



June 19, 2018  
IPP Registration

## The Printer Working Group

1 **IPP Job Reprint Password**  
2 **(REPRINTPWD)**

3 *Status: Stable*

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

7 This document is an IPP Registration. For a definition of an “IPP Registration Document”,  
8 see:

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

10 This document is available electronically at:

11 <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippreprintpwd-20180619.odt>

12 <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippreprintpwd-20180619.pdf>

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65 manufacturers and vendors of printer related software will benefit from the interoperability  
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70 For additional information regarding the Printer Working Group visit:

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## 120 **1. Introduction**

121 Users and network administrators are increasingly concerned about network and data  
122 security, and this extends to printing. Most all Users are familiar with sending a Job to a  
123 Printer and the Printer processing that Job fairly immediately. Some Printers support  
124 controlling the processing using a “job password” that prevents the Job from being  
125 processed until the User provides that password on the Printer's control panel to approve  
126 its release to processing. The IPP “job-password” operation attribute [PWG5100.11] and  
127 related attributes support this workflow in IPP.

128 Some Printers also support saving Jobs for later printing or re-printing. This facility might  
129 be provided as a user-selectable feature at job creation time, for instance using IPP Job  
130 Save [PWG5100.11]. Or the Printer might be configured to save all Jobs for some period of  
131 time so they are available for reprinting, without requiring the User to overtly choose this at  
132 job creation time.

133 But as defined currently, the IPP defined to support these two features cannot be used  
134 together to support the “saved job with password” scenario without changing the defined  
135 semantics of the existing IPP attributes. The Printer could provide unique processing  
136 methodologies to cause the job password to persist, but doing so would violate backward  
137 compatibility with the expected semantic defined for the “job-password” operation attribute.  
138 This could lead to a discrepancy between the User's expectations and what the Printer  
139 produces.

140 This registration defines a new “job-reprint-password” operation attribute to support the  
141 “saved job with password” scenario.

## 142 **2. Terminology**

### 143 **2.1. Protocol Roles Terminology**

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

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

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

### 151 **2.2. Other Terms Used in This Document**

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

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

157 **2.3. Acronyms and Organizations**

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

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

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

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

162 **3. Rationale for IPP Job Reprint Password**

163 In the definition of IPP Job Save [PWG5100.11], a reprint means that a Job has been  
 164 processed and reached the completed state, and the Job has been saved (implicitly or  
 165 explicitly). To simply save a Job, the Printer “processes” the Job by saving it.

