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The Printer Working Group Internet Printing Protocol (IPP): "-actual" attributes extension



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18 October 2002



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The Printer Working Group Standard for Internet Printing Protocol (IPP): "-actual" attributes extension

Abstract: This document defines an extension to the Internet Printing Protocol/1.0 (IPP/1.0) [RFC2566, RFC2565] & IPP/1.1 [RFC2911, RFC2910] for the OPTIONAL "-actual" set of Job Description attributes that correspond to Job Template attributes defined in IPP. These "-actual" attributes allow the client to determine the true results of a print job regardless of what was specified in the Create-Job or Print-Job operation.

This document is available electronically at:
ftp://ftp.pwg.org/pub/pwg/ipp/new_ACT/IPP-actual-attributes.pdf, .doc

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56 Title: The Printer Working Group – Internet Printing Protocol (IPP): "-actual" attributes
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111 Contact information:

112 IPP Web Page: <http://www.pwg.org/ipp/>

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114 To subscribe to the ipp mailing list, send the following email:

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116 2) leave the subject line blank

117 3) put the following two lines in the message body:

118 subscribe ipp

119 end

120

121 Implementers of this specification are encouraged to join the IPP Mailing List in order to
122 participate in any discussions of clarifications or review of registration proposals for additional
123 names. Requests for additional media names, for inclusion in this specification, should be sent to
124 the IPP Mailing list for consideration.

125

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146 1 Introduction

147 This document specifies an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1
148 [RFC2910, RFC2911]. This extension consists of a set of OPTIONAL Job Description attributes that correspond to
149 the set of Job Template attributes defined in IPP. Specifically, for each Job Template attribute, there is a
150 corresponding “-actual” attribute that reports the value that was actually used in the processing of the job. As an
151 example, along with the “copies” Job Template attribute would be the new “copies-actual” Job Description attribute,
152 which would have a value corresponding to the actual number of copies of the job that were printed (or are going to
153 print). These attributes permit an IPP Printer to report much more accurate status to a IPP client. These attributes
154 ultimately allow the client to determine the true results of a print job regardless of what was specified in the Create-
155 Job or Print-Job operation.

156
157 These new attributes are OPTIONAL for a Printer to support, and are OPTIONAL for a client to use.

158 1.1 Problem

159 In IPP/1.0 and IPP/1.1, it is possible for a client to request specific job processing behavior, through the use of the
160 Job Template attributes. Some examples of Job Template attributes are “copies”, “sides”, and “media”. The client
161 specifies these attributes in the job creation operation—for example, the Print-Job operation. It is also possible to
162 query the values of those Job Template attributes, using, for example, the Get-Job-Attributes operation. Note that
163 the value returned in a query is always the same as the value that was specified on the job creation operation.

164 It is also possible for a Printer to state, using the “pdl-override-supported” Printer Description attribute, whether the
165 Printer will attempt to override any instructions in the PDL with the values given by the Job Template attributes.
166 Imagine a job that was submitted with Job Template attribute “copies” set to 5, but the actual PDL contained in the
167 job specified 3 copies. A Printer that supports PDL override (that is, returns a value of ‘attempted’ for the “pdl-
168 override-supported” attribute) promises to attempt to print that job with 5 copies rather than 3.

169 Putting the above facts together, there is a well-defined case where the client can request a number of copies
170 through the “copies” attribute and be somewhat confident that the request will be honored.

171 However, in practice, this case is not necessarily the most prevalent.

172 First, many clients either do not or cannot specify the instructions themselves. As an example, a client integrated
173 into the Windows print subsystem must be either, in Windows terms, a print provider or a print monitor. Neither of
174 these components in the print subsystem have GUIs set up for the user to provide processing behavior requests.
175 Instead, in Windows, these requests are typically made through the print driver and therefore embedded in the PDL
176 of the job.

177 Similarly, many Printers do not support PDL override, possibly due to architecture constraints or limits based on the
178 size of the Printer. For such Printers, a Job Template attribute value specified by the client does not necessarily
179 have any correlation with the actual value used; for example, specifying a “copies” value of 3 has absolutely no effect
180 on the number of copies produced.

