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White Paper

The Printer Working Group

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

3 Status: Initial

4 Abstract: This document proposes a new Get-User-Printer-Attributes IPP operation that
5 allows an IPP Client to retrieve the Printer's settings that are available to the Client's
6 current User.

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

9 This document is available electronically at:

10 <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-userop-20170524.odt>
11 <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-userop-20170524.pdf>

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

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51 **1 Introduction**

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

58 **2 Terminology**

59 **2.1 Protocol Roles Terminology**

60 This document defines the following protocol roles in order to specify unambiguous
61 conformance requirements:

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

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

67 **2.2 Other Terms Used in This Document**

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

69 **2.3 Acronyms and Organizations**

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

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

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

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

74 **3 Rationale for IPP Get-User-Printer-Attributes Operation**

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

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

83 **3.1 Use Cases**

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

86 **3.1.1 Print Policy For Some Users Limits Print Capabilities**

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

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

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

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

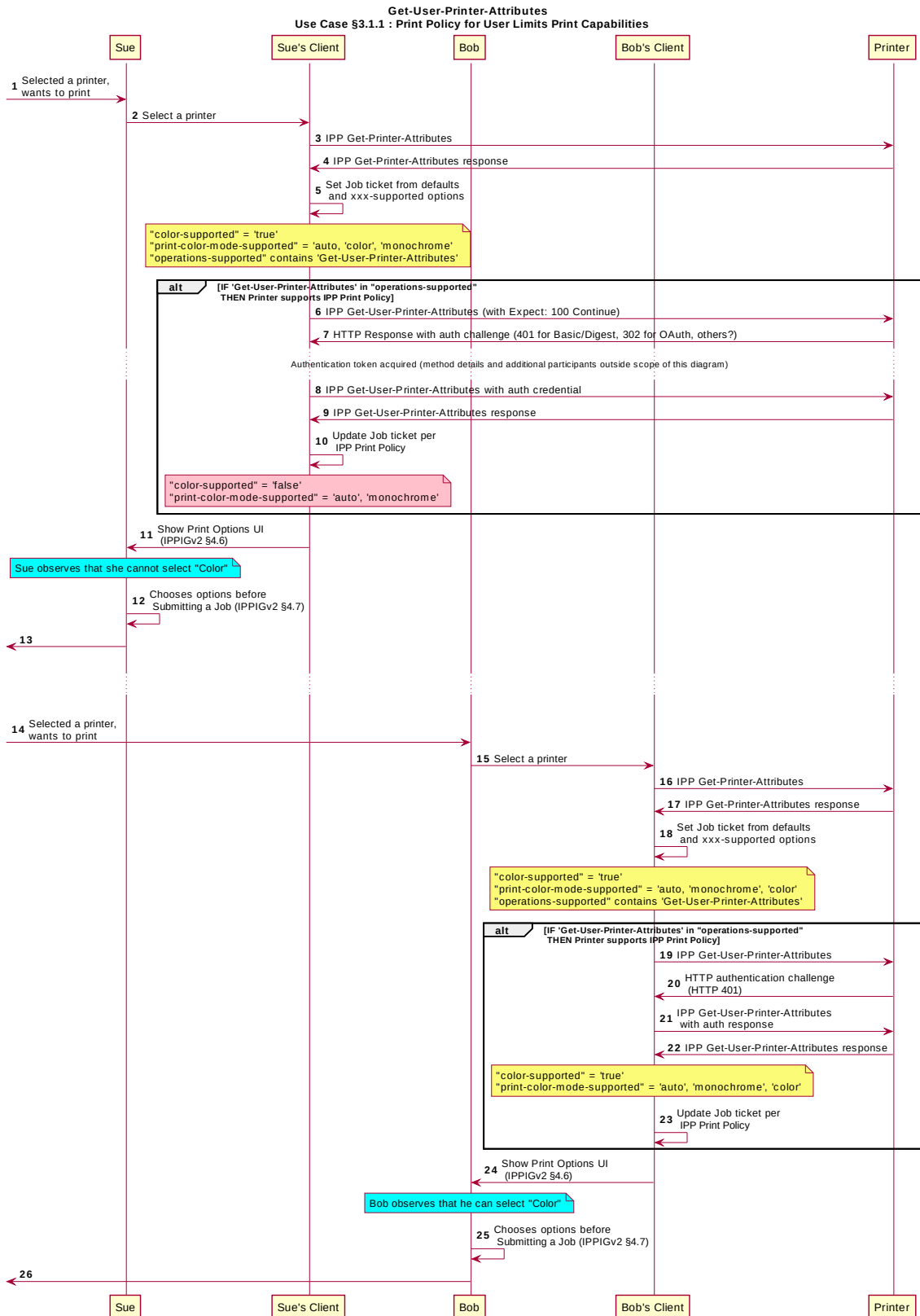


Figure 3.1 : Use Case 3.1.1 Sequence Diagram

102 **3.1.2 User Not Listed in Print Policy Denied Ability to Print in Color**

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

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

