The Printer Working Group

August 22, 2017
IPP Registration

IPP Presets
(PRESET)

Status: Interim

Abstract: This document is a whitepaper that describes IPP Presets, a mechanism that enables a set of Job Template attribute values to be applied as a set, to provide IPP print solutions with a way to support a variety of user experience optimizations.

This document is a White Paper. For a definition of a "White Paper", see: http://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf

This document is available electronically at:

https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ipp-preset-20170822.odt
~~https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ipp-preset-20170807.odt~~
https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ipp-preset-20170822.pdf
~~https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ipp-preset-20170807.pdf~~

Title: IPP Presets *(PRESET)*

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1 Introduction

This whitepaper defines a system of new IPP attributes that allow a Printer to describe a set of one or more “presets”, which are a set of job template attributes and attribute values that are applied together as a group. Each preset set has a named label and may also have an associated “trigger”, allowing the preset to be applied implicitly in response to the User making a particular settings selection.

2 Terminology

2.1 Protocol Roles Terminology

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

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

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

2.2 Printing Terminology

All the printing terminology defined in IPP/1.1 Model and Semantics [RFC8011] is~~are~~ applicable here:

Client: Initiator of outgoing IPP session requests and sender of outgoing IPP operation requests (Hypertext Transfer Protocol (HTTP/1.1) user agent, as defined in [RFC7230]).

Document: An object created and managed by a Printer that contains description, processing, and status information. A Document object can have attached data and is bound to a single Job [PWG5100.5].

'ipp' URI: An IPP URI as defined in [RFC3510].

'ipps' URI: An IPP URI as defined in [RFC7472].

Job: An object created and managed by a Printer that contains description, processing, and status information. The Job also contains zero or more Document objects.

Logical Device: A print server, software service, or gateway that processes Jobs and either forwards or stores the processed Job or uses one or more Physical Devices to render output.

Output Device: A single Logical or Physical Device.

Physical Device: A hardware implementation of an endpoint device, e.g., a marking engine, a fax modem, etc.

Printer: Listener for incoming IPP session requests and receiver of incoming IPP operation requests (HTTP/1.1 server, as defined in [RFC7230]) that represents one or more Physical Devices or a Logical Device.

2.3 Other Terms Used in This Document

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

Preset : A set of attributes and attribute values that are applied all at once as job settings.

Trigger : An attribute and value whose selection causes a Preset to be selected.

2.4 Acronyms and Organizations

IANA: Internet Assigned Numbers Authority, http://www.iana.org/

IETF: Internet Engineering Task Force, http://www.ietf.org/

ISO: International Organization for Standardization, http://www.iso.org/

PWG: Printer Working Group, http://www.pwg.org/

3 Requirements for IPP Presets

3.1 Rationale for IPP Presets

There are circumstances where a number of settings are chosen as a set to achieve some common printing objective or workflow scenario. For example, the act of selecting a 4”x6” media size implies the desire to print photos. If doing so could trigger the automatic selection of an associated group of settings (change media type to glossy photo, setting the print quality to 'best'), that could have a positive user experience benefit. Sometimes these groups of settings are referred to as “presets”.

Most vendor / model-specific drivers and driver system implement support for such associations, but they do this by including logic in the driver itself. For driverless / omni-driver systems such as IPP Everywhere, some settings collections could be constructed on the Client system, but some could originate from the Printer. IPP needs to be extended to provide attributes to convey these from the Printer to a Client to support Printer-originated “presets”, to support the use cases below.

There is currently no way for the Printer to supply explicit preset information to the Client. Preset information can be configured by admin, operator, or vendor. A crude facility could be provided using Validate-Job and the “preferred-attributes” in the response, but that requires additional Client / Printer operations that are undesirable. This should be manageable locally to the Client once the settings bundles have been provided to it by the Printer.

After the application of a preset, the Client shouldought to still allow a User to change individual settings. For example, if a preset includes “print-quality” of 'high' (5) and “print-color-mode” of 'color', the Client should allow the User to change the “print-quality” to 'normal' (4).If a preset set “print-quality” to 'high' (5) and “print-color-mode” to 'color', the User should still be capable of adjusting the control for “print-quality” to set its value to 'normal' (4).

The PWG Semantic Model [PWG5105.1] defined the concept of a “job ticket template”. Saved job ticket resources are similar but not exactly the same. In particular they lack the notion of a “trigger”.