181 Also note that even when the Printer supports PDL override, it only promises to attempt to override. There is no
182 guarantee that the requested value will end up being the “actual” value.

183 Therefore, there is a need for a method to allow clients to find out what actually happened with a job: Did it actually
184 print 5 copies?

185 1.2 Solution

186 The solution to this problem is to add a set of Job Description attributes to report these “what actually happened”
187 values. There would be one such Job Description attribute for each Job Template attribute. This goes along with the
188 already-existing concept that each Job Template attribute has a corresponding “-supported” and “-default” attribute;
189 now there will also be a corresponding “-actual” attribute. These new attributes can be queried using existing
190 operations to retrieve information on what actually happened, or what will actually happen, for a job.

191 1.3 Alternative solutions

192 There are a number of possible solutions to this problem. The solution discussed in this document is considered to
193 be the one with the least impact on the overall architecture of IPP, creating the least churn on the model while
194 providing full support to clients to discover the “actual” processing behavior.

195 Many have remarked that what is being described here is essentially what is currently in the industry being termed a
196 “Job Ticket”. Adding full job ticket support to IPP would be beneficial and would solve this problem. However, this
197 effort is expected to be complicated and result in a possibly significant update to the IPP architecture. Also, adding
198 full job ticket support might be too costly for smaller IPP implementations. The solution described here, then, could
199 be thought of as an inexpensive alternative to a full job ticket solution.

200 2 Terminology

201 This section defines terminology used throughout this document.

202 2.1 Conformance Terminology

203 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, **NEED NOT**, and
204 **OPTIONAL**, have special meaning relating to conformance to this specification. These terms are defined in
205 [RFC2911 section 13.1 on conformance terminology, most of which is taken from RFC 2119 [RFC2119]. Since
206 support of this entire IPP extension specification is **OPTIONAL** for conformance to IPP/1.0 ([RFC2566], [RFC2565])
207 or IPP/1.1 ([RFC2911], [RFC2910]), the terms **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**,
208 **NEED NOT**, and **OPTIONAL** apply *if and only if the extension specification in this document is implemented*.
209 Thus a feature labeled as **REQUIRED** in this document is not **REQUIRED** if implementing the basic IPP/1.1 protocol
210 defined by [RFC2911] and [RFC2910].

211 2.2 Other Terminology

212 This glossary defines certain terms used in this specification which may not be generally familiar or which may be
213 used with very specific meaning. These definitions are not intended to be absolute but do reflect the use of the terms
214 within this specification.

215 **IETF** Internet Engineering Task Force. A volunteer group that develops and approves standards that are relative to
216 the Internet.

217 **ISO** International Organization for Standardization.

218 3 “-actual” Job Description attributes

219 For each Job Template attribute defined in the IPP Model [RFC2566, RFC2911], or defined in any IPP extension
220 document, a new Job Description attribute is defined. This new attribute will be referred to as an “-actual” attribute,

221 since the name of such attributes is found by taking the name of the Job Template attribute and appending “-actual”.
 222 For example, the “copies” Job Template attribute has a new corresponding “copies-actual” Job Description attribute.
 223 These new attributes are OPTIONAL for a Printer to support, and are OPTIONAL for a client to use.
 224 Table 1 below lists the “-actual” Job Description attributes for all Job Template attributes in existence in approved IPP
 225 standard documents as of the date of this document.

