



October 10, 2017
IPP Registration

The Printer Working Group

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

3 Status: ~~Stable~~Interim

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 ~~Abstract: This document proposes a new Get-User-Printer-Attributes IPP operation that~~
8 ~~allows an IPP Client to retrieve the Printer's attributes and capabilities that are available~~
9 ~~specifically to the Client's most authenticated User.~~

10 ~~This document is a White Paper. For a definition of a "White Paper", see:~~
11 ~~<http://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf>~~

12 This document is available electronically at:

13 ~~<https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-userop-20171010.odt>~~

14 ~~<https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-userop-20170817.odt>~~

15 ~~<https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-userop-20171010.pdf>~~

16 ~~<https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-userop-20170817.pdf>~~

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18 Title: *IPP Get-User-Printer-Attributes (USEROP)*

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63 1 Introduction

64 This document defines the Get-User-Printer-Attributes IPP operation, which allows an IPP
65 Client to retrieve the Printer's attributes and capabilities that are available specifically to the
66 Client's most authenticated User. It is semantically analogous to the existing Get-Printer-
67 Attributes IPP operation [RFC8011], with the key difference that the Printer could respond
68 with an authentication challenge.

69 This document proposes a new Get-User-Printer-Attributes IPP operation that allows an
70 IPP Client to retrieve the Printer's settings that are available to the Client's current User. It
71 is semantically identical to the existing Get-Printer-Attributes IPP operation [RFC8011],
72 with the key difference that the Printer will always respond with an authentication
73 challenge. Once the Client has authenticated using the User's credentials, the Printer will
74 respond with the settings for that user.

75 Terminology

76 1.1 Protocol Roles Terminology

77 This document defines the following protocol roles in order to specify unambiguous
78 conformance requirements:

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

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

84 1.2 Other Terms Used in This Document

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

86 1.3 Acronyms and Organizations

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

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

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

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

91 | **2 Requirements for IPP Get-User-Printer-Attributes**

92 | **2.1 Rationale for IPP Get-User-Printer-Attributes**

93 While there are many solutions, both standard and non-standard, for creating print policies
94 that provide a way to specify allowed or disallowed features according to individual users,
95 systems, applications, and so forth, there is no established method ~~using that is in-band of~~
96 IPP. Having a print policy method using IPP would better support systems such as IPP
97 Everywhere [PWG5100.14] in print infrastructures provided by public print providers,
98 enterprises or educational environments such as university settings.

99 Technical justification for pursuing the creation of a new IPP operation rather than reusing
100 or overloading existing operations such as Get-Printer-Attributes is discussed in section 3.

