



12 Copyright © 2017-2018 The Printer Working Group. All rights reserved.

13 Title: IPP Job Save Password (*SAVEPASSWORD*)

14 The material contained herein is not a license, either expressed or implied, to any IPR  
15 owned or controlled by any of the authors or developers of this material or the Printer  
16 Working Group. The material contained herein is provided on an “AS IS” basis and to the  
17 maximum extent permitted by applicable law, this material is provided AS IS AND WITH  
18 ALL FAULTS, and the authors and developers of this material and the Printer Working  
19 Group and its members hereby disclaim all warranties and conditions, either expressed,  
20 implied or statutory, including, but not limited to, any (if any) implied warranties that the use  
21 of the information herein will not infringe any rights or any implied warranties of  
22 merchantability or fitness for a particular purpose.

23 **Table of Contents**

24 1 Introduction.....4

25 2 Terminology.....4

26 2.1 Protocol Roles Terminology.....4

27 2.2 Other Terms Used in This Document.....4

28 2.3 Acronyms and Organizations.....4

29 3 Requirements for IPP Job Save Password.....5

30 3.1 Use Cases.....5

31 3.1.1 Protecting a Saved Document with a Persistent Password.....5

32 3.1.2 Re-printing a Saved Job Via Printer Control Panel.....5

33 3.1.3 Re-printing a Saved Job Using An IPP Client.....5

34 3.2 Exceptions.....5

35 3.3 Out of Scope.....5

36 3.4 Design Requirements.....6

37 4 Operation Attributes.....6

38 4.1 job-save-accesses (collection | no-value).....6

39 4.1.1 access-oauth-token (1setOf octetString(MAX)).....6

40 4.1.2 access-oauth-uri (uri).....6

41 4.1.3 access-password (text(MAX)).....7

42 4.1.4 access-pin (text(MAX)).....7

43 4.1.5 access-user-name (text(MAX)).....7

44 4.1.6 access-x509-certificate (1setOf octetString(MAX)).....7

45 5 Printer Description Attributes.....8

46 5.1 job-save-accesses-configured (1setOf (type2 keyword)).....8

47 5.2 job-save-accesses-supported (1setOf (type2 keyword)).....8

48 6 Internationalization Considerations.....8

49 7 Security Considerations.....9

50 7.1 Human-readable Strings.....9

51 8 IANA Considerations.....9

52 8.1 Attribute Registrations.....9

53 9 References.....10

54 9.1 Normative References.....10

55 9.2 Informative References.....12

56 10 Authors' Addresses.....12

57 11 Change History.....13

58 11.1 March 11, 2018.....13

59 11.2 February 5, 2018.....13

60 11.3 December 5, 2017.....13

61 **List of Figures**

62 **List of Tables**

## 63 1 Introduction

64 Users and network administrators are increasingly concerned about network and data  
65 security, and this extends to printing. Most all Users are familiar with sending a Job to a  
66 Printer and the Printer processing that Job fairly immediately, and some do so using a “job  
67 password” that prevents the Job from being processed until the User provides that  
68 password on the Printer's control panel to approve its release to processing. The IPP “job-  
69 password” operation attribute [PWG5100.11] and related attributes provide support for this  
70 workflow. Some Printers also support saving jobs for later printing or re-printing. In certain  
71 cases there may be Users that wish to take advantage of both capabilities. Unfortunately  
72 however, since “job-password” is an operation attribute, and that Job's processing is the  
73 act of saving the Job, the “job-password” attribute does not persist beyond its being saved.  
74 Therefore, to support scenarios involving a password protected saved job, new attributes  
75 need to be defined that convey a Job password that persists beyond Job processing  
76 completion.

## 77 2 Terminology

### 78 2.1 Protocol Roles Terminology

79 This document defines the following protocol roles in order to specify unambiguous  
80 conformance requirements:

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

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

### 86 2.2 Other Terms Used in This Document

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

### 88 2.3 Acronyms and Organizations

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

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

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

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

## 93 **3 Requirements for IPP Job Save Password**

### 94 **3.1 Use Cases**

#### 95 **3.1.1 Protecting a Saved Document with a Persistent Password**

96 Wilma has written a document that she intends to save on her departmental MFD, to allow  
97 some of her peers to print copies as needed. But as the document contains sensitive  
98 information, Wilma wishes to only allow those who know the job's password to re-print  
99 copies. She is familiar with providing a password when configuring a print job, and she is  
100 also familiar with configuring the job to be saved in the printer. In the print dialog used to  
101 configure the print job on her computer, Wilma provides a password, and also chooses to  
102 have the job saved. Wilma clicks "Print" and the computer submits the job to the printer.  
103 The printer saves the job content and protects it with the password provided.

