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The Printer Working Group (PWG)
Proposed Standard Update to
The Internet Printing Protocol (IPP):
"output-bin" attribute extension

A Program of the IEEE-ISTO
pwg

Version 0.1, 30 October 2002

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Abstract: This IPP specification extends the IPP Model and Semantics [RFC2911] by defining the OPTIONAL "output-bin" (type3 keyword | name(MAX)) Job Template attribute. This attribute allows the client to specify in which output bin a job is to be placed and to query the Printer's default and supported output bins.

This draft is available electronically at:

> ftp://ftp.pwg.org/pwg/ipp/new_ATT/pwg-ipp-output-bin-v01-021030.pdf, .doc

This document is an update to an IEEE-ISTO PWG Proposed standard update. 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 update to a Draft Standard, an updated IEEE-ISTO number will be assigned and this PWG Draft Standard will replace the previous version and will be available electronically at:

> ftp://ftp.pwg.org/pub/pwg/standards/

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About the IEEE-ISTO PWG

The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and Technology Organization (ISTO) with member organizations including printer manufacturers, print server developers, operating system providers, network operating systems providers, network connectivity vendors, and print management application developers. The group is chartered to make printers and the applications and operating systems supporting them work together better. All references to the PWG in this document implicitly mean "The Printer Working Group, a Program of the IEEE ISTO." In order to meet this objective, the PWG will document the results of their work as open standards that define print related protocols, interfaces, procedures and conventions. Printer manufacturers and vendors of printer related software will benefit from the interoperability provided by voluntary conformance to these standards.

In general, a PWG standard is a specification that is stable, well understood, and is technically competent, has multiple, independent and interoperable implementations with substantial operational experience, and enjoys significant public support.

For additional information regarding the Printer Working Group visit: http://www.pwg.org

Contact information:

> IPP Web Page: http://www.pwg.org/ipp/
> IPP Mailing List: ipp@pwg.org

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> 1) send it to majordomo@pwg.org
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>> subscribe ipp
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Implementers of this specification are encouraged to join the IPP Mailing List in order to participate in any discussions of clarifications or review of registration proposals for additional attributes and values. Requests for extensions to this specification, should be sent to the IPP Mailing list for consideration. In order to reduce spam the mailing list rejects mail from non-subscribers, so you must subscribe to the mailing list in order to send a question or comment to the mailing list.

Contents

1   Introduction

1.1   Problem

Many printers have multiple output bins, that the job submission protocol permits the submitter to select in which to put the entire job.

1.2   Solution

Add a single-valued "output-bin" Job Template attribute that captures existing practice. Allow keywords with an integer values component, so that the number of output bins is not constrained. Do not specify internal mechanisms, such as collators. Do specify an externally accessible stacker, since current devices allow a user to select a stacker. Do not make the attribute multi-valued. Add the corresponding Job Template Printer attributes: "output-bin-default" and "output-bin-supported".

Note: If it is desired to allow the job submitter to select several output bin mail boxes that can be identified by number or recipient's name, propose a separate multi-valued attribute. Since the destination may also be electronic and have a method associated with it, also allow the uri attribute syntax. Probably call this other attribute "output-destination" with an attribute syntax of (1setOf uri | name). Or possibly the output-destination should be a parameter on the URL? If both "output-bin" and "output-destination" are specified, the job is both printed and sent to the specified destination. This note is provided so that the "output-bin" attribute will not suffer "scope creep" during the review and be changed into "output-destination". Printers have been allowing something like the "output-bin" specification for many years. Supporting something like "output-destination" is just starting to appear now.

1.3   Summary of the "output-bin" Job Template attribute

This specification defines only the new "output-bin" Job Template attribute as described above in the Solution. As for any IPP Job Template attribute (see [RFC2911]), the associated "xxx-default" and "xxx-supported" Printer attributes are also defined as summarized below.

