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IPP Test Plan Outline

Turner, Zehler

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110 # 1   General

111 ## *1.1   Common restrictions for test purposes*

112 To facilitate testing and analysis of results we should conduct our tests under certain restrictions. If
113 time permits specific restrictions may be lifted for specific tests.

114 - Security. No authentication, authorization or privacy will be used. There will be a series of test
115   specifically targeting interoperability of security implementations. The core protocol testing
116   will eliminate these variables.

117 - Character set. We will use the UTF-8 character encoding of ISO646. This will simplify the
118   comparison of results.

119 - Language. We will use en-us. This will simplify the comparison of results.

120 - IPP Scheme. The URLs for printers will be http://* as specified in the June 30 IPP
121   specification.

122 - Http Chunking. No IPP component being tested will chunk its requests or responses.

123 - Set 1 operations. Any implementations that support the set 1 extensions will use the PWG OP
124   codes. The PWG OP codes are from 0x0C to 0X12 inclusive.

125

126 ## *1.2   Test print files*

127 Where possible a small standard file will be used.

128 ## *1.3   Result processing and documentation*

129 ### 1.3.1 Anonymity

130 The participants of the tests will be aware of the identity of the participants. Any posting or
131 discussion of results will not identify the participants demonstrating the issue at hand. The
132 discussions will focus on issues regarding the IPP specification. The objective is to clarify the
133 specification's language to resolve the issue.

134 ### 1.3.2 Test data collection method

135 Developers of IPP test tools should operate at the IPP application layer. This will simplify the
136 comparison of results. The format of the traces will be test tool specific.   It is recommended that
137 there be an indication of success or failure. The tool should also report expected and received
138 results.

139 Network analyzers are suggested to keep a detailed trace of various tests. All participants are
140 encouraged to bring their favorite.

141 ### 1.3.3 Results determination

142 Humans can determine the results for many of the tests. An IPP Client submitting a job that is
143 printed by an IPP printer would seem to indicate interoperability. We will submit print requests

144   with various attributes. Subsequently we will list the attributes of the job and insure the expected
145   attributes are present.

146   Some clients or tools will allow us to examine the attribute groups, tags, attributes and values.
147   The examination of these may be automated to some extent.

148   If all else fails the network analyzers will allow us to examine the bits on the wire.

149

150   1.3.4 Output

151   **1.3.4.1 Detailed results**

152   The detailed results of the bake-off will be emailed directly to the participants of the test. Some
153   of the detailed results will be made available during the bake-off. All participants are
154   encouraged to make their traces available to interested participants. Implementers of IPP
155   components involved in a test are entitled to the results of the test.

156   **1.3.4.2 Summary of results**

157   A summary of the test results will be circulated among the participants prior to posting on the
158   IPP distribution list. The results will be sanitized of any vendor specific information. The
159   object of the summary results is to give a high level overview of the bake-off results.

160   **1.3.4.3 Issues**

161   Issues will be recorded and tracked by the TES whip or designate.

162   **2   Procedure**

163   After setting up and establishing basic IP connectivity every IPP component will be assigned a
164   designator. The IP address and Ethernet address will be recorded in the table in section 4.1. During
165   each step of the test, each IPP component involved will be recorded.

166   The tests are performed against IPP components. In the tables in section 4 columns marked
167   "supported" indicates the IPP component supports that operation, attribute or attribute value. The
168   columns marked "interoperate" are used to indicate the peer IPP component correctly understands the
169   operation, attribute or attribute value.

170   *2.1   Send request from Client to Printer*

171   For each IPP Printer send a get-printer-attributes request to the Printer to get default response (i.e.
172   no requested attributes or groups). Any IPP Client or Test Tool may be used. The objective of this
173   initial test is basic IPP connectivity. It is preferable to use an independently implemented
174   Client/Test Tool. Use the results of the IPP operation below.