#### 104 **3.1.2 Re-printing a Saved Job Via Printer Control Panel**

105 Barney hears from Wilma that she has saved that document to the departmental MFD.  
106 Wilma tells Barney the job's name, and Barney then goes to the MFD and looks up the job.  
107 He taps on the control panel to have a copy printed, and is prompted to enter the job's  
108 password. He enters that on the control panel, and the MFD prints a copy. Barney collects  
109 it from the output bin and returns to his desk.

#### 110 **3.1.3 Re-printing a Saved Job Using An IPP Client**

111 Barney sends an IM to Betty that Wilma has saved a job on the departmental MFD. Betty  
112 opens her computer's print system and browses the saved jobs on the MFD. She selects  
113 the job and clicks "Print" to have a copy made for her. A dialog is presented asking for the  
114 job's password. Betty types in the job's password, and the MFD prints a copy. She collects  
115 it from the MFD and returns to her office.

### 116 **3.2 Exceptions**

117 Harvey, an employee from another department, walks up to Wilma's departmental MFD.  
118 The .

### 119 **3.3 Out of Scope**

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

- 121 1. How the Document or Documents in a Job are stored by the Printer
- 122 2. Methods for encrypting the document itself.
- 123 3. Mechanisms for supporting per-user credentials / access control list for releasing
- 124 the stored job.

## 125 **3.4 Design Requirements**

126 The design requirements for this document are:

- 127 1. Use existing attributes or collections if possible.
- 128 2. Support at the least the fidelity supported currently by “job password” and “job-  
129 password-encryption”
- 130 3. Register all attributes and operations with IANA

131 The design recommendations for this document are:

- 132 1. Reusing UI controls with similar enough purposes so that the user doesn't need  
133 to be confused by e.g. needing to interact with different controls for different  
134 kinds of passwords.

## 135 **4 Operation Attributes**

### 136 **4.1 job-save-accesses (collection | no-value)**

137 The OPTIONAL “job-save-accesses” operation attribute allows the Client to provide  
138 authentication information for a referenced saved Job.

139 The collection value contains zero or more member attributes which provide the  
140 authentication information required for the Job to be reprinted. A Client MAY also provide  
141 the no-value out-of-band value to specify that no authentication information is necessary.

142 Printers specify which member attributes are supported using the “job-save-accesses-  
143 supported” Printer attribute (section XXX).

#### 144 **4.1.1 access-oauth-token (1setOf octetString(MAX))**

145 The OPTIONAL “access-oauth-token” member attribute provides a Base64-encoded  
146 OAuth Access Token as defined in The OAuth 2.0 Authorization Framework [RFC6749].  
147 When the size of the access token exceeds 1023 octets (the maximum size of an  
148 octetString value), the Client separates the token into multiple octetString values and  
149 sends the result as an ordered set to the Printer. The Printer reassembles each octetString  
150 to produce the complete access token value to be used to access the Document URI.

151 Printers that support this attribute MUST list ‘access-oauth-token’ in the “job-save-  
152 accesses-supported” Printer Description attribute.

#### 153 **4.1.2 access-oauth-uri (uri)**

154 The OPTIONAL “access-oauth-uri” member attribute is the authorization server that issued  
155 the “access-oauth-token” member attribute. See Authorization Server [RFC6749] section  
156 1.1.

### 157 **4.1.3 access-password (text(MAX))**

158 The OPTIONAL "access-password" member attribute provides a password string, typically  
159 for HTTP Basic or Digest authentication [RFC2617]. Clients MUST provide the password  
160 using the UTF-8 encoding [STD63] in Unicode Normalization Form C as required for  
161 Network Unicode [RFC5198]. Printers MUST convert the password, as needed, to  
162 whatever encoding is required to access the Document URI.

163 Printers that support this attribute MUST list 'access-password' in the "job-save-accesses-  
164 supported" Printer Description attribute.

