



November 3, 2017
IPP Registration

The Printer Working Group

1 **IPP Get-User-Printer-Attributes**
2 **(GUPA)**

3 Status: Stable

4 Abstract: This registration defines the Get-User-Printer-Attributes IPP operation, which
5 allows an IPP Client to retrieve the Printer's attributes and capabilities that are available
6 specifically to the Client's most authenticated User.

7 This document is available electronically at:

8 <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wd-ippgupa-20171103.odt>
9 <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wd-ippgupa-20171103.pdf>

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11 Title: *IPP Get-User-Printer-Attributes (GUPA)*

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58 **1 Introduction**

59 This IPP Registration defines the Get-User-Printer-Attributes IPP operation, which allows
60 an IPP Client to retrieve the Printer's attributes and capabilities that are available
61 specifically to the Client's most authenticated User. It is semantically analogous to the
62 existing Get-Printer-Attributes IPP operation [RFC8011], with the key difference that the
63 Printer could respond with an authentication challenge.

64 **2 Terminology**

65 **2.1 Protocol Roles Terminology**

66 This document defines the following protocol roles in order to specify unambiguous
67 conformance requirements:

68 *Client*: Initiator of outgoing IPP session requests and sender of outgoing IPP operation
69 requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] User Agent).

70 *Printer*: Listener for incoming IPP session requests and receiver of incoming IPP operation
71 requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] Server) that represents one
72 or more Physical Devices or a Logical Device.

73 **2.2 Other Terms Used in This Document**

74 *User*: A person or automata using a Client to communicate with a Printer.

75 **2.3 Acronyms and Organizations**

76 *IANA*: Internet Assigned Numbers Authority, <http://www.iana.org/>

77 *IETF*: Internet Engineering Task Force, <http://www.ietf.org/>

78 *ISO*: International Organization for Standardization, <http://www.iso.org/>

79 *PWG*: Printer Working Group, <http://www.pwg.org/>

80 **3 Requirements**

81 **3.1 Rationale**

82 While there are many proprietary print policy solutions that provide a way to specify
83 allowed or disallowed features according to individual users, systems, applications, and so
84 forth, there is no established standard method using IPP. IPP ecosystems would benefit
85 from having such a print policy method to better support systems such as IPP
86 Everywhere™ [PWG5100.14] in print infrastructures provided by public print providers,
87 enterprises or university settings.

88 Technical justification for pursuing the creation of a new IPP operation rather than reusing
89 or overloading existing operations such as Get-Printer-Attributes is discussed in section 4.

90 **3.2 Use Cases**

91 The need for solutions to these use cases emerged during the process of writing the IPP
92 Implementor's Guide v2 [PWG5100.19].

93 **3.2.1 Print Policy For Some Users Limits Print Capabilities**

94 Sue wants to print her report on her department's workgroup printer. She wants to print it in
95 color to make the color graphs look best. However, she has abused her printing privileges,
96 so her department head has instructed the network administrator to restrict her user
97 account's ability to print in color.

98 Sue opens the document on her laptop, chooses to print, and selects the department's
99 workgroup printer. The Printer authenticates the laptop using Sue's credentials, and then
100 provides the laptop with the print choices available for Sue's account, which does not
101 include color printing. Sue decides whether to print it in black-and-white anyway or to print
102 from one of the campus print centers, where she can pay to print in color.

103 Bob is an associate professor in the same department as Sue. His account has no
104 limitations for color printing. He opens a document on his tablet, taps to print, and selects
105 the department's workgroup printer. His tablet presents print options including the option of
106 printing in color. Bob chooses to print in color, and prints his document, which prints in
107 color as he expects.

