



## The Printer Working Group

### IPP Job Reprint Password (REPRINTPWD)

*Status: Interim*

Abstract: This registration defines a new “job-reprint-password” operation attribute and associated semantics to provide IPP with a mechanism to support password protection for reprinting saved jobs.

This document is an IPP Registration. For a definition of an “IPP Registration Document” a “White Paper”, see: <http://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf>

<https://ftp.pwg.org/pub/pwg/general/process/ipp-registry-policy.txt>

~~This registration is available electronically at:~~

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~~<https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippreprintpwd-20180424.odt>~~

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## 127 | 1. Introduction

128 Users and network administrators are increasingly concerned about network and data  
129 security, and this extends to printing. Most all Users are familiar with sending a Job to a  
130 Printer and the Printer processing that Job fairly immediately, and some do so using a “job  
131 password” that prevents the Job from being processed until the User provides that  
132 password on the Printer's control panel to approve its release to processing. The IPP “job-  
133 password” operation attribute [PWG5100.11] and related attributes provide support for this  
134 workflow. Some Printers also support saving jobs for later printing or re-printing. In certain  
135 cases there may be Users that wish to take advantage of both capabilities. Unfortunately  
136 however, since “job-password” is an operation attribute, and that Job's processing is the  
137 act of saving the Job, the “job-password” attribute does not persist beyond its being  
138 saved. Therefore, in order for IPP to support scenarios involving a password protected  
139 saved job, ~~IPP must be extended with new attributes~~~~new attributes need to be defined~~ that  
140 convey a Job password that persists beyond Job processing completion.

## 141 | 2. Terminology

### 142 | 2.1. Protocol Roles Terminology

143 This document defines the following protocol roles in order to specify unambiguous  
144 conformance requirements:

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

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

#### 150 | 1.1 Other Terms Used in This Document

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

152 *Saved Job*: A Saved Job is a Retained Job that the Printer retains indefinitely (until  
153 removed by a Delete-Job or Purge-Jobs operation) so that a copy of it can be reprinted  
154 any time using the Reprocess-Job or Resubmit-Job operations, rather than aging the job  
155 out after an implementation-defined period. [PWG5100.11]

#### 156 | 1.2 Acronyms and Organizations

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

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

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

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

## 161 3. Requirements for IPP Job Reprint Password

### 162 3.1. Use Cases

#### 163 3.1.1. Protecting a Saved Document with a Persistent Password

164 Wilma has authored a departmental policy~~written a~~ document that she intends to save on  
165 her departmental MFD, to allow some of her peers to print copies as needed. But as the  
166 document contains sensitive information, Wilma wishes to only allow those who know the  
167 job's password to re-print copies. She is familiar with providing a password when  
168 configuring a print job, and she is also familiar with configuring the job to be saved in the  
169 printer. In the print dialog used to configure the print job on her computer, Wilma provides  
170 a password, and also chooses to have the job saved. Wilma clicks "Print" and the  
171 computer submits the job to the printer. The printer saves the job content and protects it  
172 with the password provided.

#### 173 3.1.2. Re-printing a Saved Job Via Printer Control Panel

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

#### 179 3.1.3. Re-printing a Saved Job Using An IPP Client

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

### 185 3.2. Exceptions

#### 186 3.2.1. Unauthorized Re-printing Disallowed From Printer Control Panel

187 Harvey, an employee from another department, walks up to Wilma's departmental MFD.  
188 He navigates the MFD's control panel user interface and sees Wilma's departmental  
189 policy document listed on the control panel. He tries to get the MFD to produce a re-print.  
190 The MFD challenges Harvey for the reprint password; Harvey doesn't know it. The MFD  
191 won't re-print the document without receiving the reprint password, so Harvey walks away  
192 empty handed.

193 ~~Harvey, an employee from another department, walks up to Wilma's departmental MFD.~~  
194 ~~The~~

195 Out of Scope

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

- 197 1. How the Document or Documents in a Job are stored by the Printer
- 198 2. Methods for encrypting the document itself.