226 **Table 1 – “-actual” Job Description attributes**

Job Template Attribute	“-actual” Job Description attribute	Reference
copies (integer(1:MAX))	copies-actual (1setOf integer(1:MAX))	[RFC2911] §4.2.5
cover-back (collection)	cover-back-actual (1setOf (collection))	[PWG5100.3] §3.1
cover-front (collection)	cover-front-actual (1setOf (collection))	[PWG5100.3] §3.1
document-overrides (1setOf collection)	document-overrides-actual (1setOf collection)	[PWG5100.4] §5.1
finishings (1setOf (type2 enum))	finishings-actual (1setOf (type2 enum))	[RFC2911] §4.2.6 and [PWG5100.1] §2
finishings-col (collection)	finishings-col-actual (1setOf (collection))	[PWG5100.3] §3.2
force-front-side (1setOf integer(1:MAX))	force-front-side-actual (1setOf (1setOf integer(1:MAX)))	[PWG5100.3] §3.3
imposition-template (type3 keyword name(MAX))	imposition-template-actual (1setOf (type3 keyword name(MAX)))	[PWG5100.3] §3.4
insert-sheet (collection)	insert-sheet-actual (1setOf (collection))	[PWG5100.3] §3.5
job-account-id (name(MAX))	job-account-id-actual (1setOf (name(MAX)))	[PWG5100.3] §3.6
job-accounting-user-id (name(MAX))	job-accounting-user-id-actual (1setOf (name(MAX)))	[PWG5100.3] §3.7
job-accounting-sheets (collection)	job-accounting-sheets-actual (1setOf (collection))	[PWG5100.3] §3.8
job-error-sheet (collection)	job-error-sheet-actual (1setOf (collection))	[PWG5100.3] §3.9
job-hold-until (type3 keyword name)	job-hold-until-actual (1setOf (type3 keyword name))	[RFC2911] §4.2.2
job-message-to-operator (text(MAX))	job-message-to-operator-actual (1setOf (text(MAX)))	[PWG5100.3] §3.10
job-priority (integer(1:100))	job-priority-actual (1setOf integer(1:100))	[RFC2911] §4.2.1
job-sheets (type3 keyword name)	job-sheets-actual (1setOf (type3 keyword name))	[RFC2911] §4.2.3
job-sheets-col (collection)	job-sheets-col-actual (1setOf (collection))	[PWG5100.3] §3.11
job-sheet-message (text(MAX))	job-sheet-message-actual (1setOf (text(MAX)))	[PWG5100.3] §3.12
media (type3 keyword name(MAX))	media-actual (1setOf (type3 keyword name(MAX)))	[RFC2911] §4.2.11
media-col (collection)	media-col-actual (1setOf (collection))	[PWG5100.3] §3.13
media-input-tray-check (type3 keyword name(MAX))	media-input-tray-check-actual (1setOf (type3 keyword name(MAX)))	[PWG5100.3] §3.14
multiple-document-handling (type2 keyword)	multiple-document-handling-actual (1setOf (type2 keyword))	[RFC2911] §4.2.4
number-up (integer(1:MAX))	number-up-actual (1setOf integer(1:MAX))	[RFC2911] §4.2.9
orientation-requested (type2 enum)	orientation-requested-actual (1setOf (type2 enum))	[RFC2911] §4.2.10
output-bin (type2 keyword name(MAX))	output-bin-actual (1setOf (type2 keyword name(MAX)))	[PWG5100.2] §2.1
page-delivery (type2 keyword)	page-delivery-actual (1setOf (type2 keyword))	[PWG5100.3] §3.15
page-order-received (type2 keyword)	page-order-received-actual (1setOf (type2 keyword))	[PWG5100.3] §3.16
page-overrides (1setOf collection)	page-overrides-actual (1setOf collection)	[PWG5100.4] §5.2

Job Template Attribute	“-actual” Job Description attribute	Reference
page-ranges (1setOf rangeOfInteger(1:MAX))	page-ranges-actual (1setOf rangeOfInteger(1:MAX))	[RFC2911] §4.2.7
pages-per-subset (1setOf integer)	pages-per-subset-actual (1setOf integer)	[PWG5100.4] §5.3
presentation-direction-number-up (type2 keyword)	presentation-direction-number-up-actual (1setOf (type2 keyword))	[PWG5100.3] §3.17
printer-quality (type2 enum)	printer-quality-actual (1setOf (type2 enum))	[RFC2911] §4.2.13
printer-resolution (resolution)	printer-resolution-actual (1setOf resolution)	[RFC2911] §4.2.12
separator-sheets (collection)	separator-sheets-actual (1setOf (collection))	[PWG5100.3] §3.18
sheet-collate (type2 keyword)	sheet-collate-actual (1setOf (type2 keyword))	[RFC3381] §3.1
sides (type2 keyword)	sides-actual (1setOf (type2 keyword))	[RFC2911] §4.2.8
x-image-position (type2 keyword)	x-image-position-actual (1setOf (type2 keyword))	[PWG5100.3] §3.19.2
x-image-shift (integer (MIN:MAX))	x-image-shift-actual (1setOf (integer (MIN:MAX)))	[PWG5100.3] §3.19.3
x-side1-image-shift (integer (MIN:MAX))	x-side1-image-shift-actual (1setOf (integer (MIN:MAX)))	[PWG5100.3] §3.19.4
x-side2-image-shift (integer (MIN:MAX))	x-side2-image-shift-actual (1setOf (integer (MIN:MAX)))	[PWG5100.3] §3.19.5
y-image-position (type2 keyword)	y-image-position-actual (1setOf (type2 keyword))	[PWG5100.3] §3.19.6
y-image-shift (integer (MIN:MAX))	y-image-shift-actual (1setOf (integer (MIN:MAX)))	[PWG5100.3] §3.19.7
y-side1-image-shift (integer (MIN:MAX))	y-side1-image-shift-actual (1setOf (integer (MIN:MAX)))	[PWG5100.3] §3.19.8
y-side2-image-shift (integer (MIN:MAX))	y-side2-image-shift-actual (1setOf (integer (MIN:MAX)))	[PWG5100.3] §3.19.9