Job Attribute	Printer: Default Value Attribute	Printer: Supported Values Attribute
output-bin (type3 keyword | name(MAX))	output-bin-default (type3 keyword | name(MAX))	output-bin-supported (1setOf (type3 keyword | name(MAX)))

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 Document Object specification is OPTIONAL for conformance to IPP/1.1, the use of the term REQUIRED in this document means "REQUIRED if this OPTIONAL Document Object 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 Document Object specification is OPTIONAL for conformance to IPP/1.1, the use of the term RECOMMENDED in this document means "RECOMMENDED if this OPTIONAL Document Object 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", "operation", "request", "response", "support", and "Job Template attribute" with the same meaning.

No additional terms are defined for use in this document at this time.

3   Definition of the "output-bin" Job Template attribute

3.1   output-bin (type3 keyword | name(MAX))

The "output-bin" Job Template Job attribute identifies the device output bin to which the job is to be delivered. There are standard values whose attribute syntax is 'keyword', but there are no standard values whose attribute syntax is 'name'. Output bins whose attribute syntax is 'name', if any, are assigned by local administrators (by means outside the scope of IPP/1.0 and IPP/1.1).

Each output bin may have implementation-dependent properties. Output bins identified by 'name' values MAY possess any of the properties of the output bins identified by the following keywords, depending on implementation. However, each output bin MUST be identified by only one value of any attribute syntax type. Otherwise, clients might be mis-led as to the capabilities of the device when querying the associated Printer object's "output-bin-supported" attribute.

Note: Output bin types, such as sorter(s) or collator(s), have not been included in the values of this attribute, since implementations that employ such internal or external bins, determine which to use by the values of other job attributes, such as "finishings", and "copies".

When validating a job in a Job Creation (or Validate-Job) operation, which subset of the output bins are allowed as a destination for a job MAY depend on the user submitting that job, the user's authentication, and possibly other job attributes, such as "finishings" and "copies". When returning the values of the associated "output-bin-supported" attribute, the values returned MAY depend on the user issuing the Get-Printer-Attributes operation. For example, some implementations MAY omit the 'my-mailbox' value for users who do not have a defined mailbox for this IPP Printer object, while others MAY always return 'my-mailbox' to all users even if only supported for certain users.

If this IPP Printer object is associated with multiple devices (fan-out) (see [RFC2911] section 2.1), the value of its "output-bin-supported" attribute is the union of the values supported with duplicates removed.

Standard keyword values are:

'top':   The output-bin that, when facing the device, is best identified as the "top" bin with respect to the device.

'middle':   The output-bin that, when facing the device, is best identified as the "middle" bin with respect to the device.

'bottom':   The output-bin that, when facing the device, is best identified as the "bottom" bin with respect to the device.

'side':   The output-bin that, when facing the device, is best identified as the "side" bin with respect to the device.

'left':   The output-bin that, when facing the device, is best identified as the "left" bin with respect to the device.

'right':   The output-bin that, when facing the device, is best identified as the "right" bin with respect to the device.

'center':   The output-bin that, when facing the device, is best identified as the "center" bin with respect to the device.

'front':   The output-bin that, when facing the device, is best identified as the "front" bin with respect to the device.

'rear':   The output-bin that, when facing the device, is best identified as the "rear" bin with respect to the device.

'face-up': The output-bin that is best identified as the "face-up" bin with respect to the device. The selection of this output bin does not cause output to be made face-up; rather this output bin is given this name because a sheet with printing on one-side arrives in the output bin in the face-up position.

'face-down':The output-bin that is best identified as the "face-down" bin with respect to the device. The selection of this output bin does not cause output to be made face-

down; rather this output bin is given this name because a sheet with printing on one-side arrives in the output bin in the face-down position.

'large-capacity':   The output-bin that is best identified as the "large-capacity" bin (in terms of the number of sheets) with respect to the device.

'stacker':   The output-bin that is best identified as the first available stacker.   A stacker is typically used to collate sheets within a single document (not to be confused with collated copies in which document copies are collated within a job – see the description of the 'separate-documents-collated-copies' value of the "multiple-document-handling" attribute in Section 2.5). The correspondence between the 'stacker' keyword and the actual stacker in the device is implementation-dependent, as is the number of stackers. If this value is supported, the Printer must support at least 1 stacker.