### 165 **4.1.4 access-pin (text(MAX))**

166 The OPTIONAL "access-pin" member attribute provides a Personal Identification Number  
167 string. Clients MUST restrict the characters to the US ASCII digits '0' (code 48) through '9'  
168 (code 57) and Printers MUST reject values containing characters other than the digits '0'  
169 through '9'.

170 Printers that support this attribute MUST list 'access-pin' in the "job-save-accesses-  
171 supported" Printer Description attribute.

### 172 **4.1.5 access-user-name (text(MAX))**

173 The OPTIONAL "access-user-name" member attribute provides a user name string,  
174 typically for HTTP Basic or Digest authentication [RFC2617]. Clients MUST provide the  
175 user name using the UTF-8 encoding [STD63] in Unicode Normalization Form C as  
176 required for Network Unicode [RFC5198]. Printers MUST convert the user name, as  
177 needed, to whatever encoding is required by the Document URI.

178 Printers that support this attribute MUST list 'access-user-name' in the "job-save-accesses-  
179 supported" Printer Description attribute.

### 180 **4.1.6 access-x509-certificate (1setOf octetString(MAX))**

181 The OPTIONAL "access-x509-certificate" member attribute provides a PEM-encoded  
182 X.509 certificate identifying the User or Client that is making the request. When the size of  
183 the certificate exceeds 1023 octets (the maximum size of an octetString value), the Client  
184 separates the certificate into multiple octetString values and sends the result as an ordered  
185 set to the Printer. The Printer reassembles each octetString to produce the complete X.509  
186 certificate to be used to access the Document URI.

187 Printers that support this attribute MUST list 'access-x509-certificate' in the "job-save-  
188 accesses-supported" Printer Description attribute and MUST provide an implementation-  
189 defined method for loading the corresponding private key that is used for authenticating  
190 the holder of the X.509 certificate.

## 191 **5 Printer Description Attributes**

### 192 **5.1 job-save-accesses-configured (1setOf (type2 keyword))**

193 The “job-save-accesses-configured” Printer Description attribute specifies the member  
194 attributes currently configured for use with “job-save-accesses”. This attribute's set of  
195 values MUST be a subset of the set of values specified by the Printer's “job-save-  
196 accesses-supported” attribute. This attribute MUST be supported if the “job-save-  
197 accesses-supported” Printer Description attribute is supported.

### 198 **5.2 job-save-accesses-supported (1setOf (type2 keyword))**

199 The “job-save-accesses-supported” Printer Description attribute specifies the supported  
200 member attributes of the “job-save-accesses” operation attribute. This attribute MUST be  
201 supported if the “job-save-accesses” operation attribute is supported.

## 202 **6 Internationalization Considerations**

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

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

- 209 • Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 210 • Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 211 • Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 212 • Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 213 • Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 214 • Unicode Collation Algorithm [UTS10] – sorting
- 215 • Unicode Locale Data Markup Language [UTS35] – locale databases

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

- 218 • Unicode Character Encoding Model [UTR17] – multi-layer character model
- 219 • Unicode in XML and other Markup Languages [UTR20] – XML usage



- 220 • Unicode Character Property Model [UTR23] – character properties
- 221 • Unicode Conformance Model [UTR33] – Unicode conformance basis

## 222 **7 Security Considerations**

223 The IPP extensions defined in this document require the same security considerations as  
 224 defined in the IPP/1.1: Model and Semantics [RFC8011], IPP: Job and Printer Extensions  
 225 – Set 2 (JPS2), and IPP Job Password Repertoire. Additionally, the operation attributes  
 226 defined in this IPP Registration MUST NOT be sent over a non-encrypted connection.

### 227 **7.1 Human-readable Strings**

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

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

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

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

## 234 **8 IANA Considerations**

### 235 **8.1 Attribute Registrations**

236 The attributes defined in this document will be published by IANA according to the  
 237 procedures in IPP Model and Semantics [RFC8011] section 6.2 in the following file:

238 <http://www.iana.org/assignments/ipp-registrations>

239 The registry entries will contain the following information:

240 Operation attributes:	Reference
241 -----	-----
242 job-save-accesses (collection   no-value)	[SAVEPASSWORD]
243 access-oauth-token (1setOf octetString(MAX))	[SAVEPASSWORD]
244 access-oauth-uri (uri)	[SAVEPASSWORD]
245 access-password (text(MAX))	[SAVEPASSWORD]
246 access-pin (text(MAX))	[SAVEPASSWORD]
247 access-user-name(text(MAX))	[SAVEPASSWORD]
248 access-x509-certificate (1setOf octetString(MAX))	[SAVEPASSWORD]
249	[SAVEPASSWORD]