199 3. Mechanisms for supporting per-user credentials / access control list for releasing  
200 the stored job.

### 201 3.3. Design Requirements

202 The design requirements for this document are:

- 203 1. Use existing attributes or collections if possible.
- 204 2. Support at the least the fidelity supported currently by “job password” and “job-  
205 password-encryption”
- 206 3. Register all attributes and operations with IANA

207 The design recommendations for this document are:

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

## 211 4. New Operation Attributes For Existing Operations

### 212 2. ~~Operation Attributes~~

### 213 3. ~~job-reprint-password (octetString(255)accesses (collection |~~ 214 ~~no-value)~~

215 ~~The REQUIRED "job-reprint-password" Operation attribute specifies the password the~~  
216 ~~Printer requires before permitting the saved Job to be reprinted. The Printer permanently~~  
217 ~~attaches the password to a saved Job [PWG5100.11]. A Client MAY provide a zero-length~~  
218 ~~value or the 'no-value' out-of-band value to specify that no authentication is required to~~  
219 ~~reprint the Job. The Printer MUST challenge the User for this password to authorize~~  
220 ~~reprinting that Saved Job if the value is a non-zero-length octetString.~~

221 ~~The OPTIONAL "job-reprint-accesses" operation attribute allows the Client to provide~~  
222 ~~authentication credentials that will be permanently attached to a saved Job~~  
223 ~~[PWG5100.11]. The Printer will require a User to provide matching credentials to authorize~~  
224 ~~a reprint of that saved Job. A Client MAY also provide the 'no-value' out-of-band value to~~  
225 ~~specify that no authentication information is necessary; sending the 'no-value' out-of-band~~  
226 ~~value is equivalent to not sending the "job-reprint-accesses" attribute. The "job-reprint-~~  
227 ~~accesses" attribute MUST NOT be sent over an insecure IPP connection.~~

228 The Printer MUST associate this operation attribute with the Job, and it MUST persist for  
229 as long as the Job is retained and available for reprinting. ~~The However the~~ Printer MUST  
230 NOT allow access to the Job's stored “job-reprint-~~password~~accesses” attribute via IPP or  
231 any other protocol. IPP operations that can and cannot include this operation attribute are  
232 listed in Section 12.1 of this document. ~~This attribute MUST NOT be included in any IPP~~  
233 ~~operation responses.~~

234 ~~A Client MUST NOT include the "job-reprint-password" Operation attribute in an Operation~~  
235 ~~sent over an insecure IPP connection. This Operation attribute MUST be present in the~~  
236 ~~Operation request if the "job-reprint-password-encryption" operation attribute is present.~~



237 | **4.1. job-reprint-password-encryption (type2 keyword | name(MAX))**

238 | ~~Printers specify which member attributes are supported using the "job-reprint-accesses-~~  
239 | ~~supported" Printer attribute (section XXX).~~

240 | ~~The "job-reprint-password-encryption" Operation attribute specifies the hashing algorithm~~  
241 | ~~used to obfuscate the password to produce the value specified by the "job-reprint-~~  
242 | ~~password" operation attribute. This attribute is semantically similar to the "job-password-~~  
243 | ~~encryption" operation attribute [PWG5100.11]. This attribute MUST NOT be included in~~  
244 | ~~any IPP operation responses.~~

245 | **3.1.1. access-oauth-token (1setOf octetString(MAX))**

246 | ~~5. The OPTIONAL "access-oauth-token" member attribute provides a Base64-encoded~~  
247 | ~~OAuth Access Token as defined in The OAuth 2.0 Authorization Framework [RFC6749].~~  
248 | ~~When the size of the access token exceeds 1023 octets (the maximum size of an~~  
249 | ~~octetString value), the Client separates the token into multiple octetString values and~~  
250 | ~~sends the result as an ordered set to the Printer. The Printer reassembles each~~  
251 | ~~octetString to produce the complete access token value to be used to access the~~  
252 | ~~Document URI.~~