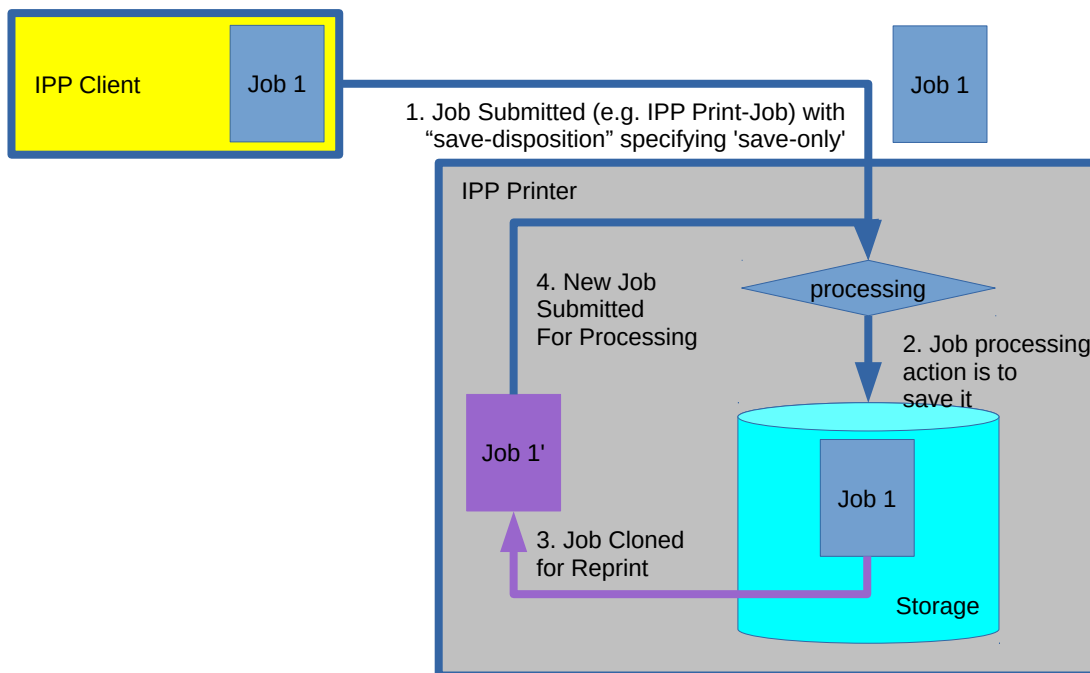


Figure 1: IPP Job Save and Reprint

166 The “job-password” operation attribute was defined to prevent the Printer from processing  
 167 the submitted Job until the matching password was provided to the Printer. Since it is an  
 168 operation attribute, the “job-password” attribute is not supposed to persist beyond the  
 169 execution of that operation.

170 If “job-password” is used with IPP Job Save, preventing Job processing will prevent the  
171 Job Save process from completing because the Job’s processing when Job Save is  
172 enabled is to save the Job.

173 Since the individual semantics of these IPP attributes cannot be used in combination with  
174 one another to provide support for the “saved job with password” scenarios described in  
175 section 3.1, this registration document defines new IPP attributes to enable IPP to provide  
176 that support.

## 177 **3.1. Use Cases**

### 178 **3.1.1. Protecting a Saved Document with a Persistent Password**

179 Wilma has authored a departmental policy document that she intends to save on her  
180 departmental MFD, to allow some of her peers to print copies as needed. But as the  
181 document contains sensitive information, Wilma wishes to only allow those who know the  
182 job’s password to re-print copies. She is familiar with providing a password when  
183 configuring a print job, and she is also familiar with configuring the job to be saved in the  
184 printer. In the print dialog used to configure the print job on her computer, Wilma provides a  
185 password, and also chooses to have the job saved. Wilma clicks “Print” and the computer  
186 submits the job to the printer. The printer saves the job content and protects it with the  
187 password provided.

### 188 **3.1.2. Re-printing a Saved Job Via Printer Control Panel**

189 Barney hears from Wilma that she has saved that document to the departmental MFD.  
190 Wilma tells Barney the job’s name, and Barney then goes to the MFD and looks up the job.  
191 He taps on the control panel to have a copy printed, and is prompted to enter the job’s  
192 password. He enters that on the control panel, and the MFD prints a copy. Barney collects  
193 it from the output bin and returns to his desk.

## 194 **3.2. Exceptions**

### 195 **3.2.1. Unauthorized Re-printing Disallowed From Printer Control Panel**

196 Harvey, an employee from another department, walks up to Wilma’s departmental MFD.  
197 He navigates the MFD’s control panel user interface and sees Wilma’s departmental policy  
198 document listed on the control panel. He tries to get the MFD to produce a re-print. The  
199 MFD challenges Harvey for the reprint password; Harvey doesn’t know it. The MFD won’t  
200 re-print the document without receiving the reprint password, so Harvey walks away empty  
201 handed.

## 202 **3.3. Out of Scope**

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



- 204 1. How the Document or Documents in a Job are stored by the Printer
- 205 2. Methods for encrypting the document itself.
- 206 3. Mechanisms for supporting per-user credentials / access control list for releasing
- 207 the stored job.
- 208 4. Remote access for reprint.

### 209 **3.4. Design Requirements**

210 The design requirements for this document are:

- 211 1. Use existing attributes or collections if possible.
- 212 2. Support at the least the fidelity supported currently by “job password” and “job-
- 213 password-encryption”
- 214 3. Register all attributes and operations with IANA

215 The design recommendations for this document are:

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

## 219 **4. New Operation Attributes For Existing Operations**

### 220 **4.1. job-reprint-password (octetString(255) | no-value)**

221 The REQUIRED “job-reprint-password” operation attribute specifies the password the  
222 Printer requires before permitting the saved Job to be reprinted. The Printer permanently  
223 attaches the password to a saved Job [PWG5100.11]. The Printer MUST associate this  
224 operation attribute with the Job when the Job Creation operation includes this attribute in  
225 the operation request, for as long as the Job is retained and available for reprinting. A  
226 Printer that supports and accepts the “job-reprint-password” attribute MUST save any Job  
227 that is created using a Job Creation operation that includes the “job-reprint-password”  
228 operation attribute. This operation attribute is used as a request attribute for the Job  
229 Creation operations listed in section 6.1, and as a response attribute for the Fetch-Job  
230 operation [PWG5100.18]. The Printer MUST NOT allow access to the Job's stored “job-  
231 reprint-password” attribute via IPP Get-Jobs or Get-Job-Attributes operations, but  
232 SHOULD provide access via Fetch-Job [PWG5100.18]. More detailed information about  
233 IPP operations that can include this operation attribute in either a request or response are  
234 listed in Section 6.1 of this document.