3.2 Use Cases

3.2.1 Explicit Preset Selection

Bert has found a good recipe for gazpacho on the Web, and wants to print the recipe to put it into his recipe binder. He clicks on the “Print” button in the web page. When the print dialog is presented, he selects the Psettings preset labeled “Recipe for binder”. The “Recipe for binder” Preset specifies in his print dialog, that selects “2 pages per sheet”

page layout, oneand disables two-sided printing, trimming and punching. The Client applies the Preset to the settings in the print dialog. Bert clicks on “Print”; the Client all at once. Bert decides he wants to re-enable two-sided printing, and does so. As the preset is simply a batch application of settings, he is still free to make individual settings choices after a preset is applied. He prints the Job. Bertrecipe, cuts it to size, and puts it into his recipe binder.

3.2.2 Implicit Preset Selection

Kelli is in the process of printing a photo. In the print dialog, she switches the selected media size from A4 to 4”x6”. Her Client has a Trigger for 4”x6” media size that names a Preset named “Photos”; the “Photos” Preset includes glThe Printer has indicated that selecting the 4”x6” media size is a trigger to select a preset including selecting a glossy photo media type, single-sided printing, and 'high' print quality. The Client acts on the Trigger by applying the settings in the “Photos” Presetupdates the print dialog and the job ticket automatically to include those changes. Kelli is pleased that these choices were made automatically by her system, saving her time and effort.

3.2.3 Client Storing aSaving Preset Settings to Printer

Ernie has constructed his own Preset named “Better Binder Recipe”, and he would like to share it with Bert. Ernie selects that Preset and taps on the “Store Preset on Printer” button. The preset is uploaded to the Printer. When Bert next goes to print, he sees the “Better Binder Recipe” preset that Ernie added to the Printer, and uses that for his next recipe printing tasks.

Ernie has constructed his own IPP preset on his system named “Better Binder Recipe”, and he would like to share it with Bert. Ernie selects that preset from a list of locally created presets and clicks on the “Upload Preset to Printer” button. The preset is uploaded to the Printer. When Bert next goes to print, he sees the “Better Binder Recipe” preset that Ernie added to the Printer, and uses that for his next recipe printing tasks.

Exceptions

3.2.4 Overriding Preset Selection

There are no exceptions.

Bert selects the Preset labeled “Recipe for binder” in his print dialog, that selects “2 pages per sheet” page layout, one-sided printing, trimming and punching. Bert decides he wants to re-enable two-sided printing, and does so using the controls in the print dialog. He prints the recipe and puts it into his recipe binder, pleased that he can take advantage of the power of Presets but still maintain full control over a Job's settings.

3.3 Out of Scope

The following are considered out of scope for this document:

1. The user interface for Presets
2. ~~User presentation of these options~~
3. Changes to the core IPP specifications

3.4 Design Requirements

The design requirements for this document are:

1. Define new IPP attributes that describe~~o specify~~ a Preset as a set of attributes and attribute values that will be applied all at once. Each Preset is to have~~s a group when either~~ a unique name~~particular attribute value is chosen~~.
2. Define new IPP attributes that describe a Trigger as an attribute and value and a corresponding Preset name, that operates according to the principle "if Trigger attribute value is chosen, then apply Preset", to support implicit Preset selection.
3. ~~Support the specification of a "trigger" attribute value in the group, to support implicit group selection.~~
4. Define sections to register all attributes, values, operations, and service types with IANA.

4 IPP Presets Definitions

This specification defines IPP attributes and operations used for Presets and Triggers.

5. ~~Support the specification of a "label" or "label key" in the group, to support explicit group selection via a name presented to the user, that might be localized.~~
6. Printer Description Attributes
7. ~~Register all attributes and operations with IANA~~
8. job-presets-supported (1setOf collection)

5 ~~Technical Solutions/Approaches~~

6 This REQUIRED Printer Description attribute lists named Presets that are stored on the Printer. Each collection value contains a REQUIRED "preset-name (keyword | name(MAX))" attribute and one or more Job Template attributes that are part of the Preset. The attribute names and values MUST be supported by the Printer and be listed in its Printer Description attributes. The set of attribute values MUST NOT be in conflict with one another as described by a constraint in "job-constraints-supported".

~~This specification defines the following: an IPP attribute that creates an association between a set of Job Template attribute names and values (a "preset"); define ancillary member attributes to uniquely identify each preset set and allow a Client to support explicit named selection of a set; and also define a mechanism that a Client can use to cause an implicit selection of a preset set.~~

6.1 ~~job-presets-supported (1setOf collection)~~

~~The "job-presets-supported" attribute provides a set of collections, where each collection consists of a "preset-key (keyword | name(MAX))" attribute and the set of attribute names and values, to be applied as a set by the Client when this preset is selected by the User. The attribute names and values MUST be supported by the Printer and be listed in its Printer Description attributes. The set of attribute values MUST NOT be in conflict with one another as described by a constraint in "job-constraints-supported".~~

~~A Printer MUST support the "job-presets-supported" attribute if it supports the "job-triggers-supported" attribute.~~

preset-name~~key~~ (keyword | name(MAX))

~~The "preset-key" member attribute provides each collection in "job-presets-supported" with a unique string identifier. Each "preset-key" MUST be unique within a "job-presets-supported" attribute, so that each preset collection is uniquely identifiable and can be unambiguously referenced using that "preset-key" value.~~

This attribute provides a unique name for the Preset. Values can be localized using the message catalog provided at the URL specified by the "printer-strings-uri" Printer Description attribute [PWG5100.13].