253 | ~~6. Printers that support this attribute MUST list 'access-oauth-token' in the "job-reprint-~~  
254 | ~~accesses-supported" Printer Description attribute. This member attribute MUST be~~  
255 | ~~present if the "access-oauth-uri" member attribute is present.~~

256 | **6.1.1. access-oauth-uri (uri)**

257 | ~~7. The OPTIONAL "access-oauth-uri" member attribute is the authorization server that~~  
258 | ~~issued the "access-oauth-token" member attribute. See Authorization Server [RFC6749]~~  
259 | ~~section 1.1. This member attribute MUST be present if the "access-oauth-token"~~  
260 | ~~member attribute is present.~~


261 | **7.1.1. access-password (text(MAX))** 

262 | ~~8. The OPTIONAL "access-password" member attribute provides a password string,~~  
263 | ~~typically for HTTP Basic Authentication [RFC7617] or HTTP Digest authentication~~  
264 | ~~[RFC7616]. Clients MUST provide the password using the UTF-8 encoding [STD63] in~~  
265 | ~~Unicode Normalization Form C as required for Network Unicode [RFC5198]. Printers~~  
266 | ~~MUST convert the password, as needed, to whatever encoding is required to access~~  
267 | ~~the Document URI.~~

268 | **3.1.2. If the Client specifies a zero-length value or 'no-value' for "job-reprint-**  
269 | **password" then the value of this attribute MUST be 'none'.**

270 | ~~Printers that support this attribute MUST list 'access-password' in the "job-reprint-~~  
271 | ~~accesses-supported" Printer Description attribute.~~

272 | **3.1.3. access-pin (text(MAX))**

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

277 This Operation attribute MUST be present in the Operation request if the "job-reprint-  
278 password" operation attribute is present. The value of Printers that support this attribute  
279 must be one of the values listed MUST list 'access-pin' in the Printer's "job-reprint-  
280 password-encryption-supported"accesses-supported" Printer Description attribute.

#### 281 **3.1.4. access-user-name (text(MAX))**

282 ~~9. The OPTIONAL "access-user-name" member attribute provides a user name string,~~  
283 ~~typically for HTTP Basic Authentication [RFC7617] or HTTP Digest authentication~~  
284 ~~[RFC7616]. Clients MUST provide the user name using the UTF-8 encoding [STD63] in~~  
285 ~~Unicode Normalization Form C as required for Network Unicode [RFC5198]. Printers~~  
286 ~~MUST convert the user name, as needed, to whatever encoding is required by the~~  
287 ~~Document URI.~~

288 ~~10. Printers that support this attribute MUST list 'access-user-name' in the "job-reprint-~~  
289 ~~accesses-supported" Printer Description attribute.~~

11.

#### 290 **3.1.5. Printer Description Attributes**

##### 291 **11.1. job-reprint-passwordaccesses-supported** 292 **(rangeOfInteger(0:255)setOf (type2 keyword))**

293 The "job-reprint-password-supported" attribute specifies the minimum and maximum  
294 length the Printer supports for the cleartext unencrypted password. A conforming Printer  
295 MUST be able to accept 255 octets without truncation. However, a Printer MAY be  
296 implemented as a gateway to another print system that cannot accept the full 255-octet  
297 range, in which case the client MUST NOT allow an unencrypted password greater than  
298 the length specified by this attribute.