'automatic': The printer MUST automatically determine the most appropriate output bin for the job. Typically, this determination would be based upon the characteristics of the job (such as media or finishing values) and the capabilities of the supported output bins.

'stacker-*N*': The output-bin that is best identified as the stacker with values 'stacker-1', 'stacker-2', ... A stacker is typically used to collate sheets within a single document (not to be confused with collated copies in which document copies are collated within a job - see the description of the 'separate-documents-collated-copies' value of the "multiple-document-handling" attribute in [RFC2911] section 4.2.4). The correspondence between the 'stacker-*N*' keyword and the actual stacker in the device is implementation-dependent, as is the number of stackers. If this group of values is supported, at least the 'stacker-1' value MUST be supported, unless the system administrator has assigned names.

For client implementations that require distinct keywords for each possible value, say, for localization purposes, it is recommended for interoperability with other vendor's Printer implementations that 'stacker-1' to 'stacker-10' keywords be represented.

'mailbox-*N*': The output-bin that is best identified as a mailbox with values 'mailbox-1', 'mailbox-2', 'mailbox-3', …. Each mailbox is typically used to collect jobs for an individual or group. Whether the mailbox has doors and/or locks or is open, depends on implementation. The correspondence between the 'mailbox-*N*' keyword and the actual output-bin in the device is implementation-dependent, as is the number of mailboxes. A system administrator MAY be able to assign a name to each mailbox in order to make selection of a mailbox easier for the user. If this group of values is supported, at least the 'mailbox-1' value MUST be supported, unless the system administrator has assigned names or integer values to mailboxes.

For client implementations that require distinct keywords for each possible value, say, for localization purposes, it is recommended for interoperability with other vendor's Printer implementations that 'mailbox-1' to 'mailbox-25' keywords be represented.

'my-mailbox':   The output-bin that is best identified as functioning like a private "mailbox" with respect to the device. An output-bin functions like a private mailbox if a printer selects the actual output bin using additional implementation-dependent criteria, such as the "authenticated user" (see [RFC2911] section 8.3)

that depends on the user submitting the job. Whether the mailbox has doors and/or locks or is open, depends on implementation, as is the number of mailboxes.

'tray-*N*':   Output bins that are best identified as 'tray-1', 'tray-2', ... rather than the descriptive names defined in the above keyword list.

4   Conformance Requirements

The Printer and client conformance requirements for supporting this attribute are the same as for any Job Template attribute and Job Template attribute values (see [RFC2911]).

5   Normative References

[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.

6   Informative References

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

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

[RFC2567]
> Wright, D., "Design Goals for an Internet Printing Protocol", RFC 2567, April 1999.

[RFC2568]
> Zilles, S., "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol", RFC 2568, April 1999.

[RFC2639]
> Hastings, T., Manros, C., "Internet Printing Protocol/1.0: Implementer's Guide", RFC 2639, July 1999.

7   IANA Considerations

This section contains the registration information for IANA to add to the various IPP Registries according to the procedures defined in RFC 2911 [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.

> <mark>*Note to the RFC Editor: Replace the References below with the RFC number for the appropriate document, so that it accurately reflects the content of the information for the IANA Registry.*</mark>

7.1   Attribute Registrations

The following table lists all the attributes defined in this document.   These are to be registered according to the procedures in RFC 2911 [RFC2911] section 6.2.

```
Job Template attributes:                          Reference:  Section:
output-bin (type3 keyword | name(MAX))        5100.2      3.1
output-bin-default (type3 keyword | name(MAX)) 5100.2      3.1
output-bin-supported (1setOf (type3 keyword | name(MAX)))
                                              5100.2      3.1
```

