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

Version 0.~~43~~, January 31, 2003~~December 16, 2002~~

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Version 0.~~43~~, January 31, 2003~~December 16, 2002~~

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 version of the PWG Proposed Standard is available electronically at:
ftp://ftp.pwg.org/pub/pwg/ipp/new_ACT/pwg-ipp-actual-attrs-v0~~43~~-030131~~021216~~.pdf, .doc

This document is an IEEE-ISTO PWG Proposed standard. For a definition of a "PWG Proposed Standard" and its transition to a "PWG Draft Standard", see: ftp://ftp.pwg.org/pub/pwg/general/pwg-process.pdf. After approval by the PWG (by a Last Call) to transition this Proposed Standard to a Draft Standard, an IEEE-ISTO number will be assigned and this PWG Draft Standard will be available electronically at:

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1 Introduction

This document specifies an extension to the Internet Printing Protocol~~/1.0~~ (IPP) ~~[RFC2565, RFC2566] and IPP/1.1~~ [RFC2910, RFC2911]. This extension consists of a set of OPTIONAL Job Description attributes that correspond to the set of Job Template attributes defined in IPP. Specifically, for each Job Template attribute, there is a corresponding "-actual" attribute that reports the value that was actually used, or will be used, in the processing of the job. As an example, along with the "copies" Job Template attribute would be the new "copies-actual" Job Description attribute, which would have a value corresponding to the actual number of copies of the job that were printed (or are expected to be printed~~going to print~~).

These attributes permit an IPP Printer to report much more accurate status to an IPP client. There are two aspects to this. First, the client can determine the true results of a print job regardless of what was specified in the Create-Job or Print-Job operation. But second, a client can often find out *in advance* what the true results are expected to be; for example, it can tell a user "Copy 3 of 7" rather than simply "Copy 3".

This extension is applicable to IPP/1.0 and IPP/1.1, as well as all future IPP/1.x versions.

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

1.1 Problem

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 Job Template attributes. Some examples of Job Template attributes are "copies", "sides", and "media". The client specifies these attributes in the Job Creation operation—for example, the Print-Job operation. It is also possible to query the values of those Job Template attributes, using, for example, the Get-Job-Attributes operation. Note that the value returned in a query is always the same as the value that was specified on the Job Creation operation.

Using the "pdl-override-supported" Printer Description attribute [RFC2911], it is possible for a Printer to indicate that it will attempt to override instructions in the PDL with values given by the Job Template attributes. Imagine a job that was submitted with Job Template attribute "copies" set to 5, but the PDL contained in the job specified 3 copies. A Printer that supports PDL override (that is, returns a value of 'attempted' for the "pdl-override-supported" attribute) promises to attempt to print that job with 5 copies rather than 3.

Thus, while IPP defines and facilitates a case where the client can request a number of copies through the "copies" attribute and be confident that the request will be honored, in practice, this is not necessarily the most prevalent case.

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

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

Also note that even when the Printer supports PDL override, this is only an indication that the Printer will *attempt* to override. There is no guarantee that the requested value will end up being the "actual" value.

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

1.2 Solution

The solution to this problem is to add a set of Job Description attributes to report these "what actually happened" values. There will be one such Job Description attribute for each Job Template attribute. This extends the pre-existing concept that each Job Template attribute has a corresponding "-supported" and "-default" attribute; now there will also be a corresponding "-actual" attribute. These new attributes can be queried using existing operations to retrieve information on what actually happened, or what will actually happen, for a job.

1.3 Alternative solutions

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

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

1.4 Scope

While implementers of this specification may use the "-actual" attributes to perform accounting functions, this specification is intended to address information that is displayed to a human user.

2 Terminology

This section defines terminology used throughout this document.

2.1 Conformance Terminology

Capitalized terms, such as **MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY, NEED NOT,** and **OPTIONAL**, have special meaning relating to conformance as defined in RFC 2119 [RFC2119] and [RFC2911] section 12.1. If an implementation supports the extension defined in this document, then these terms apply; otherwise, they do not. These terms define conformance to *this document (and [RFC2911]) only*; they do not affect conformance to other documents, unless explicitly stated otherwise. To be more specific:

REQUIRED - an adjective used to indicate that a conforming IPP Printer implementation MUST support the indicated operation, object, attribute, attribute value, status code, or out-of-band value in requests and responses. See [RFC2911] "Appendix A - Terminology for a definition of "support". *Since support of this entire specification is OPTIONAL for conformance to IPP/1.1, the use of the term REQUIRED in this document means "REQUIRED if this OPTIONAL specification is implemented".*

RECOMMENDED - an adjective used to indicate that a conforming IPP Printer implementation is recommended to support the indicated operation, object, attribute, attribute value, status code, or out-of-band value in requests and

responses. *Since support of this entire specification is OPTIONAL for conformance to IPP/1.1, the use of the term RECOMMENDED in this document means "RECOMMENDED if this OPTIONAL specification is implemented".*

OPTIONAL - an adjective used to indicate that a conforming IPP Printer implementation MAY, but is NOT REQUIRED to, support the indicated operation, object, attribute, attribute value, status code, or out-of-band value in requests and responses.

