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# **IPP Test Plan Outline**

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116

117

## 118 **1 General**

### 119 **1.1 Common restrictions for test purposes**

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

- 122 • Security. No authentication, authorization or privacy will be used. There will be a series of test  
123 specifically targeting interoperability of security implementations. The core protocol testing  
124 will eliminate these variables.
- 125 • Character set. We will use the UTF-8 character encoding of ISO646. This will simplify the  
126 comparison of results.
- 127 • Language. We will use en-us. This will simplify the comparison of results.
- 128 • IPP Scheme. The URLs for printers will be [http://\\*](http://*) as specified in the June 30 IPP  
129 specification.
- 130 • Http Chunking. No IPP component being tested will chunk its requests or responses. If time  
131 permits testing of chunking IPP requests and responses will specifically be performed.
- 132 • Set 1 operations. Any implementations that support the set 1 extensions will use the PWG OP  
133 codes. The PWG OP codes are from 0x0C to 0X12 inclusive.
- 134 • HTTP Version 1.1 will be used. If time permits compatibility tests with 1.1 and 1.0  
135 components will be performed.

136

### 137 **1.2 Test print files**

138 Where possible a small standard file will be used.

### 139 **1.3 Result processing and documentation**

#### 140 **1.3.1 Anonymity**

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

#### 145 **1.3.2 Test data collection method**

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

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

### 152 1.3.3 Results determination

153 Humans can determine the results for many of the tests. An IPP Client submitting a job that is  
154 printed by an IPP printer would seem to indicate interoperability. We will submit print requests  
155 with various attributes. Subsequently we will list the attributes of the job and insure the expected  
156 attributes are present.

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

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

160

### 161 1.3.4 Output

#### 162 1.3.4.1 Detailed results

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

#### 167 1.3.4.2 Summary of results

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

#### 171 1.3.4.3 Issues

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

## 173 2 Procedure

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

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

### 181 2.1 *Send request from Client to Printer*

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

186 2.1.1 Get-printer-attributes

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

189 2.1.2 Mandatory operations coverage

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

191 2.1.3 Optional operations coverage

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

193 **2.2 Find out the capabilities of the printer**

194 Use the results from 2.1

195 2.2.1 Mandatory printer attributes coverage

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

197 2.2.2 Optional printer attribute coverage

198 Check off the attributes supported in the table in section 4.3.2

199

200

201 **NOTE: The remainder of the testing should be performed using a**  
202 **pair of independent implementations of the IPP protocol.**

203 **2.3 Print Job interoperability matrix**

204 Each IPP Client/Test Tool will submit a simple print job to all of the IPP Printers. The attributes in  
205 the request will be the entire mandatory attributes and one optional attribute. The mandatory  
206 attributes are attributes-charset, attributes-natural-language and printer-uri. The optional attribute  
207 will be job-name. For each IPP Client/Test Tool, the results will be recorded in the table in section  
208 4.4.  
209

210 **2.4 Print job validation**

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

214 2.4.1 Simple Job

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

## 218 2.4.2 Unsupported attribute job/best effort

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

## 223 2.4.3 Unsupported attribute job/fidelity

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

## 227 2.5 *Print jobs submission*

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

### 231 2.5.1 Simple Job

232 Submit some jobs using the print-job operation. Use the attribute combinations used in section  
233 2.4.1. If the results do not agree, make a note in section 4.6.

### 234 2.5.2 Unsupported attribute job/best effort

235 Submit some jobs using the print-job operation. Use the attribute combinations used in section  
236 2.4.2. If the results do not agree, make a note in section 4.6.

### 237 2.5.3 Unsupported attribute job/fidelity

238 Submit some jobs using the print-job operation. Use the attribute combinations used in section  
239 2.4.3. If the results do not agree, make a note in section 4.6.

## 240 2.6 *List all the jobs*

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

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

### 247 2.6.1 Default

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

### 249 2.6.2 Requested-attributes: groups

250 The groups to be tested are 'all', 'job-description' and 'job-template'. Record results in section  
251 4.7.

252 **2.6.3 Requested-attributes: attributes**

253 Pick an attribute that is in every job. Pick an attribute that is not in every job. Record results in  
254 section 4.7.