175   2.1.1 Get-printer-attributes

176   Use the test tool and/or a network analyzer and insure the appropriate operational attributes are
177   returned. Record results in section 4.2.1

178 ## 2.1.2 Mandatory operations coverage

179 Check off the operations supported in the table in section 4.2.2.

180 ## 2.1.3 Optional operations coverage

181 Check off the attribute supported in the table in section 4.2.3

182 ## *2.2 Find out the capabilities of the printer*

183 Use the results from 2.1

184 ## 2.2.1 Mandatory printer attributes coverage

185 Check off the attribute supported in the table in section 4.3.1.

186 ## 2.2.2 Optional printer attribute coverage

187 Check off the attributes supported in the table in section 4.3.2
188
189
190 **NOTE: The remainder of the testing should be performed using a**
191 **pair of independent implementations of the IPP protocol.**

192 ## *2.3 Print Job interoperability matrix*

193 Each IPP Client/Test Tool will submit a simple print job to all of the IPP Printers. The attributes in
194 the request will be the entire mandatory attributes and one optional attribute. The mandatory
195 attributes are attributes-charset, attributes-natural-language and printer-uri. The optional attribute
196 will be job-name. For each IPP Client/Test Tool, the results will be recorded in the table in section
197 4.4.
198

199 ## *2.4 Print job validation*

200 This will test the mandatory validate-job operation. Implementations that do not implement
201 validate job can substitute the results from section 2.5 in the table in section 4.5. A note should be
202 made in the table indicating this substitution has bee made.

203 ## 2.4.1 Simple Job

204 Send a validate-job to the printer. Record the job attributes that are being sent. Try various
205 supported attributes. Record combinations in the table in section 4.5 for comparison with the
206 results in section 2.5.1.

207 ## 2.4.2 Unsupported attribute job/best effort

208 Send a validate-job to the printer. The attribute-fidelity attribute should be set to false and/or not
209 included. Record the job attributes that are being sent. Try various unsupported and supported
210 attribute combinations. Record combinations in the table in section 4.5 for comparison with the
211 results in section 2.5.2.

212 ### 2.4.3 Unsupported attribute job/fidelity

213 Send a validate-job to the printer. The attribute-fidelity attribute should be set to true. Record the
214 job attributes that are being sent. Try various unsupported and supported attribute combinations.
215 Record combinations in the table in section 4.5 for comparison with the results in section 2.5.3.

216 ## *2.5   Print jobs submission*

217 This step tests the print-job operation. The results of this test can be checked by the examining the
218 response and performing a subsequent operation as in sections 2.6 and 2.7. List any results that do
219 not match the results from section 2.4 in the table in section 4.6

220 ### 2.5.1 Simple Job

221 Submit some jobs using the print-job operation. Use the attribute combinations used in section
222 2.4.1. If the results do not agree, make a note in section 4.6.

223 ### 2.5.2 Unsupported attribute job/best effort

224 Submit some jobs using the print-job operation. Use the attribute combinations used in section
225 2.4.2. If the results do not agree, make a note in section 4.6.

226 ### 2.5.3 Unsupported attribute job/fidelity

227 Submit some jobs using the print-job operation. Use the attribute combinations used in section
228 2.4.3. If the results do not agree, make a note in section 4.6.

229 ## *2.6   List all the jobs*

230 This will test the get-jobs operation. If job information is not retained once a job is completed the
231 printer should be paused. This may be done with the optional set 1 operation "pause-printer" or
232 by preventing the printer by some other means from processing the job. This test can be done in
233 combination with the section 2.5 to examine the results.   For each job the results from this test
234 should match the results from section 2.7.

235 For this section, submit a job(s) with known attributes.

236 ### 2.6.1 Default

237 The list of jobs should only have the 'job-uri' and 'job-id' attributes. Record results in section 4.7.

238 ### 2.6.2 Requested-attributes: groups

239 The groups to be tested are 'all', 'job-description' and 'job-template'.   Record results in section
240 4.7.

241 ### 2.6.3 Requested-attributes: attributes

242 Pick an attribute that is in every job. Pick an attribute that is not in every job. Record results in
243 section 4.7.

244 ## 2.6.4 Which-jobs

245   List 'completed' and 'not-completed' jobs. Record results in section 4.7.

246 ## 2.6.5 Limit

247   Send a request with the 'limit' set to less than the number of jobs on the printer. Try again with
248   'limit' greater than the number of jobs on the printer. Record results in section 4.7.