235 A Client MUST NOT include the “job-reprint-password” operation attribute in an operation  
236 sent over an insecure IPP connection. This operation attribute MUST be present in the

237 operation request if the “job-reprint-password-encryption” operation attribute is present in  
238 the operation request.

#### 239 **4.2. job-reprint-password-encryption (type2 keyword | name(MAX))**

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 equivalent to the “job-  
243 password-encryption” operation attribute [PWG5100.11]. This operation attribute is used as  
244 a request attribute for the Job Creation operations listed in section 6.1, and as a response  
245 attribute for the Fetch-Job operation [PWG5100.18]. The Printer MUST NOT allow access  
246 to the Job's stored “job-reprint-password” attribute via IPP Get-Jobs or Get-Job-Attributes  
247 operations, but SHOULD provide access via Fetch-Job [PWG5100.18]. More detailed  
248 information about IPP operations that can include this operation attribute in either a  
249 request or response are listed in Section 6.1 of this document.

250 The value of this attribute must be one of the values listed in the Printer's “job-reprint-  
251 password-encryption-supported” Printer Description attribute. If the Client specifies a zero-  
252 length value or 'no-value' for “job-reprint-password” then the value of this attribute MUST  
253 be 'none'.

### 254 **5. Printer Description Attributes**

#### 255 **5.1. job-reprint-password-supported (rangeOfInteger(0:255))**

256 The “job-reprint-password-supported” attribute specifies the minimum and maximum  
257 length the Printer supports for the cleartext unencrypted password. A conforming Printer  
258 MUST be able to accept 255 octets without truncation. However, a Printer MAY be  
259 implemented as a gateway to another print system that cannot accept the full 255-octet  
260 range, in which case the client MUST NOT allow an unencrypted password greater than  
261 the length specified by this attribute.

262 If the “job-reprint-password” operation attribute is supported, then this attribute MUST be  
263 supported.

#### 264 **5.2. job-reprint-password-encryption-supported (1setOf type2 keyword |** 265 **name(MAX))**

266 The “job-reprint-password-encryption-supported” Printer Description attribute specifies the  
267 encryption methods the Printer supports for obfuscating the value of the “job-reprint-  
268 password” operation attribute. The set of allowable keywords for this attribute are the same  
269 as those registered for the “job-password-encryption” attribute [PWG5100.11]. Deprecated  
270 keywords SHOULD NOT be listed.

271 If the Printer supports the "job-reprint-password" and "job-reprint-password-encryption"  
272 operation attributes, then this attribute MUST be supported.

### 273 **5.3. job-reprint-password-repertoire-configured (type2 keyword)**

274 The "job-reprint-password-repertoire-configured" attribute indicates the password  
275 repertoire currently configured for this Printer. The value of this attribute MUST be one of  
276 the set of values listed in the "job-reprint-password-repertoire-supported" attribute defined  
277 in 5.4. A supporting Client can use this attribute's value to limit User input so that the value  
278 in "job-reprint-password" will comply with the configured password repertoire.

### 279 **5.4. job-reprint-password-repertoire-supported (1setOf type2 keyword)**

280 The "job-reprint-password-repertoire-supported" Printer Description attribute specifies the  
281 password repertoires (sets of allowable characters) supported by this Printer for the "job-  
282 reprint-password-repertoire-configured" Printer Description attribute.

## 283 **6. Additional Semantics For Existing Operations**

### 284 **6.1. Print-Job, Print-URI, Create-Job and job-reprint-password**

285 The "job-reprint-password" and "job-reprint-password-encryption" operation attributes MAY  
286 be included in a Print-Job, Print-URI, or Create-Job operation request [RFC8011] to  
287 specify the persistent access credentials for a Job created by one of these operations. The  
288 Printer MUST NOT include a Job's "job-reprint-password" and "job-reprint-password-  
289 encryption" attributes in any Job operation such as Get-Jobs or Get-Job-Attributes  
290 [RFC8011].