255 **2.6.4 Which-jobs**

256 List ‘completed’ and ‘not-completed’ jobs. Record results in section 4.7.

257 **2.6.5 Limit**

258 Send a request with the ‘limit’ set to less than the number of jobs on the printer. Try again with  
259 ‘limit’ greater than the number of jobs on the printer. Record results in section 4.7.

260 **2.6.6 My-jobs**

261 Submit a job from two different users. Each user should then submit a ‘get-jobs’ request. Record  
262 results in section 4.7.

263 **2.7 List specific job**

264 This will test the Get-Job-Attributes operation. If job information is not retained once a job is  
265 completed the printer should be paused. This may be done with the optional set 1 operation “pause-  
266 printer” or by preventing the printer by some other means from processing the job. This test can be  
267 done in combination with the section 2.5 to examine the results. This test should also be done in  
268 combination with section 2.6

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

270 **2.7.1 Default**

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

274 **2.8 get-printer-attributes**

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

276 **2.8.1 Default**

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

279 **2.8.2 All**

280 Make sure output is the same as 2.8.1

281 **2.8.3 Printer-description**

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



## 286 2.8.4 Job-template

287 Make sure all the job-template attributes listed in section 4.3 for the target printer are reported.  
288 The list of attributes for the target printer may be obtained from performing section 2.2 on the  
289 Printer. The Printer implementers will have these results. The attribute groupings are listed in  
290 section 5.3.

## 291 2.9 Cancel a job

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

### 295 2.9.1 Cancel a pending job (owner)

### 296 2.9.2 Cancel a pending job (not owner)

### 297 2.9.3 Cancel a completed job

### 298 2.9.4 Cancel a processing job

## 299 2.10 Printer State and Status

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

### 305 2.10.1 State of the printer

306

307 Poll the printer before, during and after a job has been processed. The printer-state should be  
308 'idle', 'processing' and 'idle' respectively. The printer-state of 'paused' will be tested in section  
309 2.10.5.

### 310 2.10.2 Out of paper

311 Submit a job of a known size to a printer with the input tray(s) empty. The printer-state should be  
312 stopped and the printer-state-reasons should be 'media-empty'.

313 Put some paper into the input tray. There should not be enough to complete the job. While the  
314 printer is printing, examine the printer-state and printer-state-reasons. The printer-state should be  
315 processing and the printer-state-reasons may contain media-low.

316 When the printer runs out of paper, examine the two attributes again. The printer-state should be  
317 stopped. The printer-state-reasons may contain media-needed

### 318 2.10.3 Cover open

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

#### 321 2.10.4 Tray missing

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

#### 324 2.10.5 Pausing a printer

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

#### 327 2.10.6 Paper jam

328 If possible, cause the printer to jam. The printer-state should be stopped. The printer-state-  
329 reasons may contain media-jam.  
330

### 331 **2.11 Operation status code sampling**

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

#### 336 2.11.1 successful-ok (0x0000)

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

#### 338 2.11.2 successful-ok-ignored-or-substituted-attributes (0x0001)

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

#### 340 2.11.3 client-error-bad-request (0x0400)

341 Submit a request that is syntactically incorrect.

#### 342 2.11.4 client-error-not-found (0x0406)

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

#### 344 2.11.5 client-error-request-value-too-long (0x0409)

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

#### 346 2.11.6 client-error-document-format-not-supported (0x040A)

347 Submit a request specifying a document format not listed in the printer attribute document-format-  
348 supported.

#### 349 2.11.7 client-error-attributes-or-values-not-supported (0x040B)

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

353 **2.11.8 client-error-charset-not-supported (0x040D)**

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

357 **2.11.9 server-error-operation-not-supported (0x0501)**

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

359 **2.11.10 server-error-version-not-supported (0x0503)**

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

361 **2.12 Printer Contention**

362           Have multiple clients submit print jobs to a single printer. Record the status codes, status code  
363           message from the responses. Describe the behavior of the client/printer interactions. Record in  
364           section 4.11

365           Compare the results with other printer contention tests.

366 **2.13 Large Jobs**

367           Have a clients submit a large print jobs to several printers. Watch the data flow using a network  
368           analyzer. Record the status codes, status code message from the responses. Describe the behavior  
369           of the client/printer interactions. Record in section 4.12