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

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

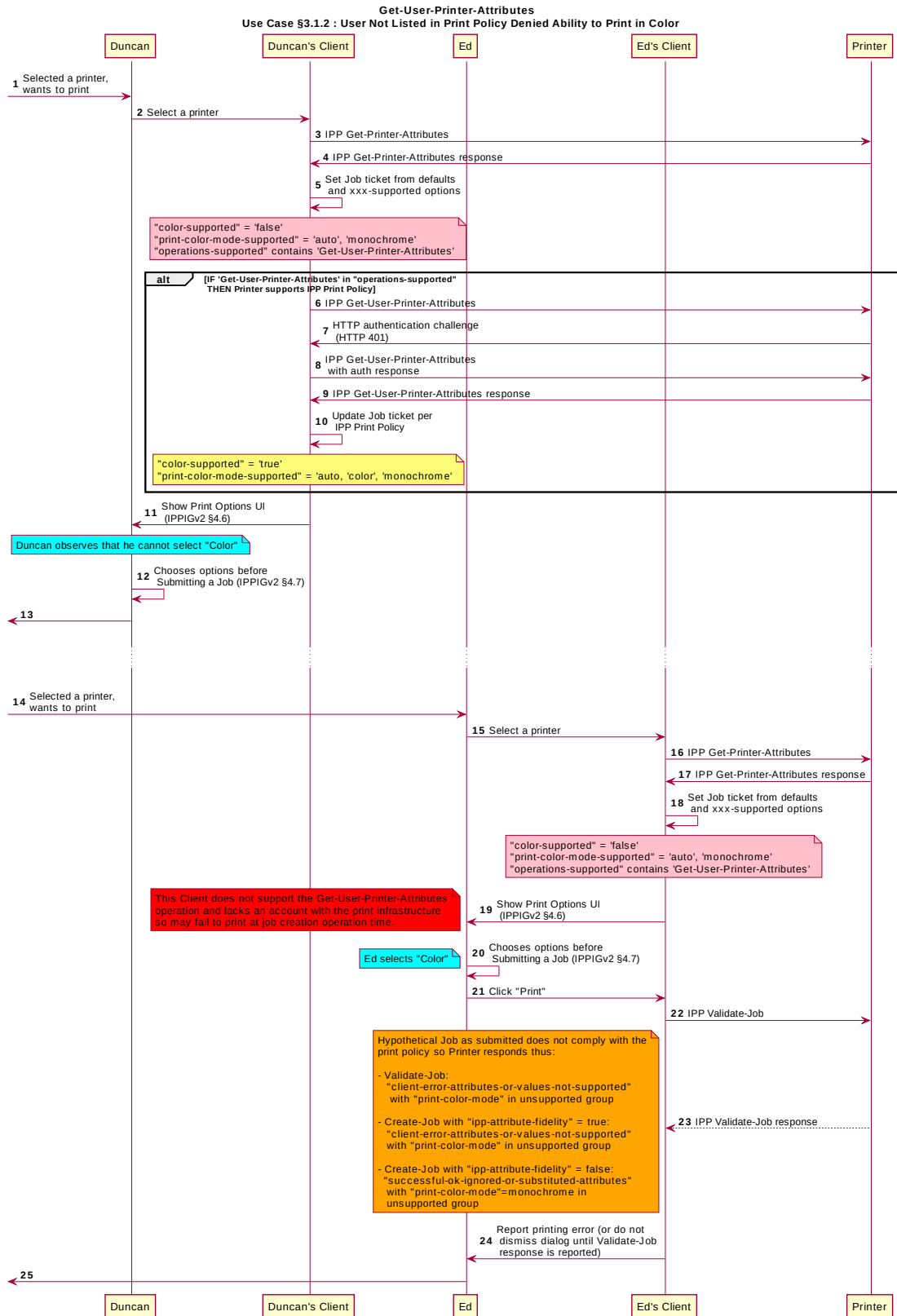


Figure 3.2 : Use Case 3.1.2 Sequence Diagram

123 **3.2 Exceptions**

124 There are no exceptions to the use cases in section 3.1.

125 **3.3 Out of Scope**

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

- 127 1. Definition of actual print policies.
- 128 2. Definition of how print policy management systems structure and/or organize the
- 129 sets of users and their policies.
- 130 3. Definition of non-IPP protocols that can provide similar functionality.

131 **3.4 Design Requirements**

132 The design requirements for this document are:

- 133 1. Identify an appropriate set of IPP operations that allows a supporting Client to
- 134 acquire from the target Printer the set of print features available for a particular
- 135 User.
- 136 2. Identify an appropriate Printer behavior and expected Client behavior for a non-
- 137 supporting Client (i.e. one that is unaware of this new system) can still be a
- 138 legitimate actor in the print policy system.
- 139 3. Identify an appropriate set of IPP operations and attributes that allows a Printer
- 140 to refer a Client to a trusted IPP Print Policy Service, such that the Client can
- 141 assert that the options it provides with a submitted job do comply with a policy
- 142 originating from that trusted policy server.
- 143 4. Maintain backward compatibility with existing versions of IPP (IPP/1.1, IPP/2.x).
- 144 5. Register all attributes 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 that could inform the creation of a high quality Client user experience.

148 **4 Technical Solutions/Approaches**

149 Although the existing Get-Printer-Attributes operation [RFC8011] conveys the needed
150 information and could be used for this task, no legacy Clients expect the Printer to respond
151 to a Get-Printer-Attributes operation with an HTTP authentication challenge. A new
152 operation with the appropriate semantics was decided to be the most efficient way to add
153 this facility to the IPP ecosystem. Adding additional operation attributes to the Get-Printer-
154 Attributes operation to cause the Printer to respond with an authentication challenge could