101 | **2.2 Use Cases**

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

104 | **2.2.1 Print Policy For Some Users Limits Print Capabilities**

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

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

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

119 Figure 2.1 illustrates this use case with a sequence diagram.

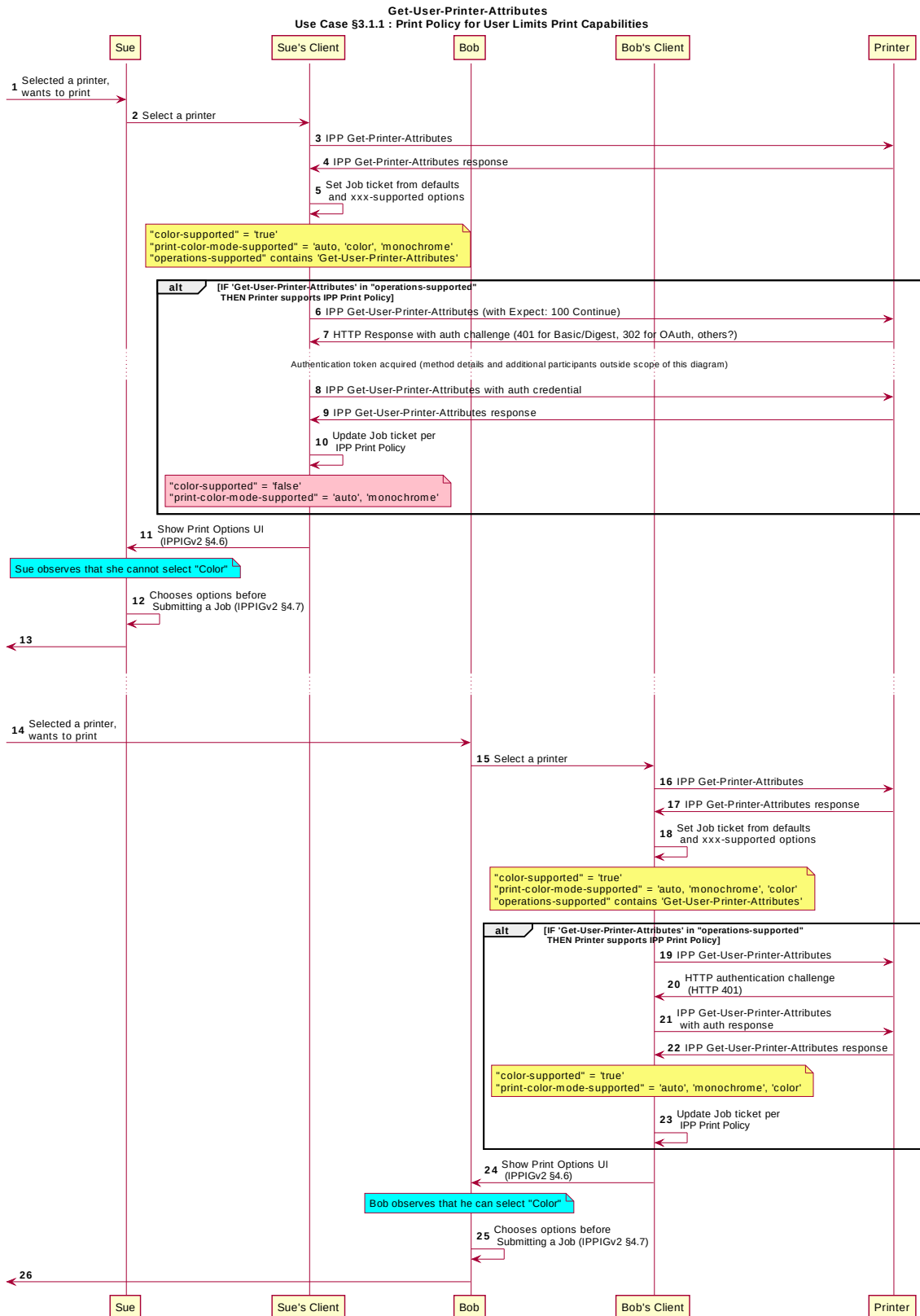


Figure 2.1 : Use Case 3.1.1 Sequence Diagram

120 **2.2.2 User Not Listed in Print Policy Denied Ability to Print in Color**

121 In this use case, a user who is not named in the print policy system is denied the ability to
122 print using existing conventional IPP print protocol use. The Client may implement support
123 for IPP Print Policy but authentication may fail, or the Client may have not implemented
124 support for IPP Print Policy.

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

133 Ed is visiting Duncan's office and needs to print a 3 page document. Ed is not listed as a
134 user in the print policy. Ed opens the document on his laptop, clicks to print, and selects
135 the Printer recommended by Duncan. The laptop does not support print policies or does
136 but has no valid credentials. The Printer provides Ed's laptop with the default print
137 capabilities. When the Job is submitted to the Printer, the Printer rejects the Job or
138 identifies the setting that were adjusted, since unknown users don't have the right to print
139 in color on this printer.