249 ## 2.6.6 My-jobs

250   Submit a job from two different users. Each user should then submit a 'get-jobs' request. Record
251   results in section 4.7.

252 ## *2.7   List specific job*

253   This will test the Get-Job-Attributes operation. If job information is not retained once a job is
254   completed the printer should be paused. This may be done with the optional set 1 operation "pause-
255   printer" or by preventing the printer by some other means from processing the job. This test can be
256   done in combination with the section 2.5 to examine the results.   This test should also be done in
257   combination with section 2.6

258   For this section, submit a job(s) with known attributes.

259 ## 2.7.1 Default

260   Send get-jobs-attributes and compare with section **Error! Reference source not found.**. Note
261   that the default behavior of get-jobs-attributes is different from that of get-jobs. Record results in
262   section 4.7.

263 ## *2.8   get-printer-attributes*

264   Test the attribute groups in the get-printer-attributes

265 ## 2.8.1 Default

266   Make sure output is the same as the results for the printer in section 2.1 as listed in the tables in
267   section 4.2

268 ## 2.8.2 All

269   Make sure output is the same as 2.8.1

270 ## 2.8.3 Printer-description

271   Make sure all the printer-description attributes listed in section 4.3 for the target printer are
272   reported. The list of attributes for the target printer may be obtained from performing section 2.2
273   on the Printer. The Printer implementers will have these results. The attribute groupings are listed
274   in section 5.3.

275 ## 2.8.4 Job-template

276   Make sure all the job-template attributes listed in section 4.3 for the target printer are reported.
277   The list of attributes for the target printer may be obtained from performing section 2.2 on the

278   Printer. The Printer implementers will have these results. The attribute groupings are listed in
279   section 5.3.

280 ## *2.9   Cancel a job*

281   The printers tested must have the ability to prevent jobs from being scheduled. This may be
282   accomplished by the Set 1 IPP operations, opening a cover or by other printer specific means.
283   Record the results and behavior in section 4.8

284 ### 2.9.1 Cancel a pending job (owner)

285 ### 2.9.2 Cancel a pending job (not owner)

286 ### 2.9.3 Cancel a completed job

287 ### 2.9.4 Cancel a processing job

288 ## *2.10 Printer State and Status*

289   The objective of this step is to compare the state of printers under various conditions. The get-
290   printer-attributes operation will be used to obtain the printer-state and printer-state-reasons
291   attributes.   The printer-state-reasons attribute is optional. Therefore, it may be unsupported in
292   some implementations.
293   Record the results in section 4.9

294 ### 2.10.1 State of the printer

295

296   Poll the printer before, during and after a job has been processed. The printer-state should be
297   'idle', 'processing' and 'idle' respectively. The printer-state of 'paused' will be tested in section
298   2.10.5.

299 ### 2.10.2 Out of paper

300   Submit a job of a known size to a printer with the input tray(s) empty. The printer-state should be
301   stopped and the printer-state-reasons should be 'media-empty'.
302   Put some paper into the input tray. There should not be enough to complete the job. While the
303   printer is printing, examine the printer-state and printer-state-reasons. The printer-state should be
304   processing and the printer-state-reasons may contain media-low.
305   When the printer runs out of paper, examine the two attributes again. The printer-state should be
306   stopped. The printer-state-reasons may contain media-needed

307 ### 2.10.3 Cover open

308   Open the appropriate covers and doors. The printer-state should move to 'stopped'. The printer-
309   state-reasons may contain 'cover-open' and/or 'door-open'

310 ### 2.10.4 Tray missing

311   Remove an input tray and record the printer-state and printer-state-reasons. The printer-state-
312   reasons may contain 'input-tray-missing'.

313   2.10.5 Pausing a printer

314   If possible, pause the printer. The printer-state should be stopped. The printer-state-reasons may
315   contain paused.

316   2.10.6 Paper jam

317   If possible, cause the printer to jam. The printer-state should be stopped. The printer-state-
318   reasons may contain media-jam.
319

320   *2.11 Operation status code sampling*

321   Below are some statuses codes that will be tested. The list is not all-inclusive. It is intended to
322   touch on some of the important conditions.
323   For each of these scenarios record the status-code in section 4.10. The status-code-message should
324   also be recorded.