2.2 Other Terminology

This document uses the same terminology as [RFC2911], such as "**client**", "**Printer**", "**attribute**", "**attribute value**", "**keyword**", "**Job Template attribute**", "**Operation attribute**", "**operation**", "**request**", and "**support**" with the same meaning.

3 "-actual" attributes

For each Job Template attribute defined in the IPP Model [~~RFC2566,~~ RFC2911], or defined in any IPP extension document, a new Job Description attribute is defined. This new attribute will be referred to as an "-actual" attribute, since the name of such attributes is found by taking the name of the Job Template attribute and appending "-actual". The "-actual" attribute is multi-valued, where each value has the same syntax as the corresponding Job Template attribute. For example, the "copies" (integer(1:MAX)) Job Template attribute has a new corresponding "copies-actual" (1setOf integer(1:MAX)) Job Description attribute. Another example is the "media-col" (collection) Job Template attribute, which now has a new corresponding "media-col-actual" (1setOf collection) Job Description attribute, where each value in the 1setOf has the same collection syntax, with the same member attributes, as the "media-col" attribute.

The only exception to the rule that each value of the "-actual" attribute has the same syntax as the corresponding Job Template attribute is for Job Template attributes that are themselves multi-valued. For example, the "finishings" (1setOf (type2 enum)) attribute has a corresponding "finishings-actual" (1setOf (type2 enum)) attribute ~~that has the same syntax; that is, the syntax is (1setOf (type2 enum)) instead of (1setOf (1setOf (type2 enum)))~~.

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

Table 1 lists the "-actual" Job Description attributes for all Job Template attributes in existence in approved IPP specifications as of the date of this document.

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

Job Template Attribute	"-actual" Job Description attribute	Reference
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-sheets (collection)	job-accounting-sheets-actual (1setOf (collection))	[PWG5100.3] §3.8
job-accounting-user-id (name(MAX))	job-accounting-user-id-actual (1setOf (name(MAX)))	[PWG5100.3] §3.7
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
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
print-quality (type2 enum)	print-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

Note that Table 1 is not meant to be an exhaustive list of the "-actual" attributes a Printer might implement, as it lists only those attributes in existence in approved IPP standard documents as of the date of this document. For any Job

Template attributes created by past, present, or future IPP standard documents, this specification states that a corresponding "-actual" Job Description attribute exists and can be implemented by a Printer or queried by a client.

3.1 Overall philosophy

These attributes are to be set on a "best effort" basis by the Printer. It cannot be expected that a Printer that can return a known value for some "-actual" attribute will never return the 'unknown' value for that attribute. Also, a Printer does not guarantee the accuracy of the value until the job/document has moved to a completion state (job-state/document-state is 'completed', 'canceled', or 'aborted').

In the same vein, a client SHOULD be robust in its use of these attributes, being able to handle both when the attribute is unknown and when the attribute changes value, including changing to a value different than that specified by the client. For example, the client might query for job attributes and present the status string "Printed page 2 of 4, Copy 3" since the "copies-actual" attribute was returned as 'unknown'. Then, the very next query it makes might have an updated "copies-actual" value, since the Printer had just determined the value, so the next status string presented might be "Printed page 3 of 4, Copy 3 of 6".

3.2 Relationship between "-actual" attributes and Job Template attributes

A very important point about the new "-actual" attributes is that support for them is not in any way tied to the support for the corresponding Job Template attributes. For example, a Printer that does not support the "copies" Job Template attribute SHOULD support the "copies-actual" Job Description attribute if the Printer knows how many copies printed for a job.

Similarly, whether or not a value for a Job Template attribute was included in the Job Creation operation, the Printer SHOULD return the corresponding "-actual" attribute if the value is known.

3.3 Timeline of values

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

The value of an "-actual" attribute can change during the processing of a Job. The most obvious possible change is from 'unknown' to an actual value, but other possibilities exist as well. For example, a Printer might be planning on 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 case, the "copies-actual" value would start at 5, then change to 3 at the point the Printer determines the final copy count will be 3.