140 Figure 2.2 illustrates this use case with a sequence diagram.

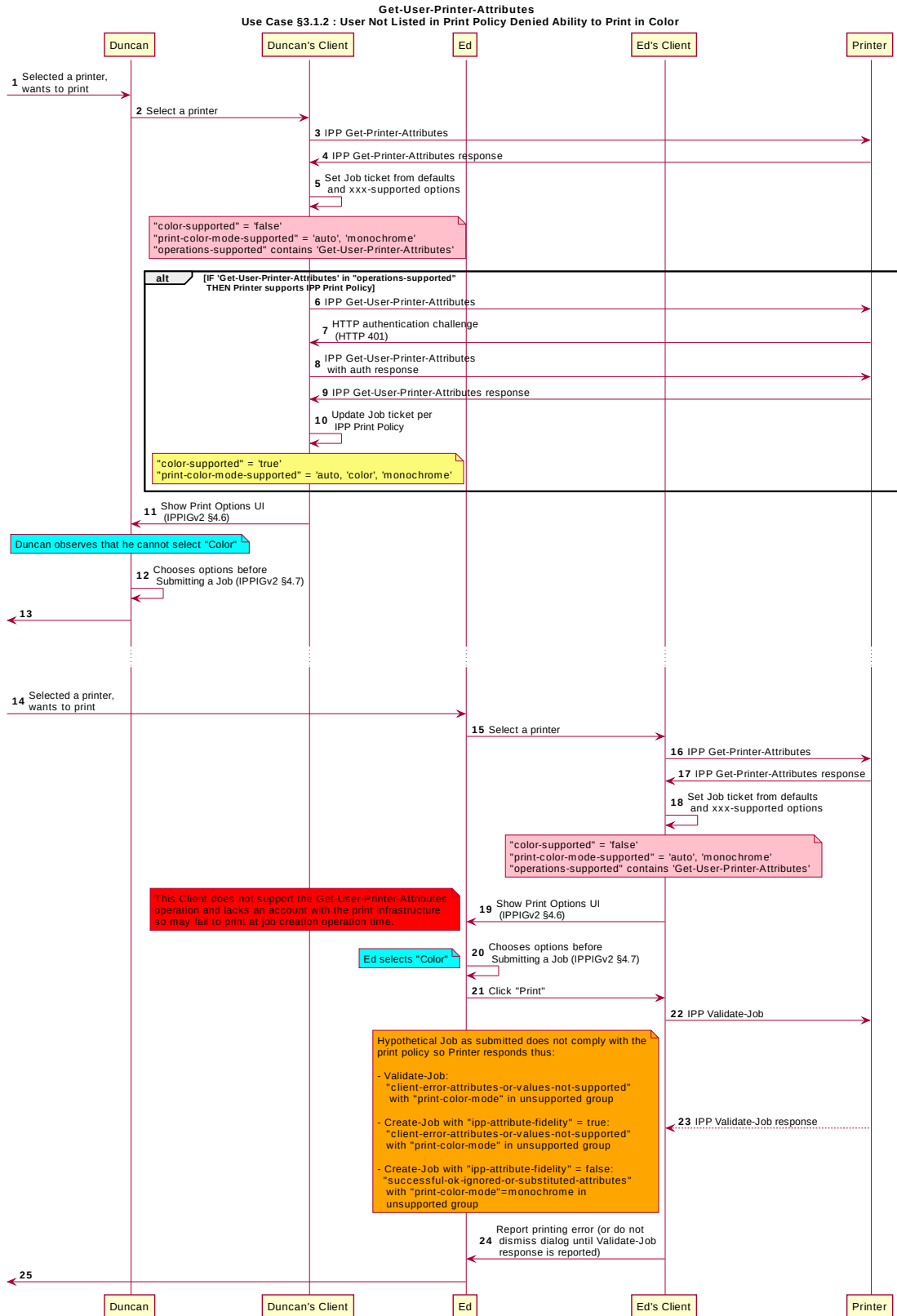


Figure 2.2 : Use Case 3.1.2 Sequence Diagram

141 2.3 Exceptions

142 There are no exceptions to the use cases in section 2.2.

143 2.4 Out of Scope

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

- 145 1. Definition of specific print policies.
- 146 2. Definition of how print policy management systems structure and/or organize the
- 147 sets of users and their policies.
- 148 3. Definition of non-IPP protocols that can provide similar functionality.

149 2.5 Design Requirements

150 The design requirements for this registration document are:

- 151 1. Define an IPP operation to allow a Client to obtain supported Printer capabilities
- 152 for a given User.
- 153 2. Document interoperability requirements for Clients and Printers.
- 154 3. Define security requirements necessary to support the newly defined operations.
- 155 4. Identify an appropriate set of IPP operations that allows a supporting Client to
- 156 acquire from the target Printer the set of print features available for a particular
- 157 User.
- 158 5. Identify an appropriate Printer behavior and expected Client behavior for a non-
- 159 supporting Client (i.e. one that is unaware of this new system) can still be a
- 160 legitimate actor in the print policy system.
- 161 6. Identify an appropriate set of IPP operations and attributes that allows a Printer
- 162 to refer a Client to a trusted IPP Print Policy Service, such that the Client can
- 163 assert that the options it provides with a submitted job do comply with a policy
- 164 originating from that trusted policy server.
- 165 7. Maintain backward compatibility with existing versions of IPP (IPP/1.1, IPP/2.x).
- 166 8. Define sections to register all aRegister all attributes, values, and operations
- 167 with IANA.

168 The design recommendations for this document are:

- 169 1. Recommend suitable authentication methods and guidelines for the use of those
- 170 methods and provide guidance for that could inform the creation of a high-quality
- 171 Client user interfaces experience.

172 3 IPP Get-User-Printer-Attributes Definitions

173 IPP/1.1 [RFC8011] (and its predecessors) do not specify that the Get-Printer-Attributes
174 operation can be authenticated, and explicitly does not specify that the most authenticated
175 user name has any effect on the semantics of the operation, unlike the various Job-related

176 operations. Since changing the semantics of the existing Get-Printer-Attributes operation
177 would break existing Clients and require a new IPP major version number, this document
178 defines the semantically analogous operation Get-User-Printer-Attributes.