227 **3.1 Overall philosophy**

228 These attributes are to be set on a “best effort” basis by the Printer. It cannot be expected that a Printer that can
 229 return a value for some “-actual” attribute will always return a value for that attribute. Also, a Printer does not
 230 guarantee the accuracy of the value until the job has moved to a completion state (job-state is ‘completed’,
 231 ‘canceled’, or ‘aborted’).

232 In the same vein, a client SHOULD be robust in its use of these attributes, being able to handle both when the
 233 attribute is unknown and when the attribute changes value. For example, the client might query for job attributes and
 234 present the status string “Printed page 2 of 4, Copy 3” since the “copies-actual” attribute was returned as ‘unknown’.
 235 Then, the very next query it makes might have a “copies-actual” attribute since the Printer has just determined the
 236 value, so the next status string presented might be “Printed page 3 of 4, Copy 3 of 6”.

237 **3.2 Relationship between “-actual” attributes and Job Template attributes**

238 A very important point about the new “-actual” attributes is that support for them is not in any way tied to the support
 239 for the corresponding Job Template attributes. For example, a Printer that does not support PDL override will not
 240 support the “copies” Job Template attribute either. However, that same Printer SHOULD support the “copies-actual”
 241 attribute if the Printer knows how many copies printed for a job.
 242 Similarly, the “-actual” attribute’s existence is not in any way tied to the existence of the Job Template attribute on the
 243 job creation request. Whether or not a number of copies was requested, the Printer SHOULD report on how many
 244 copies actually printed if the value is known.

245 **3.3 Timeline of values**

246 As with all Job Description attributes, if the value of a supported “-actual” attribute is not yet known for a job, it MUST
 247 be returned with the out-of-band ‘unknown’ value in any query.

248 The value of an “-actual” attribute can change during the processing of a job. The most obvious possible change is
 249 from ‘unknown’ to an actual value, but other possibilities exist as well. For example, a Printer might be planning on
 250 printing 5 copies of a job, but due to some error or to the job being canceled, the job might only print 3 copies. In this
 251 case, the “copies-actual” value would start at 5, then change to 3 at the point the Printer determines the final copy
 252 count will be 3.

253 If a Printer supports PDL override, it SHOULD initialize the “-actual” attribute’s value to be the value that was
254 requested for the associated Job Template attribute on the job creation operation.

255 In any case, a Printer MUST NOT return a value that it does not believe is the correct value; that is, even though the
256 Printer can change the value later, it should never “guess” at the value.

257 **3.4 Multi-valued**

258 All “-actual” attributes are multi-valued. If a certain attribute has more than one value for a job, such as a job that
259 prints partly simplex and partly duplex, the Printer SHOULD include all values, in the order they were used.

260 **4 Conformance Requirements**

261 Any support for the “-actual” attributes is OPTIONAL for both Printers and clients, and any subset of the attributes
262 can be supported.

263 **5 Security Considerations**

264 This specification will have no impact on the security burden of or potential threats to the importing system.

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