Printer Description attributes:	Reference
-----	-----
250 job-save-accesses-configured (1setOf (type2 keyword))	
251	[SAVEPASSWORD]
252 job-save-accesses-supported (1setOf (type2 keyword))	
253	[SAVEPASSWORD]

## 256 9 References

### 257 9.1 Normative References

- 258 [IPPREPETOIRE] S. Kennedy, "IPP Job Password Repertoire", January 2016,  
 259 [https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wp-job-password-](https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wp-job-password-repertoire-20160101.pdf)  
 260 [repertoire-20160101.pdf](https://ftp.pwg.org/pub/pwg/ipp/whitepaper/wp-job-password-repertoire-20160101.pdf)
- 261 [ISO10646] "Information technology -- Universal Coded Character Set (UCS)",  
 262 ISO/IEC 10646:2011
- 263 [PWG5100.5] D. Carney, T. Hastings, P. Zehler. "Internet Printing Protocol (IPP):  
 264 Document Object", PWG 5100.5-2003, October 2003,  
 265 [http://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject10-20031031-](http://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject10-20031031-5100.5.pdf)  
 266 [5100.5.pdf](http://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject10-20031031-5100.5.pdf)
- 267 [PWG5100.11] T. Hastings, D. Fullman, "IPP: Job and Printer Extensions – Set 2  
 268 (JPS2)", PWG 5100.11-2010, October 2010,  
 269 [https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-](https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-20101030-5100.11.pdf)  
 270 [20101030-5100.11.pdf](https://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext10-20101030-5100.11.pdf)
- 271 [PWG5100.12] R. Bergman, H. Lewis, I. McDonald, M. Sweet, "IPP Version 2.0, 2.1,  
 272 and 2.2", PWG 5100.12-2015, October 2015,  
 273 <http://ftp.pwg.org/pub/pwg/standards/std-ipp20-20151030-5100.12.pdf>
- 274 [PWG5100.13] M. Sweet, I. McDonald, P. Zehler, "IPP: Job and Printer Extensions -  
 275 Set 3 (JPS3)", PWG 5100.13-2012, July 2012,  
 276 [http://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext3v10-](http://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext3v10-20120727-5100.13.pdf)  
 277 [20120727-5100.13.pdf](http://ftp.pwg.org/pub/pwg/candidates/cs-ippjobprinterext3v10-20120727-5100.13.pdf)
- 278 [PWG5100.19] S. Kennedy, "IPP Implementor's Guide v2.0", PWG 5100.19-2015,  
 279 August 2015, [http://ftp.pwg.org/pub/pwg/candidates/cs-ippig20-](http://ftp.pwg.org/pub/pwg/candidates/cs-ippig20-20150821-5100.19.pdf)  
 280 [20150821-5100.19.pdf](http://ftp.pwg.org/pub/pwg/candidates/cs-ippig20-20150821-5100.19.pdf)
- 281 [RFC2817] R. Khare, S. Lawrence, "Upgrading to TLS Within HTTP/1.1", RFC  
 282 2817, May 2000, <https://www.ietf.org/rfc/rfc2817.txt>