370           Compare the results with other printer contention tests.

371

372

373 **3 Optional Testing**

374

375           If time permits some additional tests may be performed.

376 **3.1 Security**

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

380 **3.1.1 Basic**

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

383 **3.1.2 Digest**

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

386

387 **3.2 Get-printer-attribute/Document-format Test**

388 Any printer that supports the behavior of returning different printer attributes based on the document-  
 389 format attribute will be tested. The test will be similar to section 2.2 except the procedure will be  
 390 repeated for each document-format-supported. Record the results in section 4.14  
 391

392 **3.3 Chunking Request/Response Test**

393 Select Clients and Printers that support chunking. Try operations that will cause the client to chunk a  
 394 request and record the results. Try operations that will cause the Printer to chunk a response and  
 395 record the results. Record the results in section 4.15.  
 396

397 **3.4 HTTP version compatibility Test**

398 Select Clients and Printers that use different versions of HTTP. Record the results of their  
 399 interactions. Record the results in section 4.16  
 400  
 401

402 **4 Procedure Checklists**

403 **4.1 IPP Components matrix**

404

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			

405

406

407 **4.2 Checklists for section 2.1**

408 4.2.1 Checklist for section 2.1.1

409

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		

<b>Operational attributes</b>				
<b>Printer ID</b>				
<b>Client(s) ID</b>				
<b>Test Tool(s) ID</b>				
<b>Attr ID</b>	<b>Operational Attribute</b>	<b>Group</b>	<b>Supported</b>	<b>Interoperate</b>
OA14	requesting-user-name	operational-attribute		
OA17	status code	preamble		
OA18	Status-message	operational-attribute		

410

## 411 4.2.2 Checklist for section 2.1.2

<b>Mandatory Operations</b>		
<b>Printer ID</b>		
<b>Client(s) ID</b>		
<b>Test Tool(s) ID</b>		
<b>Attr ID</b>	<b>Operation</b>	<b>Supported</b>
OC01	print-job	
OC04	validate-job	
OC05	get-printer-attributes	
OC06	get-jobs	
OC07	get-job-attributes	
OC08	cancel-job	

## 412 4.2.3 Checklist for section 2.1.3

<b>Optional Operations</b>		
<b>Printer ID</b>		
<b>Client(s) ID</b>		
<b>Test Tool(s) ID</b>		
<b>Attr ID</b>	<b>Operation</b>	<b>Supported</b>
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	

<b>Optional Operations</b>		
OC18	reprint-job	

413

414

415

416 **4.3 Checklist for section 2.2**

## 417 4.3.1 Checklist for section 2.2.1

<b>Mandatory Printer Attributes</b>		
<b>ID</b>	<b>Attribute</b>	<b>Supported</b>
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	

## 418 4.3.2 Checklist for section 2.2.2

<b>Optional Printer Attributes</b>		
<b>Attr ID</b>	<b>Attribute</b>	<b>Supported</b>
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	

<b>Optional Printer Attributes</b>		
<b>Attr ID</b>	<b>Attribute</b>	<b>Supported</b>
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	
JT39	print-quality-supported	

419

420

421

422 **4.4 Checklist for section 2.3**

423

Print Job interoperability matrix

<b>Client/Test Tool ID</b>	<b>Successful Printer ID (s)</b>	<b>Unsuccessful Printer ID (s)</b>







433 **4.7 Checklist for section 2.6 and 2.7**

434 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	

435

436

437 **4.8 Checklist for section 2.9**

438 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			

Scenerio	status code	status-message	Describe behavior
Cancel a processing job			

439

440 **4.9 Checklist for section 2.10**

441 **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			

442

443

444 **4.10 Checklist for section 2.11**

445 **Operation status code sampling**

status code	status-message	Operation	Description of conditions/behavior
successful-ok (0x0000)			
successful-ok-ignored-or-substituted-			