325   2.11.1 successful-ok (0x0000)

326   This code should be returned in any of the successful operations performed so far.

327   2.11.2 successful-ok-ignored-or-substituted-attributes (0x0001)

328   This code should have been returned in the test in section 2.4.2 and section 2.5.2.

329   2.11.3 client-error-bad-request (0x0400)

330   Submit a request that is syntactically incorrect.

331   2.11.4 client-error-not-found (0x0406)

332   Submit a get-jobs-attribute request for a job that does not exist.

333   2.11.5 client-error-request-value-too-long (0x0409)

334   Submit a request with an attribute value whose length exceeds the specified maximum.

335   2.11.6 client-error-document-format-not-supported (0x040A)

336   Submit a request specifying a document format not listed in the printer attribute document-format-
337   supported.

338   2.11.7 client-error-attributes-or-values-not-supported (0x040B)

339   Submit a get-printer-attribute request with a requested attribute that is not supported by the printer.
340   The attribute may be an attribute not defined in the IPP model specification. The test should be
341   repeated for an invalid attribute value for a supported attribute.

342   2.11.8 client-error-charset-not-supported (0x040D)

343   Submit a request where the value of the operational attribute attributes-charset is set to an
344   unsupported value. The value may be something other than the valid values from the IPP
345   specification.

346 ## 2.11.9 server-error-operation-not-supported (0x0501)

347   Submit a request with a value in the operation field for a nonexistent operation.

348 ## 2.11.10   server-error-version-not-supported (0x0503)

349   Submit a request with an invalid value for the IPP version.

350 ## *2.12 Printer Contention*

351   Have multiple clients submit print jobs to a single printer. Record the status codes, status code
352   message from the responses. Describe the behavior of the client/printer interactions.   Record in
353   section 4.11
354   Compare the results with other printer contention tests.

355 ## *2.13 Large Jobs*

356   Have a clients submit a large print jobs to several printers. Watch the data flow using a network
357   analyzer. Record the status codes, status code message from the responses. Describe the behavior
358   of the client/printer interactions.   Record in section 4.12
359   Compare the results with other printer contention tests.
360

361

362 # 3   Optional Testing

363
364   If time permits some additional tests may be performed.

365 ## *3.1   Security*

366   Security that is supported by the HTTP layer will be tested for interoperability. The IPP printers
367   participating will all turn on the security mentioned below. The results will be summarized and
368   recorded in section .

369 ### 3.1.1 Basic

370   Turn on basic authentication at the printer. Have the client submit an request. Record the
371   participating components, the operation and the results.

372 ### 3.1.2 Digest

373   Turn on digest authentication at the printer. Have the client submit an request. Record the
374   participating components, the operation and the results.
375

376 ## *3.2   Get-printer-attribute/Document-format Test*

377   Any printer that supports the behavior of returning different printer attributes based on the document-
378   format attribute will be tested. The test will be similar to section 2.2 except the procedure will be
379   repeated for each document-format-supported. Record the results in section 4.14
380

381 **4   Procedure Checklists**

382 *4.1 IPP Components matrix*

383

Section 2 (Procedure)			
ID	**IP Address**	**Ethernet Address**	**URL**
Clients			
CA			
CB			
CC			
CD			
CE			
CF			
CG			
Printers			
PA			
PB			
PC			
PD			
PE			
PF			
PG			
PH			
PI			
PJ			
PK			
PL			
PM			
PN			
PM			
Test Suites			
TS A			
TS B			
TS C			

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384

385

4.2   Checklists for section 2.1

387   4.2.1 Checklist for section 2.1.1

388

Operational attributes				
Printer ID				
Client(s) ID				
Test Tool(s) ID				
Attr ID	**Operational Attribute**	**Group**	**Supported**	**Interoperate**
OA05	version-number	preamble		
OA06	operation-id	preamble		
OA07	request-id	preamble		
OA08	attributes-charset	operational-attribute		
OA09	attributes-natural-language	operational-attribute		
OA10	printer-uri	operational-attribute		
OA14	requesting-user-name	operational-attribute		
OA17	status code	preamble		
OA18	Status-message	operational-attribute		