108 Figure 3.1 illustrates this use case with a sequence diagram.

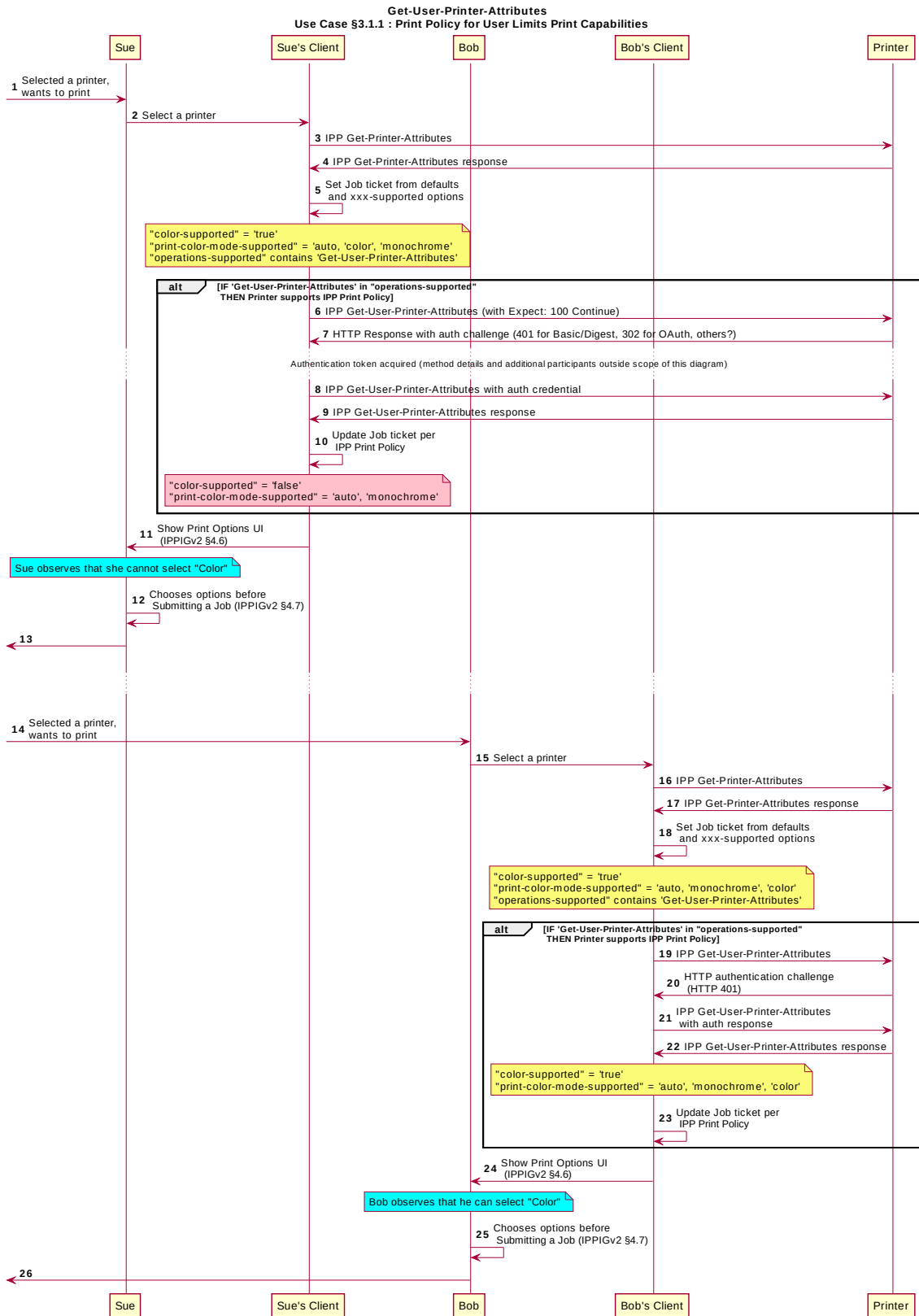


Figure 3.1 : Use Case 3.1.1 Sequence Diagram

109 3.2.2 User Not Listed in Print Policy Denied Ability to Print in Color

110 In this use case, a user who is not named in the print policy system is denied the ability to
111 print using existing conventional IPP print protocol use. The Client might implement
112 support for IPP Print Policy but authentication could fail, or the Client might have not
113 implemented support for IPP Print Policy.

114 Duncan is at the office and needs to print a 5 page report that contains color diagrams
115 before his next meeting. His office user account has been granted permission by his office
116 network administrator to print in color. Duncan opens the document on his tablet, taps to
117 print, and selects the desired Printer. The tablet fetches the Printer's default capabilities,
118 and then authenticates using Duncan's user account to retrieve the print options available
119 to him as per his account's print policy, including the option to print in color or
120 monochrome. He prints the document using the color option, retrieves the hardcopy from
121 the printer, and then goes on to his meeting.

122 Ed is visiting Duncan's office and needs to print a 3 page document. Ed is not listed as a
123 user in the print policy. Ed opens the document on his laptop, clicks to print, and selects
124 the Printer Duncan pointed out to him. The laptop does not support print policies or does
125 but has no valid credentials. The Printer provides Ed's laptop with the default print
126 capabilities. When the Job is submitted to the Printer, the Printer rejects the Job or
127 identifies the setting that were adjusted, since unknown users don't have the right to print
128 in color on this printer.