A printer that supports a Job Template attribute in such a way that the value of the attribute overrides any instructions in the PDL SHOULD populate the corresponding "-actual" attribute at the time at which it reads the Job Template attribute. On the other hand, for an attribute where the PDL might override the value provided for the Job Template attribute, the Printer SHOULD wait until the PDL has been sufficiently processed to determine the true value of the "-actual" attribute before populating it. In any case, a Printer MUST NOT return a value that it does not believe is the correct value; that is, even though the Printer can change the value later, it should never "guess" at the value.

3.4 Implementation of multiple values

As discussed above, all "-actual" attributes are multi-valued. If a certain attribute has more than one value for a Job, such as a job that prints partly simplex and partly duplex, the Printer SHOULD include all values, in the order they were used. For a given attribute, a printer MUST return a value that is a "true" set, with no duplicates.

To obtain more fine-grained information, the "page-overrides-actual" and "document-overrides-actual" attributes can be used. For example, the "page-overrides-actual" attribute could be used to report that a job printed page 1 in simplex and the rest of the job in duplex. For more information on the format of these two attributes, see [PWG5100.4].

3.5 Existing attributes that are similar to "-actual" attributes

There are three existing attributes in IPP that function in a similar way to the new "-actual" attributes: the "job-k-octets", "job-impressions", and "job-media-sheets" attributes. These attributes can be specified as operation attributes of a Job Creation operation, and are also available as Job Description attributes. When queried, the Printer can return the value that was specified in the creation operation, or can return a different value that it has determined to be more accurate. For more information on these attributes, see [RFC2911], §4.3.17 and §3.2.1.1.

4 New attribute group name

To accommodate the ability of a client to query the "-actual" attributes, a new attribute group name is defined for use with the Get-Job-Attributes and Get-Jobs operations. In addition to the existing attribute groups defined in [RFC2911] §3.3.4, the following attribute group name is now defined:

- 'job-actual': the subset of the "-actual" Job Description attributes specified in this document that the implementation supports for Job objects.

To conform to this specification, a Printer MUST support the 'job-actual' keyword.

5 Conformance Requirements

To conform to this specification, a Printer or client MUST comply with the descriptions in sections 3 and 4 above.

To conform to this specification, a printer SHOULD support an "-actual" attribute if it knows the value through any means, such as through the value of the corresponding Job Template attribute, through the value specified on an IPP "Set" operation [RFC3380], through the PDL, or through some means external to IPP or the PDL.

Although a number of optional extensions to IPP are referred to in this document, support for those extensions is not required in order to support the "-actual" attributes extension defined in this specification. For example, although this specification defines new Job Description attributes to go along with the Job Template attributes defined in the "Production Printing Attributes – Set 1" optional extension to IPP [PWG5100.3], a Printer or client could implement or use "-actual" attributes without implementing the Job Template attributes defined in [PWG5100.3].

6 Security Considerations

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

7 References

7.1 Normative References

[PWG5100.1]
Hastings, T., and D. Fullman, "Internet Printing Protocol (IPP): "finishings" attribute value extension", IEEE-ISTO 5100.1-2001, February 5, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.1.pdf.

[PWG5100.2]
Hastings, T., and R. Bergman, "Internet Printing Protocol (IPP): output-bin attribute extension", IEEE-ISTO 5100.2-2001, February 7, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.2.pdf.

[PWG5100.3]
Ocke, K., and T. Hastings, "Internet Printing Protocol (IPP): Production Printing Attributes – Set 1", IEEE-ISTO 5100.3-2001, February 12, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf.

[PWG5100.4]
Herriot, R., and K. Ocke, "Internet Printing Protocol (IPP): Override Attributes for Documents and Pages", IEEE-ISTO 5100.4-2001, February 7, 2001, ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.4.pdf.

[RFC2119]
S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119, March 1997.

~~[RFC2565]~~
~~Herriot, R., Butler, S., Moore, P. and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport", RFC 2565, April 1999.~~

~~[RFC2566]~~
~~deBry, R., Hastings, T., Herriot, R., Isaacson, S. and P. Powell, "Internet Printing Protocol/1.0: Model and Semantics", RFC 2566, April 1999.~~

[RFC2910]
Herriot, R., Butler, S., Moore, P., Turner, R. and J. Wenn, "Internet Printing Protocol/1.1: Encoding and Transport", RFC 2910, September 2000.

[RFC2911]
Hastings, T., Herriot, R., deBry, R., Isaacson, S. and P. Powell, "Internet Printing Protocol/1.1: Model and Semantics", RFC 2911, September 2000.

[RFC3380]
Hastings, T., Herriot, R., Kugler, C. and H. Lewis, "Internet Printing Protocol (IPP): Job and Printer Set Operations", RFC 3380, September 2002.

[RFC3381]
Hastings, T., Lewis, H., and R. Bergman, "Internet Printing Protocol (IPP): Job Progress Attributes", RFC 3381, September 2002.