7.2   Keyword Attribute Value Registrations

This section lists all the keyword attribute value registrations defined in this document. These are to be registered according to the procedures in RFC 2911 [RFC2911] section 6.1.

```
Keyword Attribute Values:                         Reference:  Section:

output-bin (type3 keyword | name(MAX)),
output-bin-default (type3 keyword | name(MAX)),
output-bin-supported (1setOf (type3 keyword | name(MAX)):
  top                                             5100.2     3.1
  middle                                          5100.2     3.1
  bottom                                          5100.2     3.1
  side                                            5100.2     3.1
  left                                            5100.2     3.1
  right                                           5100.2     3.1
  center                                          5100.2     3.1
  front                                           5100.2     3.1
  rear                                            5100.2     3.1
  face-up                                         5100.2     3.1
  face-down                                       5100.2     3.1
  large-capacity                                  5100.2     3.1
  stacker                                         5100.2     3.1
  automatic                                       5100.2     3.1
  stacker-N                                       5100.2     3.1
      <where N = 1, 2, 3, ...>
  mailbox-N                                       5100.2     3.1
      <where N = 1, 2, 3, ...>
  my-mailbox                                      5100.2     3.1
  tray-N                                          5100.2     3.1
      <where N = 1, 2, 3, ...>
```

8 Internationalization Considerations

The IPP extensions defined in this document require the same internationalization considerations as any of the Job Template attributes defined in IPP/1.1 [RFC2911]. Normally a client will provide localization of the keywords values of this attribute to the language of the user, but will not localize the name values (see [RFC2911] section 4.1.2 and 4.1.3). Localization of an indefinite number of the values that have an integer component (e.g. Stacker-N, where N = 1, 2, 3, …) may run into problems when an implementation requires more values than are currently registered. Thus, localization of an indefinite number of the values of this type would require special parsing.

9 Security Considerations

The 'my-mailbox' attribute requires some form of Client Authorization to be really secure. See [RFC2911] section 8. Otherwise, this extension poses no additional security threats or burdens than those in IPP/1.0 [RFC2566, RFC2565] and IPP/1.1 [RFC2911, RFC2910].

10 Acknowledgments

Other Participants were as follows:

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Appendix A *Description of Base IPP documents (Informative)*

The base set of IPP documents includes:

> Design Goals for an Internet Printing Protocol [RFC2567]
> Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
> Internet Printing Protocol/1.1: Model and Semantics [RFC2911]
> Internet Printing Protocol/1.1: Encoding and Transport [RFC2910]
> Internet Printing Protocol/1.1: Implementer's Guide [RFC3196]
> Mapping between LPD and IPP Protocols [RFC2569]

The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed printing functionality, and it enumerates real-life scenarios that help to clarify the features that need to be included in a printing protocol for the Internet. It identifies requirements for three types of users: end users, operators, and administrators. It calls out a subset of end user requirements that are satisfied in IPP/1.0. A few OPTIONAL operator operations have been added to IPP/1.1.

The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document describes IPP from a high level view, defines a roadmap for the various documents that form the suite of IPP specification documents, and gives background and rationale for the IETF working group's major decisions.

The "Internet Printing Protocol/1.1: Model and Semantics" document describes a simplified model with abstract objects, their attributes, and their operations that are independent of encoding and transport. It introduces a Printer and a Job object. The Job object optionally supports multiple documents per Job. It also addresses security, internationalization, and directory issues.

The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the abstract operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines the encoding rules for a new Internet MIME media type called "application/ipp". This document also defines the rules for transporting over HTTP a message body whose Content-Type is "application/ipp". This document defines the 'ipp' scheme for identifying IPP printers and jobs.

The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some of the considerations that may assist them in the design of their client and/or IPP object

implementations. For example, a typical order of processing requests is given, including error checking. Motivation for some of the specification decisions is also included.

The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of gateways between IPP and LPD (Line Printer Daemon) implementations.

Appendix B *Changes to create Updated 5100.2 (Informative)*

The following changes have been made to IEEE-ISTO 5100.2-2001, February 5, 2001 to make the updated IEEE-ISTO 5100.2-2002:

1. Added the following keyword values: 'front', 'stacker', and 'automatic'.

2. Changed the syntax specification from: (type2 keyword | name(MAX)) to (type3 keyword | name(MAX)), since the value is also a name that the administrator can define.

3. Corrected the IANA Registrations

Appendix C *Change Log (Informative)*

The following changes have been made to versions of this document, in reverse chronological order:

C.1 Changes to make version 0.1, October 30, 2002

Initial version.