129 Figure 3.2 illustrates this use case with a sequence diagram.

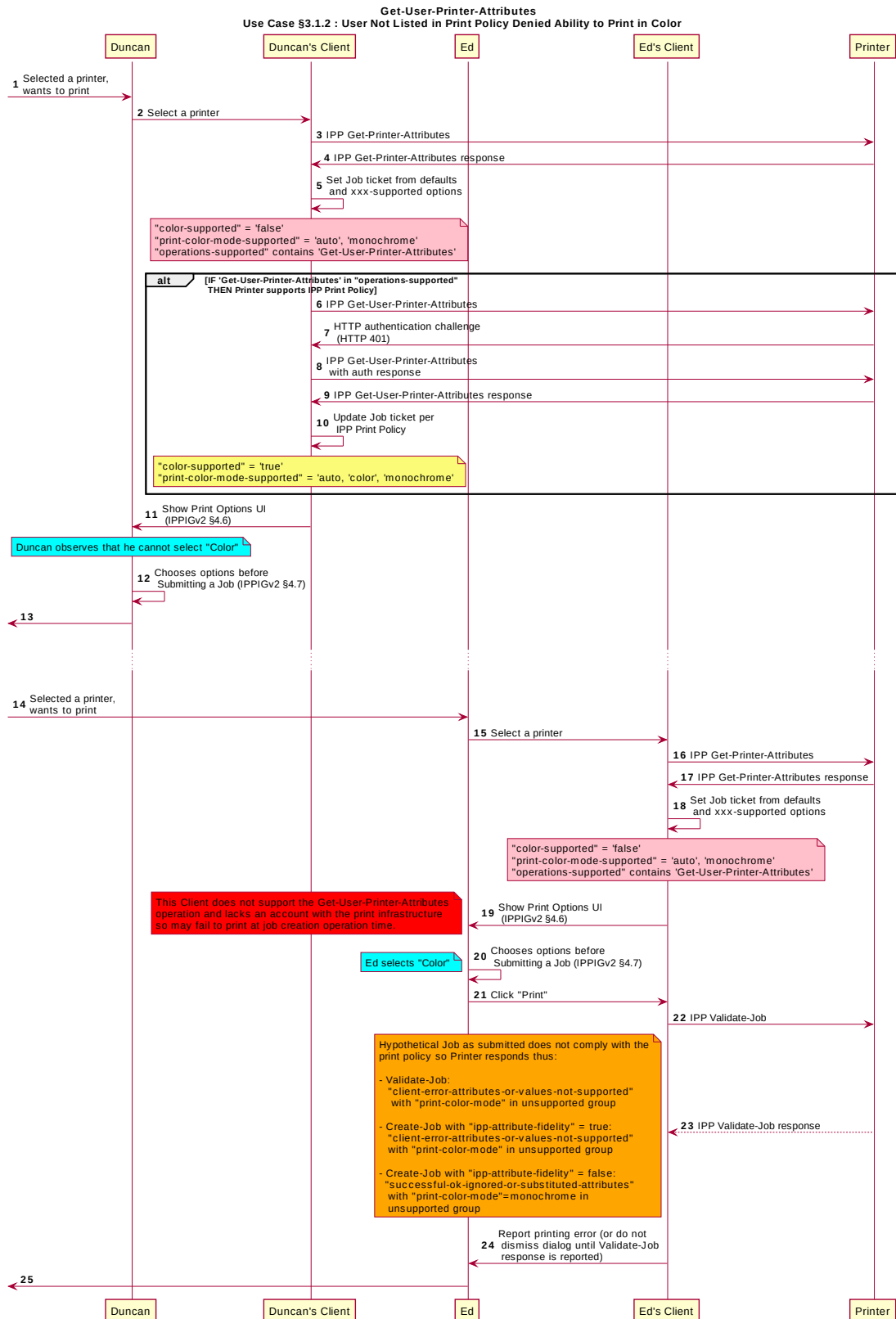


Figure 3.2 : Use Case 3.1.2 Sequence Diagram

130 **3.3 Exceptions**

131 There are no exceptions to the use cases in section 3.2.

132 **3.4 Out of Scope**

133 The following are considered out of scope for this document:

- 134 1. Definition of specific print policies.
- 135 2. Definition of how print policy management systems structure and/or organize the
- 136 sets of users and their policies.
- 137 3. Definition of non-IPP protocols that can provide similar functionality.