~~A localized string label for "preset-key" suitable for User presentation SHOULD be made available by the Printer. A Client can acquire the localized string label by using the value of "preset-key" as the lookup key in the strings catalog provided at the URL specified by "printer-strings-uri" [PWG5100.13]. As a fallback, the "preset-key" value may be presented directly; for this reason, the "preset-key" value SHOULD be descriptive.~~

Examples

Below~~Here~~ is an example "job-presets-supported" attribute, which includes 2 collections, described using PAPI notation [PAPI]:

```
job-presets-supported={
     preset-name~~key~~="draft"
     print-quality=3
},{
     preset-name~~key~~="photo"
     print-content-optimize='graphics'
```



```
            print-quality=5
      }
```

6.1.1 job-triggers-supported (1setOf collection)

This RECOMMENDED Printer Description attribute lists Triggers that are stored on the Printer. Each collection value contains a REQUIRED "preset-name (keyword | name(MAX))" member attribute (section) and one or more Job Template attributes that are part of the Trigger.

6.2 ~~"job-triggers-supported" (1setOf collection)~~

7 ~~The "job-triggers-supported" attribute provides a set of collections, where each collection contains a "preset-key" member attribute (section 6.1), along with a single attribute name and set of values. A Client, upon detecting that that attribute has acquired that particular value, will apply the settings in the preset in "job-presets-supported" that has the matching "preset-key" value.~~

8 ~~A Printer MAY support the "job-triggers-supported" attribute if it supports the "job-presets-supported" attribute.~~

8.1 Examples

Here is an example "job-triggers-supported" attribute, which includes 2 collections, described using PAPI notation [PAPI]:

```
      job-triggers-supported={
            preset-namekey="draft"
            media-col={media-type='stationery-recycled'}
      },{
            preset-namekey="photo"
            media-col={media-type='photographic','photographic-
      glossy','photographic-matte'}
      }
```

In this example, if the user selects the 'stationery-recycled' media type, that will trigger the selection of the "draft" preset from "job-presets-supported".

8.2 Storing Presets and Triggers

Presets and Triggers may be constructed by a User and stored locally on the Client. In some cases (as described in the use case in section 3.2.3), the Client may want to store those Presets and Triggers on the Printer. A Client can store a Preset or a Trigger on the Printer using the Set-Printer-Attributes operation [RFC3380].

If a Printer supports accepting new Presets and Triggers via a Set-Printer-Attributes operation, it advertises this by listing “Set-Printer-Attributes” in its “operations-supported” Printer Description attribute [RFC8011], and by also listing “job-presets-supported” and “job-triggers-supported” in its “printer-settable-attributes-supported” Printer Description attribute [RFC3380].

8.3 Using Resources

- Talk about resource-ids member attributes in job-presets-supported collection to include Job Template and other resources in the Job Ticket.
- Reference to IPP System Service spec

9 Client Implementation Recommendations

9.1 Presets

A Client should list available Presets by name in some manner in its UI presenting printing choices. The Presets may come from the Printer or they may be created by the Client and persisted in some way. When a User selects a Preset, the print settings in that Preset should be applied. Implementors of Clients may want to consider what to do when a setting has been changed by the user and then a Preset has been selected that might change that setting. The Client might notify the User that the setting will be changed, or alternately might apply the Preset but not change the setting changed by the User.

9.2 Triggers

The semantic expectation of a Trigger is “IF setting value is chosen, THEN apply Preset”. Upon detecting that a Trigger's setting value has been chosen by the User, the Client applies the Preset. Client implementors may want to consider cases where Triggers are disabled, such as following manual selection by a user, or perhaps only allowing one Trigger per “print dialog session” to be used.

A Trigger should only be applied in response to user input, and not in response to a value being set by another Preset, a constraint, or some other automatic selection implemented by the Client.

10 Conformance Requirements

10.1 Conformance Requirements for Clients

In order for a Client to claim conformance to this specification, a Client MUST support:

1. The IPP Printer attributes defined in section 6;

11 ~~Internationalization Considerations~~

12 The internationalization considerations in section 13;

2. The security considerations in section 14.

12.1 Conformance Requirements for Printers

In order for a Printer to claim conformance to this specification, a Printer MUST support:

1. The IPP Printer attributes defined in section 6;
2. The internationalization considerations in section 13;
3. The security considerations in section 14.