389

390   4.2.2 Checklist for section 2.1.2

Mandatory Operations		
Printer ID		
Client(s) ID		
Test Tool(s) ID		
Attr ID	**Operation**	**Supported**
OC01	print-job	
OC04	validate-job	
OC05	get-printer-attributes	
OC06	get-jobs	

OC07	get-job-attributes	
OC08	cancel-job	

391 4.2.3 Checklist for section 2.1.3

Optional Operations		
Printer ID		
Client(s) ID		
Test Tool(s) ID		
Attr ID	**Operation**	**Supported**
OC09	print-uri	
OC10	create-job	
OC11	send-document	
OC12	send-uri	
OC13	hold-job	
OC14	release-job	
OC15	pause-printer	
OC16	resume-printer	
OC17	purge-printer	
OC18	reprint-job	

392

393

394

395 *4.3 Checklist for section 2.2*

396 4.3.1 Checklist for section 2.2.1

Mandatory Printer Attributes		
ID	**Attribute**	**Supported**
PD01	printer-uri-supported	
PD01	uri-security-supported	
PD03	printer-name	
PD04	printer-state	
PD05	operations-supported	
PD06	charset-configured	
PD07	charset-supported	
PD08	natural-language-configured	
PD09	generated-natural-language-supported	
PD10	printer-is-accepting-jobs	
PD11	pdl-override-supported	
PD21	document-format-default	
PD22	document-format-supported	
PD12	printer-up-time	

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397   4.3.2 Checklist for section 2.2.2

Optional Printer Attributes		
Attr ID	**Attribute**	**Supported**
PD13	printer-location	
PD14	printer-info	
PD15	printer-more-info	
PD16	printer-driver-installer	
PD17	printer-make-and-model	
PD18	printer-more-info-manufacturer	
PD19	printer-state-reasons	
PD20	printer-state-message	
PD23	queued-job-count	
PD24	printer-message-from-operator	
PD25	color-supported	
PD26	reference-uri-schemes-supported	
PD27	printer-current-time	
PD28	multiple-operation-time-out	
PD29	compression-supported	
PD30	job-k-octets-supported	
PD31	job-impressions-supported	
PD32	job-media-sheets-supported	
JT02	job-priority-default	
JT03	job-priority-supported	
JT05	job-hold-until-default	
JT06	job-hold-until-supported	
JT08	job-sheets-default	
JT09	job-sheets-supported	
JT11	multiple-document-handling-default	
JT12	multiple-document-handling-supported	
JT14	copies-default	
JT15	copies-supported	
JT17	finishings-default	
JT18	finishings-supported	
JT20	page-ranges-supported	
JT22	sides-default	
JT23	sides-supported	
JT25	number-up-default	
JT26	number-up-supported	
JT28	orientation-requested-default	
JT29	orientation-requested-supported	
JT31	media-default	
JT32	media-supported	
JT33	media-ready	
JT35	printer-resolution-default	
JT36	printer-resolution-supported	
JT38	print-quality-default	

Optional Printer Attributes		
Attr ID	Attribute	Supported
JT39	print-quality-supported	

398

399

400

4.4 Checklist for section 2.3

Print Job interoperability matrix

Client/Test Tool ID	Successful Printer ID (s)	Unsuccessful Printer ID (s)

403

404

4.5 Checklist for section 2.4

Print job validation

Test #	Client/ Test Tool ID	Printer ID	Status Code	Requested Attributes	Accepted Attributes	Rejected Attributes
A						
B						
C						
D						
E						
F						
G						
H						
I						
J						
K						
L						
M						
N						
O						

407

408

409   *4.6   Checklist for section 2.5*

410   Print jobs submission

Test #	Description of difference

Test #	Description of difference

411

4.7   Checklist for section 2.6 and 2.7

413   List all the jobs and List specific job

Operation and description	results
List-jobs default	
List-jobs requested-attributes = all	
List-jobs requested-attributes = job-description	
List-jobs requested-attributes = job-template	
List-jobs attribute in every job	
List-jobs attribute not in every job	
List-jobs which-jobs = completed'	
List-jobs which-jobs = not-completed'	
List-jobs limit is less than the number of printer jobs	
List-jobs limit is greater than the number of printer jobs	
List-jobs my-jobs	