179 ~~Although the existing Get-Printer-Attributes operation [RFC8011] conveys the needed~~
180 ~~information and could be used for this task, few legacy Clients expect the Printer to~~
181 ~~respond to a Get-Printer-Attributes operation with an HTTP authentication challenge. To~~
182 ~~preserve backward compatibility with legacy Clients, a new operation is defined here, with~~
183 ~~semantics similar to Get-Printer-Attributes.~~

184 IPP Operations

185 **3.1.1 Get-User-Printer-Attributes**

186 This REQUIRED operation is semantically analogous to the Get-Printer-Attributes
187 operation [RFC8011] except that the Printer MUST return the attributes and values allowed
188 for the most authenticated user. The most authenticated user provides the identity the
189 Printer will use to construct its IPP response, containing the attributes and values for that
190 identity.

191 The Client MUST be prepared to respond to an HTTP authentication challenge. The Client
192 detects whether the Printer supports this operation by examining the “operations-
193 supported” attribute [RFC8011]. If the Client initiates the Get-User-Printer-Attributes
194 operation over a non-TLS connection, the Client MUST be prepared to receive an HTTP
195 426 response to upgrade the connection to TLS [RFC2817]. The Printer MUST only send a
196 Get-User-Printer-Attributes responses over a TLS connections [RFC8010] [RFC8011], for
197 authentication methods that require a secure channel.

198 **3.1.1.1 Get-User-Printer-Attributes Request**

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

201 Group 1: Operation Attributes

202 "attributes-charset" (charset) and
203 "attributes-natural-language" (naturalLanguage) :

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

206 "printer-uri" (uri) :

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

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

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

212 “requesting-user-uri” (uri) :

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

215 ~~The Client MUST supply and the Printer MUST support this attribute, as~~
216 ~~described in [PWG5100.13] section~~

217 ~~“requesting-user-name” (name(MAX)) and~~
218 ~~“requesting-user-uri” (uri) and~~
219 ~~“requesting-user-vcard” (1setOf text(MAX)) :~~

220 ~~The Client SHOULD supply and the Printer MUST support this all three of~~
221 ~~these attribute, as described in [SYSTEM] section 7.1.6s.~~

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

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

226 "document-format" (mimeMediaType):

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

229 **3.1.1.2 Get-User-Printer-Attributes Response**

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

232 Group 1: Operation Attributes

233 "attributes-charset" (charset) and
234 "attributes-natural-language" (naturalLanguage) :

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

237 Status Message:

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

242 Group 2: Unsupported Attributes

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

244 Group 3: Printer Attributes

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

247 **4 Internationalization Considerations**

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

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

- 254 • Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 255 • Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 256 • Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 257 • Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 258 • Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 259 • Unicode Collation Algorithm [UTS10] – sorting
- 260 • Unicode Locale Data Markup Language [UTS35] – locale databases

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

- 263 • Unicode Character Encoding Model [UTR17] – multi-layer character model
- 264 • Unicode in XML and other Markup Languages [UTR20] – XML usage
- 265 • Unicode Character Property Model [UTR23] – character properties
- 266 • Unicode Conformance Model [UTR33] – Unicode conformance basis

267 **5 Security Considerations**

268 The security considerations for the Get-User-Printer-Attributes operation build upon those
269 defined for IPP/1.1 [RFC8011] and IPP/2.0 [PWG5100.12] for the Validate-Job, Create-Job

270 and Print-Job operations. In addition to those security considerations, a Printer MUST
271 NOT send a Get-User-Printer-Attributes response over a non-TLS connection for
272 authentication methods that require a secure channel.

273 5.1 Human-readable Strings

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

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

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

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

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344 7 Authors' Addresses

345 Primary authors:

346 Smith Kennedy
347 HP Inc.
348 11311 Chinden Blvd. MS 506
349 Boise, ID 83714
350 smith.kennedy@hp.com

351 The authors would also like to thank the following individuals for their contributions to this
352 standard:

353 Mike Sweet – Apple Inc.
354 Ira McDonald – High North Inc.

355 **8 Change History**

356 **8.1 October 10, 2017**

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

359 **8.2 August 17, 2017**

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

- 361 • Removed section 4
- 362 • Rewrote portions of now section 4 “Get-User-Printer-Attributes” definition and
363 restructured presentation of list of attributes in request and response sub-sections
364 for Get-User-Printer-Attributes definition
- 365 • Relabeled document to be “IPP Registration” instead of “White Paper”

366 **8.3 August 1, 2017**

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

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

374 **8.4 May 24, 2017**

375 Updated as per feedback from May 2017 F2F review.

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

379 **8.5 April 18, 2017**

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

383 **8.6 April 4, 2017**

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

386 **8.7 February 1, 2017**

- 387 • Editorial changes.

388 **8.8 January 30, 2017**

- 389 • Initial draft.