7.2 Informative References

[RFC2565]
Herriot, R., Butler, S., Moore, P. and R. Turner, "Internet Printing Protocol/1.0: Encoding and Transport", RFC 2565, April 1999.

[RFC2566]
deBry, R., Hastings, T., Herriot, R., Isaacson, S. and P. Powell, "Internet Printing Protocol/1.0: Model and Semantics", RFC 2566, April 1999.

8 IANA Considerations

This section contains the registration information for IANA to add to the various IPP Registries according to the procedures defined in [RFC2911] section 6 to cover the definitions in this document. The resulting registrations will be published in the http://www.iana.org/assignments/ipp-registrations registry.

8.1 Attribute Registrations

The following table lists all the attributes defined in this document. These are to be registered according to the procedures in [RFC2911] section 6.2.

```
Job Description attributes:
copies-actual (1setOf integer(1:MAX))
cover-back-actual (1setOf (collection))
cover-front-actual (1setOf (collection))
document-overrides-actual (1setOf collection)
finishings-actual (1setOf (type2 enum))
finishings-col-actual (1setOf (collection))
force-front-side-actual (1setOf (1setOf integer(1:MAX)))
imposition-template-actual (1setOf (type3 keyword | name(MAX)))
insert-sheet-actual (1setOf (collection))
job-account-id-actual (1setOf (name(MAX)))
job-accounting-sheets-actual (1setOf (collection))
job-accounting-user-id-actual (1setOf (name(MAX)))
job-error-sheet-actual (1setOf (collection))
job-hold-until-actual (1setOf (type3 keyword | name))
job-message-to-operator-actual (1setOf (text(MAX)))
job-priority-actual (1setOf integer(1:100))
job-sheets-actual (1setOf (type3 keyword | name))
job-sheets-col-actual (1setOf (collection))
job-sheet-message-actual (1setOf (text(MAX)))
media-actual (1setOf (type3 keyword | name(MAX)))
media-col-actual (1setOf (collection))
media-input-tray-check-actual (1setOf (type3 keyword | name(MAX)))
multiple-document-handling-actual (1setOf (type2 keyword))
number-up-actual (1setOf integer(1:MAX))
orientation-requested-actual (1setOf (type2 enum))
output-bin-actual (1setOf (type2 keyword | name(MAX)))
page-delivery-actual (1setOf (type2 keyword))
page-order-received-actual (1setOf (type2 keyword))
page-overrides-actual (1setOf collection)
page-ranges-actual (1setOf rangeOfInteger(1:MAX))
```

```
pages-per-subset-actual (1setOf integer)
presentation-direction-number-up-actual (1setOf (type2 keyword))
print-quality-actual (1setOf (type2 enum))
printer-resolution-actual (1setOf resolution)
separator-sheets-actual (1setOf (collection))
sheet-collate-actual (1setOf (type2 keyword))
sides-actual (1setOf (type2 keyword))
x-image-position-actual (1setOf (type2 keyword))
x-image-shift-actual (1setOf (integer (MIN:MAX)))
x-side1-image-shift-actual (1setOf (integer (MIN:MAX)))
x-side2-image-shift-actual (1setOf (integer (MIN:MAX)))
y-image-position-actual (1setOf (type2 keyword))
y-image-shift-actual (1setOf (integer (MIN:MAX)))
y-side1-image-shift-actual (1setOf (integer (MIN:MAX)))
y-side2-image-shift-actual (1setOf (integer (MIN:MAX)))
```

8.2 Attribute Group name Registrations

The following table lists the one new attribute group names defined in this document. This is to be registered according to the procedures in [RFC2911] section 6.2.

```
Attribute Group name:
job-actual
```

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10 Appendix A: Change Log (informative)

Version 0.4, 31 January 2003, as a result of a last call running from 09 January 2003 to 31 January 2003:

1. Updated all places that referred to IPP/1.0 and its RFCs. Essentially, changed to have only one reference to IPP/1.0 (in a new paragraph in section1), and moved IPP/1.0 RFCs from Normative References section to Informative References section.
2. Made a few small editorial updates.

Version 0.3, 16 December 2002, as a result of the PWG Semantic Model telecon, December 12, 2002:

1. Removed all references to the document object. Extending this concept to the document object will be done in the document object specification only. In this way, moving this specification forward on the standards track will not be held up.
2. Clarified in section 3.4 that multi-valued "-actual" attributes are "true" sets.
3. Changed the title of section 3.4 to better match the content.
4. In section 4, made it extra clear that the new attribute group value is only required if an implementation wants to be conformant to this specification.
5. Slightly reworked section 5 to make the conformance requirements more clear.
6. In sections 4 and 8.2, fixed wording to say "attribute group name" rather than "attribute group value" or "attribute group tag".