414

415

416 ## *4.8   Checklist for section 2.9*

417   Cancel a job

Scenerio	status code	status-message	Describe behavior
Cancel a pending job (owner)			
Cancel a pending job (not owner)			
Cancel a completed job			
Cancel a processing job			

418

419 ## *4.9   Checklist for section 2.10*

420   Printer State and Status

Scenario	Printer-state	Printer-state-reasons	Describe behavior
State of the printer before job			
State of the printer during job			
State of the printer after job			
Out of paper			
Cover open			
Tray missing			
Pausing a printer			
Paper jam			

421

422

4.10 Checklist for section 2.11

Operation status code sampling

status code	status-message	Operation	Description of conditions/behavior
successful-ok (0x0000)			
successful-ok-ignored-or-substituted-attributes (0x0001)			
client-error-bad-request (0x0400)			
client-error-not-found (0x0406)			
client-error-request-value-too-long (0x0409)			
client-error-document-format-not-supported (0x040A)			
client-error-attributes-or-values-not-supported (0x040B)			
client-error-charset-not-supported (0x040D)			
server-error-operation-not-supported (0x0501)			
server-error-version-not-			

status code	status-message	Operation	Description of conditions/behavior
supported (0x0503)			

425 *4.11 Checklist for section 2.12*

426
<center>Printer Contention</center>

status code	status-message	Description of behavior

427

428 *4.12 Checklist for section 2.13*

429
<center>Large Jobs</center>

status code	status-message	Description of behavior

430 *4.13 Checklist for section 3.1*

431
<center>Security</center>

Client ID	Printer ID	Security	Description of results

Client ID	Printer ID	Security	Description of results

432 *4.14 Checklist for section 3.2*

433   Get-printer-attribute/Document-format Test

1st document-format	2nd document-format	Description difference

434

435 **5 Summary Checklists**

436 The purpose of the set of tables in this section is to assign a shorthand ID to all operations, attributes and
437 syntaxes . These tables may also be used during and after the test to document the IPP Model coverage.

438 *5.1 Operation Coverage*

439

ID	Operation	Mandatory	Tested

ID	Operation	Mandatory	Tested
OC01	print-job	Yes	
OC04	validate-job	Yes	
OC05	get-printer-attributes	Yes	
OC06	get-jobs	Yes	
OC07	get-job-attributes	Yes	
OC08	cancel-job	Yes	
OC09	print-uri	No	
OC10	create-job	No	
OC11	send-document	No	
OC12	send-uri	No	
OC13	hold-job	No	
OC14	release-job	No	
OC15	pause-printer	No	
OC16	resume-printer	No	
OC17	purge-printer	No	
OC18	restart-job	No	

440

441   ## 5.2   *Operational Attributes Coverage*

442

Operational Attribute Coverage					
ID	Operational Attribute	Group	Comment	Mandatory	Tested
OA01		job-attribute	Tested by get-jobs	Yes	
OA02		printer-attribute	Tested by get-printer-attributes	Yes	
OA03		unsupported-attributes	Tested by print-job with unsupported attributes	Yes	
OA04		operational-attribute	See OA08 to OAZZ		
OA05	version-number	preamble	Test with any operation	Yes	
OA06	operation-id	preamble	See section 5.1	Yes	
OA07	request-id	preamble	Test with any operation	Yes	
OA08	attributes-charset	operational-attribute	Must support utf-8	Yes	
OA09	attributes-natural-language	operational-attribute	Test imposes en-us requirement	Yes	