138 **3.5 Design Requirements**

139 The design requirements for this registration are:

- 140 1. Define an IPP operation to allow a Client to obtain supported Printer capabilities
- 141 for a given User.
- 142 2. Document interoperability requirements for Clients and Printers.
- 143 3. Define security requirements necessary to support the newly defined operations.
- 144 4. Define sections to register all attributes, values, and operations with IANA.

145 The design recommendations for this document are:

- 146 1. Recommend suitable authentication methods and guidelines for the use of those
- 147 methods and provide guidance for Client user interfaces.

148 **4 Get-User-Printer-Attributes Operation**

149 The Get-User-Printer-Attributes operation is semantically analogous to the Get-Printer-
150 Attributes operation [RFC8011] but can be authenticated and the response can be filtered
151 based on the most authenticated user. The Client MUST be prepared to handle an HTTP
152 authentication challenge in response to a Get-User-Printer-Attributes operation request. If
153 the Client initiates the Get-User-Printer-Attributes operation over a non-TLS connection,
154 the Client MUST be prepared to receive an HTTP 426 response to upgrade the connection
155 to TLS [RFC2817]. See [RFC8010] and [RFC8011] for authentication methods that require
156 a secure channel.

157 A Printer MUST support all the same operation attributes for a Get-User-Printer-Attributes
158 operation that it supports with a Get-Printer-Attributes operation, including those used by a
159 Client to request a filtered response: “document-format” [RFC8011]; “first-index”
160 [PWG5100.13]; “limit” [PWG5100.13]; and any of the attributes named by “printer-get-
161 attributes-supported” [PWG5100.13].

162 4.1.1.1 Get-User-Printer-Attributes Request

163 The following groups of attributes are supplied as part of the Get-User-Printer-Attributes
164 request:

165 Group 1: Operation Attributes

166 "attributes-charset" (charset) and
167 "attributes-natural-language" (naturalLanguage) :

168 As described in [RFC8011] Section 4.1.4.1. The Client MUST supply and the
169 Printer MUST support both of these attributes.

170 "printer-uri" (uri) :

171 The Client MUST supply and the Printer MUST support this attribute, which is
172 the target for this operation as described in [RFC8011] Section 4.1.5.

173 "requesting-user-name" (name(MAX)) :

174 The Client MUST supply and the Printer MUST support this attribute, as
175 described in [RFC8011] Section 9.3.

176 "requesting-user-uri" (uri) :

177 The Client SHOULD supply and the Printer MUST support this attribute, as
178 described in [PWG5100.13] section 5.1.6.

179 "requesting-user-vcard" (1setOf text(MAX)) :

180 The Client SHOULD supply and the Printer MUST support this attribute, as
181 described in [PWG5100.SYSTEM] section 7.1.6.

182 "requested-attributes" (1setOf keyword):

183 The "requested-attributes" (1setOf keyword) attribute MAY be supplied by the
184 Client and MUST be supported by the Printer as described in [RFC8011]
185 Section 4.2.5.1.

186 "document-format" (mimeMediaType):

187 The "document-format" (mimeMediaType) attribute SHOULD be supplied by
188 the Client as described in [RFC8011] Section 4.2.5.1.

189 4.1.1.2 Get-User-Printer-Attributes Response

190 The Printer returns the following sets of attributes as part of the Get-User-Printer-Attributes
191 response:

192 Group 1: Operation Attributes

193 "attributes-charset" (charset) and
194 "attributes-natural-language" (naturalLanguage) :

195 As described in [RFC8011] Section 4.1.4.1. The Client MUST supply and the
196 Printer MUST support both of these attributes.

197 Status Message:

198 In addition to the REQUIRED status-code returned in every response, the
199 response MAY include a "status-message" (text(255)) and/or a "detailed-
200 status-message" (text(MAX)) operation attribute as described in [RFC8011]
201 Appendix B and Section 4.1.6.

202 Group 2: Unsupported Attributes

203 See [RFC8011] Section 4.1.7 for details on returning unsupported attributes.

204 Group 3: Printer Attributes

205 This is the set of requested attributes and their current values. See [RFC8011]
206 Section 4.2.5.2 for details.

207 5 Conformance Requirements

208 5.1 Printer Conformance Requirements

209 In order for a Printer to claim conformance to this document, a Printer MUST support:

- 210 1. The Get-User-Printer-Attributes operation as defined in section 4.

211 5.2 Client Conformance Requirements

212 In order for a Client to claim conformance to this document, a Client MUST support:

- 213 1. The Get-User-Printer-Attributes operation as defined in section 4.

