set-Printer-Attributes operation and the Operation attribute "document-
591 format-varying-scope " has the value 'single-document-format', then the attribute is changed for all
592 document formats.

593 6.6   authentication-methods-supported (1setOf type2 keyword)

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

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

598 6.7   security-methods-supported (1setOf type2 keyword)

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

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

603 7   Additional status codes

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

605 7.1   'client-error-attributes-not-settable' (0x0413)

606 8   If the Set-Printer-Attributes or Set-Job-Attributes operation fails because one of the specified attributes
607   cannot be set for any of the three reasons given in Unsupported Attributes group of sections 4.1.3 and
608   4.2.3, the Printer MUST return this error code and it MUST return in the Unsupported Attributes
609   Group(see [ipp-mod] section 3.1.7) all of the attributes that could not be set. When the Printer returns
610   this status, it MUST NOT change any of the attributes specified in the operation. Additional out-of-
611   band values

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

614 8.1   'not-settable' out-of-band value

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

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

619   8.2   'any-name' out-of-band value

620   The 'any-name' out-of-band value is used by the IPP Printer as a new value allowed in "xxx-supported"
621   supported attributes which allow the 'name' syntax type.

623   To supported this value, the syntax type of the following three attributes is changed from "1setOf type3
624   keyword | name (MAX))" to "1setOf type3 keyword | name (MAX)) | any-name":

626   media-supported
627   job-hold-until-supported
628   job-sheets-supported

630   If the value 'any-name' is one of the values of an attribute returned from the Get-Reset-Printer-Attributes,
631   then the Printer MUST allow the Set-Printer-Attributes operation for that attribute to contain the 'any-name'
632   value or a name value. If the value 'any-name' is not one of the values of an attribute returned from the Get-
633   Reset-Printer-Attributes, then the Printer MUST NOT allow the Set-Printer-Attributes operation for that
634   attribute to contain the 'any-name' value or a name value.

636   Furthermore, if any of the above three attributes has the 'any-name' value or any name values,. the Reset
637   operation MUST not remove them.

639   If the value 'any-name' is one of the values of an attribute returned from the Get-Printer-Attributes, then the
640   Printer MUST validate any name value for that attribute. If the job is accepted, it is put into the pending-
641   held state. If the value 'any-name' is not one of the values of an attribute returned from the Get-Printer-
642   Attributes, then the Printer MUST NOT validate a name value for that attribute unless the name is
643   explicitly is in the corresponding "xxx-supported" attribute.

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

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

648   8.3   'default' out-of-band value

649   The 'default' out-of-band values is used by the client in Set-Job-Attributes, Job Creation (Create-Job, Print-
650   Job, Print-URI), and Validate-Job requests to indicate explicitly that the Printer is to apply its default value
651   with the same semantics and precedence (lower than the document content) as if the Job attribute were not
652   present on the Job object. The semantic effect of the client supplying the 'default' value in a Set-Job-
653   Attributes operation is as if the attribute were to be removed from the Job object. However, if the resulting
654   Job is queried by the Get-Job-Attributes or Get-Jobs operations, the Printer MUST return any attributes
655   with the 'default' value that the client had supplied with the 'default' value, rather than not returning the
656   attributes at all. In other words, the Printer MUST NOT remove any attribute from the Job object for which

657 the client supplies the 'default' out-of-band value. In addition, any attributes that had not been supplied by
658 the client in the Job Creation operation MUST NOT be returned with the 'default' value.

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

660 9   Conformance Requirements

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

662 Both the Set-Job-Attributes and the Set-Printer-Attributes operations defined in the document are
663 OPTIONAL for an IPP object to support. Either one MAY be supported without the other or both MAY be
664 supported.

665

666 If the Set-Printer-Attributes operation is supported, then the "printer-settable-attributes" Printer Description
667 attribute and Get-Reset-Printer-Attributes operation MUST be supported. Otherwise, the Get-Reset-
668 Printer-Attributes operation is OPTIONAL for an IPP Printer to support.

669 If the Set-Printer-Attributes operation is supported, then the 'not-settable' out-of-band value and the 'client-
670 error-not-settable' status code MUST be supported.

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

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

677 If the Set-Printer-Attributes operation is supported and the name syntax type is supported for any "xxx-
678 supported", then the 'any-name' value MUST be supported.

679 If the Set-Job-Attributes operation is supported, then the "job-settable-attributes" Printer Description
680 attribute and the 'default' out-of-band value MUST be supported.

681 If the Set-Printer-Attributes operation and the "printer-message-from-operator" Printer Description attribute
682 are supported, then the latter MUST be settable.

683 If the Set-Job-Attributes operation and the "job-message-from-operator" Printer Description attribute are
684 supported, then the latter MUST be settable.

685 It is OPTIONAL for the Printer object to support the "printer-message-time" (integer) and "printer-
686 message-date-time" (dateTime). If both the "printer-message-time" (integer) and the "printer-current-time"

687 (dateTime) (see [ipp-mod] section 4.4.30) Printer Description attributes are supported, then the "printer-
688 message-date-time" (dateTime) attribute MUST be supported.

