



The Printer Working Group

November 8, 2017  
IPP Registration

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-20171108.odt>  
9                                   <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wd-ippgupa-20171103.odt>  
10                                  <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wd-ippgupa-20171108.pdf>  
11                                  <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wd-ippgupa-20171103.pdf>

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

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## 65 1 Introduction

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

## 71 2 Terminology

### 72 2.1 Conformance Terminology

73 Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD,  
74 SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as  
75 defined in Key words for use in RFCs to Indicate Requirement Levels [BCP14]. The term  
76 CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that  
77 applies when a specified condition is true.

### 78 2.2 Printing Terminology

79 Normative definitions and semantics of printing terms are imported from IETF Printer MIB  
80 v2 [RFC3805], IETF Finisher MIB [RFC3806], and IETF Internet Printing Protocol/1.1:  
81 Model and Semantics [RFC8011].

82 *Document*: An object created and managed by a Printer that contains the description,  
83 processing, and status information. A Document object may have attached data and is  
84 bound to a single Job.

85 *Job*: An object created and managed by a Printer that contains description, processing,  
86 and status information. The Job also contains zero or more Document objects.

87 *Logical Device*: a print server, software service, or gateway that processes jobs and either  
88 forwards or stores the processed job or uses one or more Physical Devices to render  
89 output.

90 *Output Device*: a single Logical or Physical Device

91 *Physical Device*: a hardware implementation of an endpoint device, e.g., a marking engine,  
92 a fax modem, etc.