13 Internationalization Considerations

For interoperability and basic support for multiple languages, conforming implementations MUST support the Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8) [RFC3629] encoding of Unicode [UNICODE] [ISO10646] and the Unicode Format for Network Interchange [RFC5198].

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

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

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

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

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

14 Security Considerations

The IPP extensions defined in this document require the same security considerations as defined in the IPP/1.1: Model and Semantics [RFC8011] plus additional security considerations below .

14.1 Human-readable Strings

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

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

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

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

15 IANA and PWG Considerations

15.1 Attribute Registrations

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

http://www.iana.org/assignments/ipp-registrations

The registry entries will contain the following information:

Printer Description attributes:	Reference
job-presets-supported (1setOf collection)	[5100.PRESET]
preset-name (keyword | name(MAX))	[5100.PRESET]
job-triggers-supported (1setOf collection)	[5100.PRESET]
preset-name (keyword | name(MAX))	[5100.PRESET]

16 References

16.1 Normative References

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[PWG5100.5] D. Carney, T. Hastings, P. Zehler. “Internet Printing Protocol (IPP): Document Object”, PWG 5100.5-2003, October 2003, http://ftp.pwg.org/pub/pwg/candidates/cs-ippdocobject10-20031031-5100.5.pdf

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[RFC3510] R. Herriot, I. McDonald, “Internet Printing Protocol/1.1: IPP URL Scheme”, RFC 3510, April 2003, https://tools.ietf.org/html/rfc3510

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[RFC8011] M. Sweet, I. McDonald, “Internet Printing Protocol/1.1: Model and Semantics”, RFC 8011, January 2017, https://www.ietf.org/rfc/rfc8011.txt

[UAX9] Unicode Consortium, “Unicode Bidirectional Algorithm”, UAX#9, May 2016, http://www.unicode.org/reports/tr9

[UAX14] Unicode Consortium, “Unicode Line Breaking Algorithm”, UAX#14, June 2016, http://www.unicode.org/reports/tr14

[UAX15] Unicode Consortium, “Normalization Forms”, UAX#15, February 2016, http://www.unicode.org/reports/tr15

[UAX29] Unicode Consortium, “Unicode Text Segmentation”, UAX#29, June 2016, http://www.unicode.org/reports/tr29

[UAX31] Unicode Consortium, “Unicode Identifier and Pattern Syntax”, UAX#31, May 2016, http://www.unicode.org/reports/tr31

[UNICODE] The Unicode Consortium, “Unicode® 10.0.0”, June 2017, http://unicode.org/versions/Unicode10.0.0/

[UTS10] Unicode Consortium, “Unicode Collation Algorithm”, UTS#10, May 2016, http://www.unicode.org/reports/tr10

[UTS35] Unicode Consortium, “Unicode Locale Data Markup Language”, UTS#35, October 2016, http://www.unicode.org/reports/tr35

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16.2 Informative References

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[UTR20] Unicode Consortium "Unicode in XML and other Markup Languages", UTR#20, January 2013, http://www.unicode.org/reports/tr20

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17 Authors' Addresses

Primary authors ~~(using Address style)~~:

Smith Kennedy
11311 Chinden Blvd.
Boise, Idaho 83714
smith.kennedy@hp.com

The authors would also like to thank the following individuals for their contributions to this standard:

Ira McDonald – High North
Mike Sweet – Apple Inc.

18 Change History

18.1 August 22, 2017

Updated as per feedback from August 2017 PWG vF2F session:

- Extensively updated structure of section 4 “IPP Presets Definitions”
  - Added section 4.2 to discuss storing presets using Set-Printer-Attributes
  - Added section 4.3 (placeholder) to discuss storing presets as resources
- Added “Client Implementation Recommendations” section
- Added “Conformance Requirements” section
- Added “IANA and PWG Considerations” section

18.2 August 7, 2017

18.3 ~~August 7, 2017~~

18.4 Minor clarifications and editorial changes to section 3.

18.5 July 28, 2017

Updated following IPP WG review and feedback:

- Added Printing Terminology by copy / paste from RFC 8011 section 2.2
- Incorporated Internationalization and Security Considerations content from IPP System
- Added and fixed many references
- Refactored section 4 according to the meeting minutes to include PAPI examples to better illustrate the structure, which is difficult to articulate using conventional IPP syntax (since there isn't a formal “data type” for “any attribute”

Other additions and changes:

- Added a new use case “Client Saving Preset Settings to Printer” to explore how that might be supported in IPP, and if that requires additional definitions.

18.6 June 9, 2017

Updated and refactored following May 11 IPP WG teleconference

- Expanded use case descriptions
- Refactored IPP attribute definitions

18.7 April 18, 2017

Initial revision.

