IPP Job Extensions v1.1
(JOBEXT)

Status: Interim

Abstract: This specification defines IPP attributes and values for fine-grained fidelity, Document processing, and status reporting for issues encountered during processing.

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Contact information:

The Printer Working Group
c/o The IEEE Industry Standards and Technology Organization
445 Hoes Lane
Piscataway, NJ 08854
USA
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1. Introduction

This specification defines IPP attributes and values for fine-grained fidelity, Document processing, and status reporting for issues encountered during processing.

This specification obsoletes portions of the previous version of this specification [PWG5100.7-2003]. A list of changes can be found in section 14.

1.1 Document Natural Language and Character Set

Certain Document formats are ambiguous about the natural language and character set used in a file. The Internet Printing Protocol/1.1 [STD92] defines the "document-natural-language" operation attribute to specify the natural language in Document Creation operations, but does not provide a way to specify the character set. In addition, there is no way for a Client to discover which languages and character sets are supported by a Printer for a given Document format. This specification defines attributes for specifying and discovering supported languages and character sets.

1.2 Attribute Fidelity

The Internet Printing Protocol/1.1 [STD92] defines the "ipp-attribute-fidelity" operation attribute to enforce the fidelity of all attributes in the Job Creation request. This specification defines an operation attribute to enforce the fidelity of a subset of attributes in the Job Creation request.

1.3 Rendering Optimizations

Most Printers are able to optimize output for different kinds of Document data, for example using a higher resolution for black text and lines, however the Internet Printing Protocol/1.1 [STD92] only defines the "print-quality" and "printer-resolution" Job Template attributes that specify the overall quality and resolution of the output. This specification defines an attribute with corresponding values for specifying the type of optimizations to perform.

1.4 Printing on a Specific Output Device

The Internet Printing Protocol/1.1 [STD92] defines the "output-device-assigned" Job Status attribute but does not define corresponding Job Template or Printer Description attributes for specifying which Output Device to use for a Job.

1.5 Results of Job/Document Processing

The Internet Printing Protocol/1.1 [STD92] defines some Job Status attributes and values but none of them provide information about processing issues that do not prevent a Job or
Document from being printed. This specification defines attributes and values for discovering those processing issues.

1.6 Obsolete Attributes and Values

The original version of this specification [PWG5100.7-2003] defines several attributes and values that have proven problematic from an interoperability and privacy standpoint. This specification obsoletes these attributes and values.

2. Terminology

2.1 Conformance Terminology

Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD, SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as defined in Key words for use in RFCs to Indicate Requirement Levels [BCP14]. The term CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that applies when a specified condition is true.

2.2 Printing Terminology

Normative definitions and semantics of printing terms are imported from the Internet Printing Protocol/1.1 [STD92].

Document: An object created and managed by a Printer that contains the description, processing, and status information. A Document object may have attached data and is bound to a single Job.

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 a endpoint device, e.g., a marking engine, a fax modem, etc.

2.3 Protocol Role Terminology

This document also defines the following protocol roles to specify unambiguous conformance requirements:
236  **Client:** Initiator of outgoing connections and sender of outgoing operation requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] User Agent).
237
238  **Printer:** Listener for incoming connections and receiver of incoming operation requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] Server) that represents one or more Physical Devices or a Logical Device.

2.4 Other Terminology

242  **Document Creation Operation:** operations that accept Document Content. Specifically: Print-Job, Print-URI, Send-Document and Send-URI. Note: Print-Job and Print-URI are both Job Creation and Document Creation operations.

245  **Finished Document:** the result that the Printer produces on Sheets after the operations of printing, folding, cutting, finishing, etc. are completed.

247  **Job Attribute:** an Operation attribute or a Job Template attribute that applies to the Job (object) as a whole. For example, “job-name” is an Operation attribute and “job-priority” is a Job Template attribute.

250  **Job Creation Operation:** operations that create Job objects, specifically: Print-Job, Print-URI, and Create-Job as defined in [rfc2911].