299 If the "job-reprint-password" Operation attribute is supported, then this attribute MUST be  
300 supported.

301 ~~The "job-reprint-accesses-supported" Printer Description attribute specifies which member~~  
302 ~~attributes the Printer supports in the "job-reprint-accesses" operation attribute. This~~  
303 ~~attribute MUST be supported if the "job-reprint-accesses" operation attribute is supported.~~

304 ~~job-reprint-password-encryption-supported (1setOf (type3 keyword | name(MAX)))~~

305 The "job-reprint-password-encryption-supported" Printer Description attribute specifies the  
306 encryption methods the Printer supports for obfuscating the value of the "job-reprint-  
307 password" Operation attribute. The set of allowable keywords for this attribute are the  
308 same as those registered for the "job-password-encryption" attribute [PWG5100.11].  
309 Deprecated keywords SHOULD NOT be listed.

310 If the Printer supports the "job-reprint-password" and "job-reprint-password-encryption"  
311 Operation attributes, then this attribute MUST be supported.

##### 312 **11.2. job-reprint-password-repertoire-supported (1setOf (type2** 313 **keyword))**

314 The "job-reprint-password-repertoire-supported" Printer Description attribute specifies the  
315 password repertoire (set of allowable characters) supported by this Printer for the "job-


316 reprint-password” Operation attribute. A Client SHOULD use this attribute's value to limit  
317 the range of allowable User input so that the value in "job-reprint-password" will be  
318 supported by the Printer. If the value of the “job-reprint-password” Operation attribute is  
319 encrypted, the Printer will be unable to reject the password at time of receipt, and the User  
320 may never be able to successfully authenticate to reprint the Job.

## 321 | **12. Additional Semantics ~~For~~ Existing Operations**

### 322 | **12.1. Print-Job, Print-URI, Create-Job and job-reprint-accesses**

323 The “~~job-reprint-password” and “job-reprint-password-encryption” Operation attributes~~  
324 ~~accesses” operation attribute~~ MAY be included in Print-Job, Print-URI, and Create-Job  
325 operation requests [RFC8011] to specify the persistent access credentials for a Job  
326 created by one of these operations. ~~Although the The~~ “~~job-reprint-password” and “job-~~  
327 ~~reprint-password-encryption” attributes get accesses” attribute gets~~ copied to the Job  
328 Object, ~~but~~ the Printer MUST NOT include a Job's “~~job-reprint-password” and “job-reprint-~~  
329 ~~password-encryption” attributes as accesses” attribute as a~~ Job Description  
330 ~~attributesattribute~~ in a Job operation such as Get-Job-Attributes [RFC8011].

### 331 | **3.2. ~~Resubmit-Job and job-reprint-accesses~~**

332 13. ~~The “job-reprint-accesses” operation attribute MUST NOT be included in Resubmit-~~  
333 ~~Job operation requests [PWG5100.11] to provide the access credentials matching the~~  
334 ~~ones in a Retained Job.~~ 

### 335 | **3.3. Internationalization Considerations**

336 For interoperability and basic support for multiple languages, conforming implementations  
337 MUST support the Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)  
338 [STD63] encoding of Unicode [UNICODE] [ISO10646] and the Unicode Format for  
339 Network Interchange [RFC5198].

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

- 342 • Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 343 • Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 344 • Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 345 • Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 346 • Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 347 • Unicode Collation Algorithm [UTS10] – sorting
- 348 • Unicode Locale Data Markup Language [UTS35] – locale databases

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

- 351 • Unicode Character Encoding Model [UTR17] – multi-layer character model

- 352 • Unicode in XML and other Markup Languages [UTR20] – XML usage
- 353 • Unicode Character Property Model [UTR23] – character properties
- 354 • Unicode Conformance Model [UTR33] – Unicode conformance basis

## 355 14. Security Considerations

356 The IPP extensions defined in this document require the same security considerations as  
 357 defined in the IPP/1.1: Model and Semantics [RFC8011], IPP: Job and Printer Extensions  
 358 – Set 2 (JPS2), and IPP Job Password Repertoire.

359 In addition to those requirements, the Printer MUST protect the values of “job-reprint-  
 360 accesses” at rest. Also, the Printer MUST reject any IPP operation sent over a non-  
 361 encrypted connection that includes the “job-reprint-accesses” attribute.