214 6 Internationalization Considerations

215 For interoperability and basic support for multiple languages, conforming implementations
216 MUST support the Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
217 [RFC3629] encoding of Unicode [UNICODE] [ISO10646] and the Unicode Format for
218 Network Interchange [RFC5198].

219 Implementations of this specification SHOULD conform to the following standards on
220 processing of human-readable Unicode text strings, see:

- 221 • Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 222 • Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 223 • Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 224 • Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 225 • Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 226 • Unicode Collation Algorithm [UTS10] – sorting
- 227 • Unicode Locale Data Markup Language [UTS35] – locale databases

228 Implementations of this specification are advised to also review the following informational
229 documents on processing of human-readable Unicode text strings:

- 230 • Unicode Character Encoding Model [UTR17] – multi-layer character model
- 231 • Unicode in XML and other Markup Languages [UTR20] – XML usage
- 232 • Unicode Character Property Model [UTR23] – character properties
- 233 • Unicode Conformance Model [UTR33] – Unicode conformance basis

234 **7 Security Considerations**

235 The security considerations for the Get-User-Printer-Attributes operation build upon those
236 defined for IPP/1.1 [RFC8011] and IPP/2.0 [PWG5100.12] for the Validate-Job, Create-Job
237 and Print-Job operations. Additionally, a Printer MUST NOT send a Get-User-Printer-
238 Attributes response over a non-TLS connection for authentication methods that require a
239 secure channel, as defined in [RFC8010] and [RFC8011].

240 **7.1 Human-readable Strings**

241 Implementations of this specification SHOULD conform to the following standard on
242 processing of human-readable Unicode text strings, see:

- 243 • Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

244 Implementations of this specification are advised to also review the following informational
245 document on processing of human-readable Unicode text strings:

- 246 • Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

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319 standard:

320 Mike Sweet – Apple Inc.
321 Ira McDonald – High North Inc.

322 **10 Change History**

323 **10.1 November 3, 2017**

324 Updated with changes reported during last call.

- 325 • Broken link to section 4 in section 3.1
- 326 • Changed wording to eliminate instances of passive voice

327 **10.2 October 16, 2017**

328 Updated as per feedback from IPP WG review in conference call on 2017-10-12 in
329 preparation for editorial review and last call.

- 330 • Renamed and adopted new acronym
- 331 • Refactored section 4 editorially
- 332 • Added mention of “first-index” and “limit” filtering attributes
- 333 • Added “Conformance Requirements” section
- 334 • Removed “Table Index” since there are no tables

335 **10.3 October 10, 2017**

336 Updated as per feedback from IPP WG reflector posting from Apple, including editorial
337 changes to comply with the new IPP Registration template.

338 **10.4 August 17, 2017**

339 Updated as per feedback from August 2017 IPP WG vF2F meeting minutes:

- 340 • Removed section 4
- 341 • Rewrote portions of now section 4 “Get-User-Printer-Attributes” definition and
342 restructured presentation of list of attributes in request and response sub-sections
343 for Get-User-Printer-Attributes definition
- 344 • Relabeled document to be “IPP Registration” instead of “White Paper”

345 10.5 August 1, 2017

346 Updated as per feedback from July 20, 2017 IPP WG meeting minutes and feedback:

- 347 • Added sub-sections for the Get-User-Printer-Attributes request and response,
348 leveraging text from RFC 8011 and 5100.SYSTEM
- 349 • Updated Internationalization section to use Unicode 10 and added a bunch of
350 references.
- 351 • Updated references to add System, and full standard of IPP/2.0 (5100.12)
- 352 • Other editorial fixes

353 10.6 May 24, 2017

354 Updated as per feedback from May 2017 F2F review.

- 355 • Removed previous use cases 3.1.2-3.1.5; renamed 3.1.6 to be new 3.1.2, with
356 updated sequence diagram that includes Validate-Job / Create-Job response.
- 357 • Removed section 6 – no new IPP attributes need to be defined as of this draft.

358 10.7 April 18, 2017

- 359 • Updated and clarified the description in section 4 “Technical Solutions/Approaches”
360 to explain with more detail why it is not practical to use the venerable Get-Printer-
361 Attributes operation for the task of conveying print policies.

362 10.8 April 4, 2017

- 363 • Updated with new and elaborated use cases and accompanying sequence
364 diagrams to better articulate the breadth of the problem space.

365 10.9 February 1, 2017

- 366 • Editorial changes.

367 10.10 January 30, 2017

- 368 • Initial draft.