- 283 [RFC3510] R. Herriot, I. McDonald, "Internet Printing Protocol/1.1: IPP URL  
284 Scheme", RFC 3510, April 2003, <https://tools.ietf.org/html/rfc3510>
- 285 [RFC3629] F. Yergeau, "UTF-8, a transformation format of ISO 10646", RFC  
286 3629, November 2003, <https://www.ietf.org/rfc/rfc3629.txt>
- 287 [RFC5198] J. Klensin, M. Padlipsky, "Unicode Format for Network Interchange",  
288 RFC 5198, March 2008, <https://www.ietf.org/rfc/rfc5198.txt>
- 289 [RFC7230] R. Fielding, J. Reschke, "Hypertext Transfer Protocol (HTTP/1.1):  
290 Message Syntax and Routing", RFC 7230, June 2014,  
291 <http://www.ietf.org/rfc/rfc7230.txt>
- 292 [RFC7472] I. McDonald, M. Sweet, "Internet Printing Protocol (IPP) over HTTPS  
293 Transport Binding and the 'ipps' URI Scheme", RFC 7472, March  
294 2015, <https://tools.ietf.org/html/rfc7472>
- 295 [RFC8010] M. Sweet, I. McDonald, "Internet Printing Protocol/1.1: Encoding and  
296 Transport", RFC 8010, January 2017,  
297 <https://www.ietf.org/rfc/rfc8010.txt>
- 298 [RFC8011] M. Sweet, I. McDonald, "Internet Printing Protocol/1.1: Model and  
299 Semantics", RFC 8011, January 2017,  
300 <https://www.ietf.org/rfc/rfc8011.txt>
- 301 [UAX9] Unicode Consortium, "Unicode Bidirectional Algorithm", UAX#9, May  
302 2016, <http://www.unicode.org/reports/tr9>
- 303 [UAX14] Unicode Consortium, "Unicode Line Breaking Algorithm", UAX#14,  
304 June 2016, <http://www.unicode.org/reports/tr14>
- 305 [UAX15] Unicode Consortium, "Normalization Forms", UAX#15, February 2016,  
306 <http://www.unicode.org/reports/tr15>
- 307 [UAX29] Unicode Consortium, "Unicode Text Segmentation", UAX#29, June  
308 2016, <http://www.unicode.org/reports/tr29>
- 309 [UAX31] Unicode Consortium, "Unicode Identifier and Pattern Syntax",  
310 UAX#31, May 2016, <http://www.unicode.org/reports/tr31>
- 311 [UNICODE] The Unicode Consortium, "Unicode® 10.0.0", June 2017,  
312 <http://unicode.org/versions/Unicode10.0.0/>
- 313 [UTS10] Unicode Consortium, "Unicode Collation Algorithm", UTS#10, May  
314 2016, <http://www.unicode.org/reports/tr10>
- 315 [UTS35] Unicode Consortium, "Unicode Locale Data Markup Language",  
316 UTS#35, October 2016, <http://www.unicode.org/reports/tr35>

317 [UTS39] Unicode Consortium, “Unicode Security Mechanisms”, UTS#39, June  
318 2016, <http://www.unicode.org/reports/tr39>

## 319 **9.2 Informative References**

320 [IANA-IPP] IANA Internet Printing Protocol (IPP) Registrations,  
321 <http://www.iana.org/assignments/ipp-registrations>

322 [UNISECFAQ] Unicode Consortium “Unicode Security FAQ”, November 2016,  
323 <http://www.unicode.org/faq/security.html>

324 [UTR17] Unicode Consortium “Unicode Character Encoding Model”, UTR#17,  
325 November 2008, <http://www.unicode.org/reports/tr17>

326 [UTR20] Unicode Consortium “Unicode in XML and other Markup Languages”,  
327 UTR#20, January 2013, <http://www.unicode.org/reports/tr20>

328 [UTR23] Unicode Consortium “Unicode Character Property Model”, UTR#23,  
329 May 2015, <http://www.unicode.org/reports/tr23>

330 [UTR33] Unicode Consortium “Unicode Conformance Model”, UTR#33,  
331 November 2008, <http://www.unicode.org/reports/tr33>

## 332 **10 Authors' Addresses**

333 Primary authors (using Address style):

334 Smith Kennedy  
335 HP Inc.  
336 11311 Chinden Blvd.  
337 Boise, Idaho, 83714  
338 smith.kennedy@hp.com

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

341 Ira McDonald – High North Inc.  
342 Mike Sweet – Apple Inc.

## 343 **11 Change History**

### 344 **11.1 March 11, 2018**

345 Updated as per feedback from February 2018 PWG F2F review:

- 346 • Refactored the attributes used to leverage the attributes used in IPP Shared  
347 Infrastructure Extensions and IPP Scan Service. This model is more appropriate  
348 since job-save and its members become Job Description attributes, which are  
349 required to be accessible via a Get-Job-Attributes operation. Access to the  
350 credentials, even if hashed, would be unacceptable.
- 351 • Propose this be moved to IPP Registration candidate status

### 352 **11.2 February 5, 2018**

353 Updated as per feedback from Dec. 14, 2017 IPP WG teleconference review:

- 354 • Updated Use Cases, Out of Scope and Design Requirements sections
- 355 • Refactored to make the solution become member attributes of job-save, with  
356 associated Printer Description attributes.

### 357 **11.3 December 5, 2017**

358 Initial revision.