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Operational Attribute Coverage					
ID	**Operational Attribute**	**Group**	**Comment**	**Mandatory**	**Tested**
OA10	printer-uri	operational-attribute	This or OA11 must be 3rd attribute	Conditional	
OA11	job-uri	operational-attribute	This or OA10 must be 3rd attribute	Conditional	
OA12	job-id	operational-attribute	This must be 4th attribute	Conditional	
OA13	job-name	operational-attribute	Only for print & validate operations	Optional	
OA14	requesting-user-name	operational-attribute		Optional	
OA15	document-uri	operational-attribute	Only for print-uri	Conditional	
OA16	last-document	operational-attribute	Only for send-uri and send-document	Conditional	
OA17	status code	preamble	Test with any response	Yes	
OA18	status-message	operational-attribute	Test with any response	Optional	
OA19	compression	operational-attribute	Only for print & validate operations	Optional	
OA20	document-natural-language	operational-attribute	Only for print & validate operations	Optional	
OA21	ipp-attribute-fidelity	operational-attribute	Only for print & validate operations	Optional	
OA22	job-impressions	operational-attribute	Only for print & validate operations	Optional	
OA23	job-k-octets	operational-attribute	Only for print & validate operations	Optional	
OA24	job-media-sheets	operational-attribute	Only for print & validate operations	Optional	

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Operational Attribute Coverage					
ID	**Operational Attribute**	**Group**	**Comment**	**Mandatory**	**Tested**
OA25	limit	operational-attribute	Only for get-jobs operations	Optional	
OA26	message	operational-attribute	Only for cancel operations	Optional	
OA27	my-jobs	operational-attribute	Only for get-jobs operations	Optional	
OA28	requested-attributes	operational-attribute	Only for get-* operations	Optional	
OA29	Document-format	operational-attribute	Only for print operations	Optional	
OA30	which-jobs	operational-attribute	Only for get-jobs operations	Optional	

443 ### *5.3 Attribute Coverage*

444 ## 5.3.1 Printer Description

Printer Description				
ID	**Attribute**	**Syntax**	**Mandatory**	**Tested**
PD01	printer-uri-supported	uri	Yes	
PD01	uri-security-supported	1setOf type2 keyword	Yes	
PD03	printer-name	name	Yes	
PD04	printer-state	type1 enum	Yes	
PD05	operations-supported	1setOf type2 enum	Yes	
PD06	charset-configured	charset	Yes	
PD07	charset-supported	1setOf charset	Yes	
PD08	natural-language-configured	naturalLanguage	Yes	
PD09	generated-natural-language-supported	1setOf naturalLanguage	Yes	
PD10	printer-is-accepting-jobs	boolean	Yes	
PD11	pdl-override-supported	type2 keyword	Yes	
PD12	printer-up-time	integer	Yes	
PD13	printer-location	text	No	
PD14	printer-info	text	No	
PD15	printer-more-info	uri	No	
PD16	printer-driver-installer	uri	No	
PD17	printer-make-and-model	text	No	
PD18	printer-more-info-manufacturer	uri	No	
PD19	printer-state-reasons	1setOf type2 keyword	No	
PD20	printer-state-message	text	No	

Printer Description				
ID	**Attribute**	**Syntax**	**Mandatory**	**Tested**
PD21	document-format-default	mimeMediaType	No	
PD22	document-format-supported	1setOf mimeMediaType	No	
PD23	queued-job-count	integer	No	
PD24	printer-message-from-operator	text	No	
PD25	color-supported	boolean	No	
PD26	reference-uri-schemes-supported	1setOf uriScheme	No	
PD27	printer-current-time	dateTime	No	
PD28	multiple-operation-time-out	integer	No	
PD29	compression-supported	1setOf type3 keyword	No	
PD30	job-k-octets-supported	rangeOfInteger	No	
PD31	job-impressions-supported	rangeOfInteger	No	
PD32	job-media-sheets-supported	rangeOfInteger	No	

445

446   ## 5.3.2 Job Template

Job Template				
ID	**Attribute**	**Syntax**	**Mandatory**	**Tested**
JT01	job-priority	integer	No	
JT02	job-priority-default	integer	No	
JT03	job-priority-supported	integer	No	
JT04	job-hold-until	type4 keyword | name	No	
JT05	job-hold-until-default	type4 keyword | name	No	
JT06	job-hold-until-supported	1setOf type4 keyword | name	No	
JT07	job-sheets	type4 keyword | name	No	
JT08	job-sheets-default	type4 keyword | name	No	
JT09	job-sheets-supported	1setOf type4 keyword | name	No	
JT10	multiple-document-handling	type2 keyword	No	
JT11	multiple-document-handling-default	type2 keyword	No	
JT12	multiple-document-handling-supported	1setOf type2 keyword	No	
JT13	copies	integer	No	
JT14	copies-default	integer	No	
JT15	copies-supported	integer	No	
JT16	finishings	1setOf type2 enum	No	