### 93 2.3 Protocol Roles Terminology

94 This document defines the following protocol roles in order to specify unambiguous  
95 conformance requirements:

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

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

## 101 **2.4 Other Terms Used in This Document**

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

## 103 **2.5 Acronyms and Organizations**

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

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

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

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

## 108 **3 Requirements**

### 109 **3.1 Rationale**

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

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

### 118 **3.2 Use Cases**

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

#### 121 **3.2.1 Print Policy For Some Users Limits Print Capabilities**

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

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

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

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

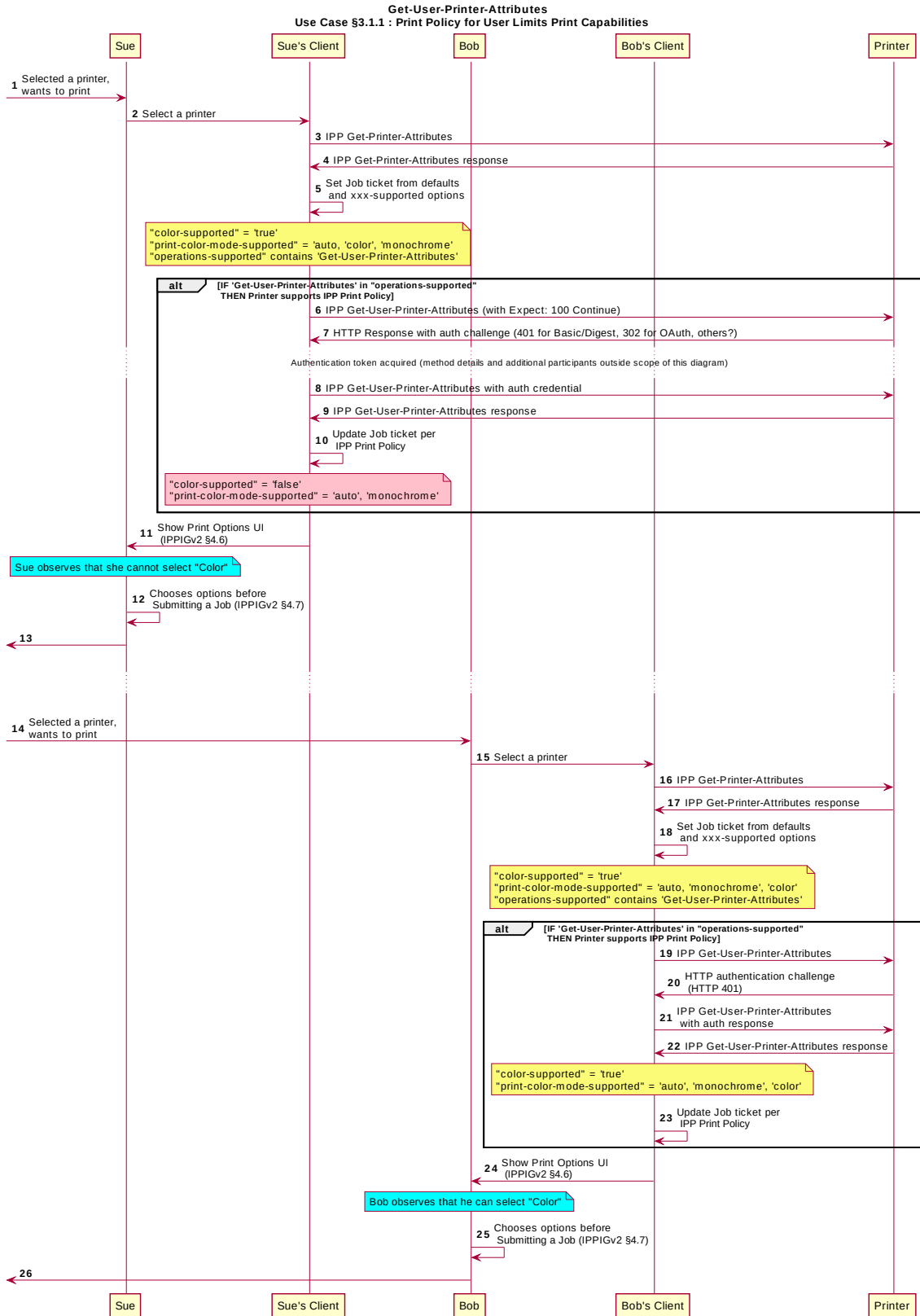


Figure 3.1 : Use Case 3.1.1 Sequence Diagram



**137 3.2.2 User Not Listed in Print Policy Denied Ability to Print in Color**

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

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

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

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

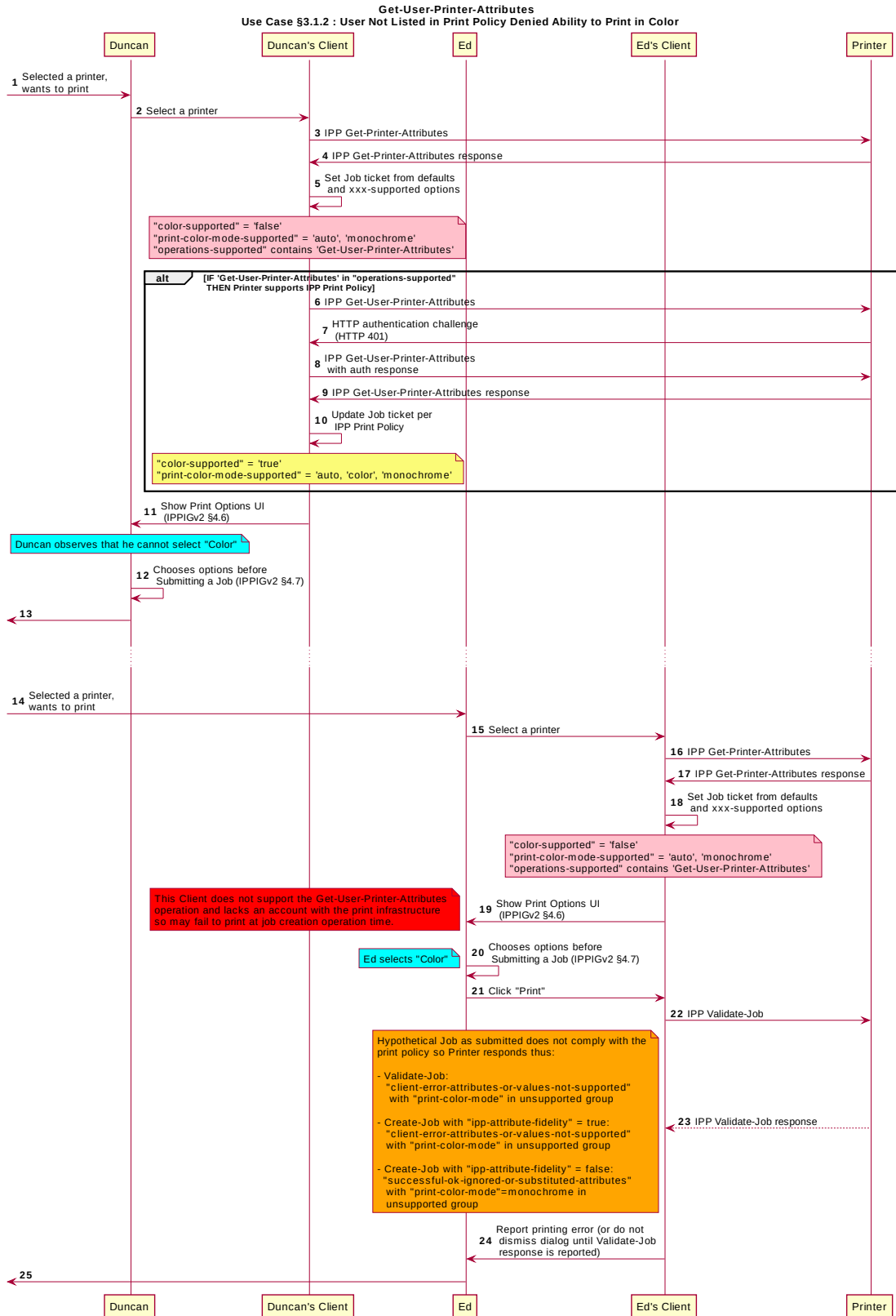


Figure 3.2 : Use Case 3.1.2 Sequence Diagram

### 158 3.3 Exceptions

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

### 160 3.4 Out of Scope

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

- 162 1. Definition of specific print policies.
- 163 2. Definition of how print policy management systems structure and/or organize the
- 164 sets of users and their policies.
- 165 3. Definition of non-IPP protocols that can provide similar functionality.

### 166 3.5 Design Requirements

167 The design requirements for this registration are:

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

173 The design recommendations for this document are:

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

## 176 4 Get-User-Printer-Attributes Operation

177 The Get-User-Printer-Attributes operation is semantically analogous to the Get-Printer-  
178 Attributes operation [RFC8011] but the response is filtered based on the most  
179 authenticated user. The authenticated user (see section 9.3 of [RFC8011]) performing this  
180 operation MUST be either a User permitted to create Print Jobs or an Operator or  
181 Administrator of the Printer. Otherwise, the Printer MUST reject the operation and return  
182 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as  
183 appropriate.

184 The Client MUST be prepared to handle an HTTP authentication challenge in response to  
185 a Get-User-Printer-Attributes operation request. If the Client initiates the Get-User-Printer-  
186 Attributes operation over a non-TLS connection, the Client MUST be prepared to receive  
187 an HTTP 426 response to upgrade the connection to TLS [RFC2817]. See [RFC8010] and  
188 [RFC8011] for authentication methods that require a secure channel.

189 ~~The Get-User-Printer-Attributes operation is semantically analogous to the Get-Printer-~~  
190 ~~Attributes operation [RFC8011] but can be authenticated and the response can be filtered~~

191 ~~based on the most authenticated user. The Client MUST be prepared to handle an HTTP~~  
192 ~~authentication challenge in response to a Get-User-Printer-Attributes operation request. If~~  
193 ~~the Client initiates the Get-User-Printer-Attributes operation over a non-TLS connection,~~  
194 ~~the Client MUST be prepared to receive an HTTP 426 response to upgrade the connection~~  
195 ~~to TLS [RFC2817]. See [RFC8010] and [RFC8011] for authentication methods that require~~  
196 ~~a secure channel.~~

197 A Printer MUST support all the same operation attributes for a Get-User-Printer-Attributes  
198 operation that it supports with a Get-Printer-Attributes operation, including those **used by a**  
199 Client **can use** to request a filtered response: “document-format” [RFC8011]; “first-index”  
200 [PWG5100.13]; “limit” [PWG5100.13]; and any of the attributes named by “printer-get-  
201 attributes-supported” [PWG5100.13].