### 291 **6.2. Fetch-Job and job-reprint-password**

292 The "job-reprint-password" and "job-reprint-password-encryption" operation attributes MAY  
293 be included in a Fetch-Job [PWG5100.18] operation response. The "job-reprint-password"  
294 and "job-reprint-password-encryption" operation attributes MUST NOT be included in a  
295 Fetch-Job [PWG5100.18] operation request.

## 296 **7. Internationalization Considerations**

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

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

- 303 • Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical
- 304 • Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping
- 305 • Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]
- 306 • Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences
- 307 • Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization
- 308 • Unicode Collation Algorithm [UTS10] – sorting
- 309 • Unicode Locale Data Markup Language [UTS35] – locale databases

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

- 312 • Unicode Character Encoding Model [UTR17] – multi-layer character model
- 313 • Unicode in XML and other Markup Languages [UTR20] – XML usage
- 314 • Unicode Character Property Model [UTR23] – character properties
- 315 • Unicode Conformance Model [UTR33] – Unicode conformance basis

## 316 **8. Security Considerations**

317 The IPP extensions defined in this document require the same security considerations as  
318 defined in the IPP/1.1: Model and Semantics [RFC8011], IPP: Job and Printer Extensions  
319 – Set 2 (JPS2) [PWG5100.11], and IPP Job Password Repertoire [IPPREPERTOIRE].

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

### 323 **8.1. Human-readable Strings**

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

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

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

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

## 330 9. IANA Considerations

### 331 9.1. Attribute Registrations

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

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

335 The registry entries will contain the following information:

336	Operation attributes:	Reference
337	-----	-----
338	job-reprint-password (octetString(255)   no-value)	
339		[REPRINTPWD]
340	job-reprint-password-encryption	
341	(type2 keyword   name(MAX))	[REPRINTPWD]
342	Printer Description attributes:	Reference
343	-----	-----
344	job-reprint-password-supported	
345	(rangeOfInteger(0:255))	[REPRINTPWD]
346	job-reprint-password-encryption-supported	
347	(1setOf type2 keyword   name(MAX))	[REPRINTPWD]
348	job-reprint-password-repertoire-configured	
349	(1setOf type2 keyword)	[REPRINTPWD]
350	job-reprint-password-repertoire-supported	
351	(1setOf type2 keyword)	[REPRINTPWD]

## 352 10. References

### 353 10.1. Normative References

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447 Ira McDonald – High North Inc.  
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## 449 **12. Change History**

### 450 **12.1. June 20, 2018**

451 Added a figure to section 3 and also moved the new text from section 4 to section 3  
452 because that is where it seems to fit best.

### 453 **12.2. June 19, 2018**

454 Updated as per feedback from the PWG May 2018 F2F

- 455 • Rewrote section 1
- 456 • Fixed title of section 3
- 457 • Removed section 3.1.3
- 458 • Added preamble text to section 4
- 459 • Updated Section 4 with a number of changes
- 460 • Added “job-reprint-password-repertoire-configured” to Section 5
- 461 • Added Fetch-Job to Section 6
- 462 • Added references to 5100.18 and IPPREPERTOIRE



**463 12.3. April 24, 2018**

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

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

**469 12.4. April 4, 2018**

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

- 471 • Converted document to an IPP Registration document and made document  
472 changes and file name changes to comply with that policy.
- 473 • Renamed “job-save-accesses” to “job-reprint-accesses”
- 474 • Removed “access-x509-certificate” but can add it back in later if its use becomes  
475 more clearly defined

**476 1.1 March 13, 2018**

477 Updated as per feedback from IPP WG reflector:

- 478 • Fixed the abstract to make it less redundantly redundant.
- 479 • Fixed RFC references for HTTP Basic and Digest authentication
- 480 • Removed “job-save-accesses-configured” (but I still don't understand why some use  
481 the “xxx” / “xxx-supported” model while others use “xxx” / “xxx-configured” / “xxx-  
482 supported”...)
- 483 • Added new “Additional Semantics for Existing Operations” section
- 484 • Updated Security Considerations

**485 1.2 March 11, 2018**

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

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

493 **1.3 February 5, 2018**

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

495 • Updated Use Cases, Out of Scope and Design Requirements sections

496 • Refactored to make the solution become member attributes of job-save, with  
497 associated Printer Description attributes.

498 **1.4 December 5, 2017**

499 Initial revision.