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

446 **4.11 Checklist for section 2.12**

447 Printer Contention

status code	status-message	Description of behavior

448

449 **4.12 Checklist for section 2.13**

450 Large Jobs

status code	status-message	Description of behavior

451 **4.13 Checklist for section 3.1**

452 Security

Client ID	Printer ID	Security	Description of results

453 **4.14 Checklist for section 3.2**

454 Get-printer-attribute/Document-format Test

1 <sup>st</sup> document-format	2nd document-format	Description difference

455 **4.15 Checklist for section 3.3**

456 Chunking Request/Response Test

Component IDs	Ids of components that support chunking	Describe results

457 **4.16 Checklist for section 3.4**

458 HTTP version compatibility Test

Client ID & HTTP Version	Printer ID & HTTP Version	Describe results

459

460

461 **5 Summary Checklists**

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

464 **5.1 Operation Coverage**

465

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	



466

467 **5.2 Operational Attributes Coverage**

468

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	
OA10	printer-uri	operational- attribute	This or OA11 must be 3 <sup>rd</sup> attribute	Conditional	
OA11	job-uri	operational- attribute	This or OA10 must be 3 <sup>rd</sup> attribute	Conditional	
OA12	job-id	operational- attribute	This must be 4 <sup>th</sup> 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	

<b>Operational Attribute Coverage</b>					
<b>ID</b>	<b>Operational Attribute</b>	<b>Group</b>	<b>Comment</b>	<b>Mandatory</b>	<b>Tested</b>
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	
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	

469 **5.3 Attribute Coverage**470 **5.3.1 Printer Description**

<b>Printer Description</b>				
<b>ID</b>	<b>Attribute</b>	<b>Syntax</b>	<b>Mandatory</b>	<b>Tested</b>
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	
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	

471

## 472 5.3.2 Job Template

<b>Job Template</b>				
<b>ID</b>	<b>Attribute</b>	<b>Syntax</b>	<b>Mandatory</b>	<b>Tested</b>
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	1 setOf type4 keyword   name	No	
JT07	job-sheets	type4 keyword   name	No	
JT08	job-sheets-default	type4 keyword   name	No	
JT09	job-sheets-supported	1 setOf type4 keyword   name	No	
JT10	multiple-document- handling	type2 keyword	No	
JT11	multiple-document- handling-default	type2 keyword	No	
JT12	multiple-document- handling-supported	1 setOf type2 keyword	No	
JT13	copies	integer	No	
JT14	copies-default	integer	No	
JT15	copies-supported	integer	No	
JT16	finishings	1 setOf type2 enum	No	
JT17	finishings-default	1 setOf type2 enum	No	
JT18	finishings-supported	1 setOf type2 enum	No	
JT19	page-ranges	1 setOf rangeOfInteger	No	
JT20	page-ranges-supported	boolean	No	
JT21	sides	type2 keyword	No	
JT22	sides-default	type2 keyword	No	
JT23	sides-supported	1 setOf type2 keyword	No	
JT24	number-up	integer	No	
JT25	number-up-default	integer	No	
JT26	number-up-supported	1 setOf integer   rangeOfInteger	No	
JT27	orientation-requested	type2	No	
JT28	orientation-requested- default	type2	No	
JT29	orientation-requested- supported	1 setOf type2	No	
JT30	media	type4 keyword   name	No	
JT31	media-default	type4 keyword   name	No	
JT32	media-supported	1 setOf type4 keyword   name	No	
JT33	media-ready	1 setOf type4 keyword   name	No	

<b>Job Template</b>				
<b>ID</b>	<b>Attribute</b>	<b>Syntax</b>	<b>Mandatory</b>	<b>Tested</b>
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	

473

## 474 5.3.3 Job Description

<b>Job Description</b>				
<b>ID</b>	<b>Attribute</b>	<b>Syntax</b>	<b>Mandatory</b>	<b>Tested</b>
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	
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	

## 475 5.4 Syntax Coverage

<b>Syntax Coverage</b>				
<b>ID</b>	<b>Syntax</b>	<b>Attribute</b>	<b>Mandatory</b>	<b>Tested</b>
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	

## 476 6 Issues

477 Use this area to record any issues, comments or concerns. The items should relate to the IPP specification  
 478 or interoperability testing.

479

480

- There is no on-line/off-line.

481

- Requested attribute groups are not well explained in MOD document

482

483