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Job Template				
ID	**Attribute**	**Syntax**	**Mandatory**	**Tested**
JT17	finishings-default	1setOf type2 enum	No	
JT18	finishings-supported	1setOf type2 enum	No	
JT19	page-ranges	1setOf rangeOfInteger	No	
JT20	page-ranges-supported	boolean	No	
JT21	sides	type2 keyword	No	
JT22	sides-default	type2 keyword	No	
JT23	sides-supported	1setOf type2 keyword	No	
JT24	number-up	integer	No	
JT25	number-up-default	integer	No	
JT26	number-up-supported	1setOf integer | rangeOfInteger	No	
JT27	orientation-requested	type2	No	
JT28	orientation-requested-default	type2	No	
JT29	orientation-requested-supported	1setOf type2	No	
JT30	media	type4 keyword | name	No	
JT31	media-default	type4 keyword | name	No	
JT32	media-supported	1setOf type4 keyword | name	No	
JT33	media-ready	1setOf type4 keyword | name	No	
JT34	printer-resolution	resolution	No	
JT35	printer-resolution-default	resolution	No	
JT36	printer-resolution-supported	1setOf resolution	No	
JT37	print-quality	type2 enum	No	
JT38	print-quality-default	type2 enum	No	
JT39	print-quality-supported	1setOf type2 enum	No	

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448 ## 5.3.3 Job Description

Job Description				
ID	**Attribute**	**Syntax**	**Mandatory**	**Tested**
JD01	job-uri	uri	Yes	
JD02	job-id	integer	Yes	
JD03	job-printer-uri	uri	Yes	
JD04	job-name	name	Yes	
JD05	job-originating-user-name	name	Yes	
JD06	job-state	type1 enum	Yes	
JD07	attributes-charset	charset	Yes	
JD08	attributes-natural-language	naturalLanguage	Yes	
JD09	job-more-info	uri	No	
JD10	job-state-reasons	1setOf type2 keyword	No	
JD11	job-state-message	text	No	
JD12	number-of-documents	integer	No	
JD13	output-device-assigned	name	No	
JD14	time-at-creation	integer	No	
JD15	time-at-processing	integer	No	

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Job Description				
ID	**Attribute**	**Syntax**	**Mandatory**	**Tested**
JD16	time-at-completed	integer	No	
JD17	number-of-intervening-jobs	integer	No	
JD18	job-message-from-operator	text	No	
JD19	job-k-octets	integer	No	
JD20	job-impressions	integer	No	
JD21	job-media-sheets	integer	No	
JD22	job-k-octets-processed	integer	No	
JD23	job-impressions-completed	integer	No	
JD24	job-media-sheets-completed	integer	No	

449   ## *5.4 Syntax Coverage*

Syntax Coverage				
ID	**Syntax**	**Attribute**	**Mandatory**	**Tested**
SC01	text	printer-location	No	
SC02	textWithLanguage			
SC03	name	printer-name	Yes	
SC04	nameWithLanguage			
SC05	keyword	pdl-override-supported	Yes	
SC06	enum	printer-state	Yes	
SC07	uri	printer-uri-supported	Yes	
SC08	UriScheme (1 setOf)	reference-uri-schemes-supported	No	
SC09	charset	charset-configured	Yes	
SC10	naturalLanguage	natural-language-configured	Yes	
SC11	mimeMediaType	document-format-default	No	
SC12	octetString			
SC13	boolean	printer-is-accepting-jobs	Yes	
SC14	integer	printer-up-time	Yes	
SC15	rangeOfInteger	job-k-octets-supported	No	
SC16	dateTime	printer-current-time	No	
SC17	resolution	printer-resolution	No	
SC18	1setOf X (1setOf type2 enum)	operations-supported	Yes	

450   # 6 Issues

451   Use this area to record any issues, comments or concerns. The items should relate to the IPP specification
452   or interoperability testing.
453
454   • There is no on-line/off-line.

455   •   Requested attribute groups are not well explained in MOD document

456

457