## 202 4.1 Get-User-Printer-Attributes Request

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

205 Group 1: Operation Attributes

206 "attributes-charset" (charset) and  
207 "attributes-natural-language" (naturalLanguage) :

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

210 "printer-uri" (uri) :

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

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

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

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

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

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

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

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 **4.2 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 **5 Conformance Requirements**

### 248 **5.1 Printer Conformance Requirements**

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

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

## 251 **5.2 Client Conformance Requirements**

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

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

## 254 **6 Internationalization Considerations**

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

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

- 261 • Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 262 • Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 263 • Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 264 • Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 265 • Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 266 • Unicode Collation Algorithm [UTS10] – sorting
- 267 • Unicode Locale Data Markup Language [UTS35] – locale databases

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

- 270 • Unicode Character Encoding Model [UTR17] – multi-layer character model
- 271 • Unicode in XML and other Markup Languages [UTR20] – XML usage
- 272 • Unicode Character Property Model [UTR23] – character properties
- 273 • Unicode Conformance Model [UTR33] – Unicode conformance basis

## 274 **7 Security Considerations**

275 The security considerations for the Get-User-Printer-Attributes operation build upon those  
276 defined for IPP/1.1 [RFC8011] and IPP/2.0 [PWG5100.12] for the Validate-Job, Create-Job  
277 and Print-Job operations. Additionally, a Printer MUST NOT send a Get-User-Printer-

278 Attributes response over a non-TLS connection for authentication methods that require a  
279 secure channel, as defined in [RFC8010] and [RFC8011].

## 280 7.1 Human-readable Strings

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

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

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

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

## 287 8 References

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366 standard:

367 Mike Sweet – Apple Inc.  
368 Ira McDonald – High North Inc.

## 369 **10 Change History**

### 370 **10.1 November 8, 2017**

- 371 • [Added missing sub-sections “Conformance Terminology” and “Printing Terminology”](#)  
372 [to section 2](#)
- 373 • [Resolved normative language issue in section 4 concerning filtering according to](#)  
374 [the most authenticated user to make it declarative](#)

### 375 **10.2 November 3, 2017**

376 Updated with changes reported during last call.

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

### 379 **10.3 October 16, 2017**

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

- 382 • Renamed and adopted new acronym
- 383 • Refactored section 4 editorially
- 384 • Added mention of “first-index” and “limit” filtering attributes
- 385 • Added “Conformance Requirements” section
- 386 • Removed “Table Index” since there are no tables

### 387 **10.4 October 10, 2017**

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

### 390 **10.5 August 17, 2017**

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

- 392 • Removed section 4

- 393 • Rewrote portions of now section 4 “Get-User-Printer-Attributes” definition and  
394 restructured presentation of list of attributes in request and response sub-sections  
395 for Get-User-Printer-Attributes definition

- 396 • Relabeled document to be “IPP Registration” instead of “White Paper”

## 397 **10.6 August 1, 2017**

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

- 399 • Added sub-sections for the Get-User-Printer-Attributes request and response,  
400 leveraging text from RFC 8011 and 5100.SYSTEM

- 401 • Updated Internationalization section to use Unicode 10 and added a bunch of  
402 references.

- 403 • Updated references to add System, and full standard of IPP/2.0 (5100.12)

- 404 • Other editorial fixes

## 405 **10.7 May 24, 2017**

406 Updated as per feedback from May 2017 F2F review.

- 407 • Removed previous use cases 3.1.2-3.1.5; renamed 3.1.6 to be new 3.1.2, with  
408 updated sequence diagram that includes Validate-Job / Create-Job response.

- 409 • Removed section 6 – no new IPP attributes need to be defined as of this draft.

## 410 **10.8 April 18, 2017**

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

## 414 **10.9 April 4, 2017**

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

## 417 **10.10 February 1, 2017**

- 418 • Editorial changes.

419 **10.11** **January 30, 2017**

420 • Initial draft.