### 362 14.1. Human-readable Strings

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

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

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

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

## 369 15. IANA Considerations

### 370 15.1. Attribute Registrations

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

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

374 The registry entries will contain the following information:

| 375 | Operation attributes:  | Reference |
|-----|--|-----------|
| 376 | -----  | -----     |
| 377 | job-reprint- <del>password</del> ( <del>octetString(255)</del> <del>accesses</del> ( <del>collection</del>   no- |           |
| 378 | value) <del>——</del> <del>{}]</del>  |           |
| 379 | <del>access</del> <del>oauth</del> <del>token</del> ( <del>1setOf octetString(MAX))</del> <del>{}]</del>         |           |
| 380 | <del>access</del> <del>oauth</del> <del>uri</del> ( <del>uri)</del>  |           |
| 381 | [REPRINTPWD]   |           |
| 382 | <del>job-reprint-password-encryption</del>   |           |
| 383 | <del>access</del> <del>password</del> ( <del>text(MAX))</del> <del>{}]</del>                                     |           |
| 384 | <del>access</del> <del>pin</del> ( <del>text(MAX))</del> <del>{}]</del>  |           |
| 385 | <del>access</del> <del>user</del> <del>name</del> ( <del>text(MAX))</del> <del>{}]</del>                         |           |
| 386 | <del>access</del> <del>x509</del> <del>certificate</del> ( <del>1setOf octetString(MAX))</del> <del>{}]</del>    |           |

387 | type2 keyword | name (MAX) )----- [REPRINTPWD]-  
388 | {}-----

389 | Printer Description attributes: Reference  
390 | -----  
391 | ~~job-reprint-password-supportedaccesses-configured (1setOf (type2~~  
392 | ~~keyword))~~  
393 | ~~(rangeOfInteger (0:255))~~-----  
394 | [REPRINTPWD]  
395 | ~~job-reprint-password-encryption-supportedaccesses-supported~~  
396 | ~~(1setOf (type2 keyword))~~  
397 | ~~(1setOf (type3 keyword | name (MAX)))~~-----  
398 | [REPRINTPWD]  
399 | job-reprint-password-repertoire-supported  
400 | (1setOf (type2 keyword)) [REPRINTPWD]

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493 Ira McDonald – High North Inc.  
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## 495 18. Change History

### 496 18.1. April 24, 2018

497 Re-authored using the new PWG Working Draft template for Apache OpenOffice, moving  
498 away from LibreOffice due to interoperability issues. Also, adopted changes  
499 recommended in the April 12, 2018 IPP WG meeting:

- 500 • Returned to the “job-password” / “job-password-encryption” attribute set design  
501 pattern from the “xxx-accesses” attribute set design pattern.

### 502 18.2. April 4, 2018

503 Updated as per feedback from IPP WG meeting on March 29, 2018

- 504 • Converted document to an IPP Registration document and made document  
505 changes and file name changes to comply with that policy.

- 506 • Renamed “job-save-accesses” to “job-reprint-accesses”
- 507 • Removed “access-x509-certificate” but can add it back in later if its use becomes
- 508 more clearly defined

### 509 **3.4 March 13, 2018**

510 Updated as per feedback from IPP WG reflector:

- 511 • Fixed the abstract to make it less redundantly redundant.
- 512 • Fixed RFC references for HTTP Basic and Digest authentication
- 513 • Removed “job-save-accesses-configured” (but I still don’t understand why some
- 514 use the “xxx” / “xxx-supported” model while others use “xxx” / “xxx-configured” /
- 515 “xxx-supported”...)
- 516 • Added new “Additional Semantics for Existing Operations” section
- 517 • Updated Security Considerations

### 518 **3.5 March 11, 2018**

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

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

### 526 **3.6 February 5, 2018**

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

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

### 531 **3.7 December 5, 2017**

532 | Initial revision.

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