155 be done, but would require updating the core IPP specifications, which is procedurally not
156 desirable. If the Printer were to filter its response or respond with an authentication

157 challenge if “requesting-user-name” were included in the operation request, that would be
158 a change to existing behavior precedent.

159 **5 IPP Operations**

160 **5.1 Get-User-Printer-Attributes Operation**

161 This REQUIRED operation allows a Client to request the values of the attributes of a
162 Printer. The semantics of this operation are identical to the semantics for the Get-Printer-
163 Attributes operation, with the difference that the Client MUST be prepared to respond to an
164 HTTP authentication challenge. The Client detects whether the Printer supports this
165 operation by examining the “operations-supported” attribute [RFC8011].

166 If the Client initiates the Get-User-Printer-Attributes operation over a non-TLS connection,
167 the Client MUST be prepared to receive an HTTP 426 response to upgrade the connection
168 to TLS [RFC2817]. The Printer MUST only send Get-User-Printer-Attributes responses
169 over TLS connections.

170 **6 Internationalization Considerations**

171 For interoperability and basic support for multiple languages, implementations use the
172 “Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)” [RFC3629]
173 encoding of Unicode [UNICODE] [ISO10646] and the Unicode Format for Network
174 Interchange [RFC5198].

175 **7 Security Considerations**

176 The security considerations for the Get-User-Printer-Attributes operation are identical to
177 those listed for IPP/1.1 [RFC8011] and IPP/2.0 [PWG5100.12].

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216 standard:

217 Mike Sweet – Apple Inc.
218 Ira McDonald – High North Inc.

219 **10 Change History**

220 **10.1 May 24, 2017**

221 Updated as per feedback from May 2017 F2F review.

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

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

225 **10.2 April 18, 2017**

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

229 **10.3 April 4, 2017**

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

232 **10.4 February 1, 2017**

233 • Editorial changes.

234 **10.5 January 30, 2017**

235 • Initial draft.