689 ## 10 IANA Considerations

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

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

693 ## 11 Internationalization Considerations

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

695 ## 12 Security Considerations

696 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
697 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
698 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism
699 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
700 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 4, 2000 version to make the January 20, 2000 version

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

788   15.2   Changes to the December 8, 1999 version to make the January 4, 2000 version

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

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

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

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

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

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

798   16   Appendix A: Allowed Values for Set-Printer-Attributes

799   This appendix contains a table of all IPP/1.1 attributes. Each row contains

800   An attribute and

801
802   The values allowed in the Set-Printer-Attributes operation for the attribute. The entry in each cell is
803   the name (first few words) of each item below 1, 2, 3 and 4a-g.

804   The allowed values include the following cases:

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

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

810   3.   Any of Reset "*xxx*-supported": the Set-Printer-Attributes operation accepts values that are allowed
811   according to the IPP/1.1 rules for the "xxx-supported" attribute (see section 3.1.2.3 of the "Internet
812   Printing Protocol/1.1: Implementer's Guide" [ipp-iig]). The "xxx-supported" attribute value is
813   obtained from Get-Reset-Printer-Attributes (see below).

814   4.   Any value of the proper syntax type: the Set-Printer-Attributes accepts any value of the specified
815   syntax type. The types supported are enumerated below.

816   a.   Any text(127)
817   b.   Any name(127)

818   c. Any uri
819   d. Any boolean
820   e. Any positive integer
821   f. Any datetime
822   g. 1setOf any uri
823   5. Combination of 'Any of Reset "*xxx*-supported"' or 'Any name'.

824 If a Printer implementation doesn't want to allow values of any syntax type, it can make the value be read-
825 only. For example, for a monochrome printer the attribute "color-supported" is "false" and must be read-
826 only. Otherwise an admin could set it to "true" because the value can have "any boolean".

827 **Table 2 - Values allowed for Job Template Attributes in the Set-Job-Attributes Operation**

828

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"

829

830 **Table 3 - Values allowed for Job Description Attributes in the Set-Job-Attributes Operation**

831
832

Job Description Attributes	Values allowed for Set
job-uri (uri)	read-only
job-id (integer(1:MAX))	read-only
job-printer-uri (uri)	read-only
job-more-info (uri)	read-only
job-name (name(MAX))	Any name(MAX)
job-originating-user-name (name(MAX))	read-only
job-state (type1 enum)	read-only
job-state-reasons (1setOf type2 keyword)	read-only
job-state-message (text(MAX))	read-only

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

833

834 **Table 4 - Values allowed for Printer Job Template Attributes in the Set-Printer-Attributes Operation**

835
836

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-resolution-default (resolution)	Any of "xxx-supported"
print-quality-default (type2 enum)	Any of "xxx-supported"
job-priority-supported (integer(1:100))	Any integer(1:100)
job-hold-until-supported (1setOf(type3 keyword	name (MAX)))	Any of Reset "xxx-supported" or

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

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838 **Table 5 - Values allowed for Printer Description Attributes in the Set-Printer-Attributes Operation**

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Printer Description Attributes	Values allowed for Set
printer-uri-supported (1setOf uri)	1setOf Any uri
uri-authentication-supported (1setOf type2 keyword)	Any of Reset "xxx-supported";use authentication-methods-supported
uri-security-supported (1setOf type2 keyword)	Any of Reset "xxx-supported"; use security-methods-supported
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)	Any of Reset "xxx-supported"
operations-supported (1setOf type2 enum)	Any of Reset "xxx-supported"
multiple-document-jobs-supported (boolean)	Any of Reset "xxx-supported"
charset-configured (charset)	Any of "xxx-supported"
charset-supported (1setOf charset)	Any of Reset "xxx-supported"
natural-language-configured (naturalLanguage)	Any of "xxx-supported", use

Printer Description Attributes	Values allowed for Set
	generated-natural-language-supported
generated-natural-language-supported (1setOf naturalLanguage)	Any of Reset "xxx-supported"
document-format-default (mimeMediaType)	Any of "xxx-supported"
document-format-supported (1setOf mimeMediaType)	Any of Reset "xxx-supported"
printer-is-accepting-jobs (boolean)	Read-only
queued-job-count (integer(0:MAX))	Read-only
printer-message-from-operator (text(127))	Any text(127)
color-supported (boolean)	Any boolean
reference-uri-schemes-supported (1setOf uriScheme)	Any of Reset "xxx-supported"
pdl-override-supported (type2 keyword)	Any of Reset "xxx-supported"
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)	Any of Reset "xxx-supported"
job-k-octets-supported (rangeOfInteger(0:MAX))	Any of Reset "xxx-supported"
job-impressions-supported (rangeOfInteger(0:MAX))	Any of Reset "xxx-supported"
job-media-sheets-supported (rangeOfInteger(0:MAX))	Any of Reset "xxx-supported"
pages-per-minute (integer(0:MAX))	Read-only
pages-per-minute-color (integer(0:MAX))	Read-only
printer-message-time	Read-only
printer-message-date-time	Read-only

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841   17   Appendix B: Full Copyright Statement

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856 OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED
857 WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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