252  **Operation Attribute:** an attribute supplied by a client in the Operation Attribute group of a request in order to affect the behavior of the operation or an attribute returned by the Printer in the Operation Attributes group in an operation response in order to report the results of the operation. For some Operation attributes, the Printer copies the values supplied by the client to corresponding Job Description attributes.

257  **Page:** The term "Page" used throughout this document is a synonym for PDL page.

258  **PDL Page:** A "PDL Page" is a page according to the definition of pages in the language used to express the document data. Note: If the PDL contains multiple original source pages that have been placed on a single page by the client application, then the PDL page count is one. On the other hand, if the client requests that multiple PDL Pages are placed on a single side of media, by supplying “number-up” with a value greater than 1, then the PDL page count will be more than one. [rfc2911] uses the term "print stream page" for PDL Page.

264  **Sheet:** A Sheet is the unit of media that a printer puts marks on. It is the most basic unit of output from a printer. A printer may mark on one side or on both sides of a sheet.

2.5 Acronyms and Organizations

267  **IANA:** Internet Assigned Numbers Authority, [http://www.iana.org/](http://www.iana.org/)

3. Requirements

3.1 Rationale

The Internet Printing Protocol/1.1 [STD92] defines many attributes and values for specifying how Jobs and Documents are processed by a Printer. Given the need for specifying Document processing options and retrieving processing status information, this specification should:

1. Define attributes and values that specify the Document character set and rendering optimizations;
2. Define an attribute for doing selective fidelity enforcement;
3. Define a media size for automatically printing Documents on the correct size; and
4. Define attributes and values that allow a Client to discover the results of Document processing.

3.2 Use Cases

3.2.1 Print a Plain Text File

Jane has a plain text file report using a character set other than UTF-8 that she would like to print. She submits the file for printing using her Client software, which allows her to specify the exact character set used for the report.

3.2.2 Print a Document Using a Matching Size

John is viewing a document in a web browser and decides to print it. He submits the file for printing from the browser which specifies the output should be formatted for US Letter or ISO A4 media, as available on the printer.

3.2.3 Force a Document to Print on a Specific Media Size

Elizabeth has a contract that must be printed on US Legal media. She uses her Client software to submit the print job, specifying that US Legal size must be used with no substitutions.

3.2.4 Print a Presentation with Best Quality

Bob wants to print a presentation. He submits the presentation for printing using his Client software, specifying that the output should be optimized for text and graphics.
3.2.5 Print Using a Specific Output Device

Sally needs to print a poster on a specific output device. She uses her Client software to select the large format printer associated with the local print service and submit the poster for printing.

3.2.6 Monitor Whether Jobs are Printed Correctly

Mary is the administrator for the office printers and wants to know whether users are having difficulty printing their documents. She uses Client software to query the history of jobs on each printer, including any errors or warnings that were encountered during processing.

3.3 Exceptions

3.3.1 Too Many Jobs on a Printer

Jane has several documents to print for a meeting. While submitting the documents for printing from her Client software, the printer responds that there are too many queued jobs.

3.3.2 Too Many Documents in a Job

Bob is submitting multiple documents in a single job. While submitting the documents from his Client software, the printer responds that there are too many documents in the job.

3.4 Out of Scope

The following are considered out of scope for this specification:

1. Definition of new file formats; and
2. Definition of new protocol bindings.

3.5 Design Requirements

The design requirements for this specification are:

1. Define attributes for supported languages and character sets in Document data;
2. Define attributes and values to describe the kind of processing optimizations that should be performed on Document data;
3. Define an attribute to specify fidelity requirements;
4. Define attributes to select an Output Device for printing;
5. Define attributes and values to report processing errors and warnings; and
6. Define sections to register all attributes, values, and operations with IANA.
4. New Attributes

4.1 Operation Attributes

4.1.1 job-mandatory-attributes (1setOf keyword)

This attribute identifies which Job Template attributes the Printer MUST support in the Job Creation request in order to accept the Job. The values are the names of Job Template attributes, for example, ‘job-hold-until’, ‘copies’, and ‘media’. In order to identify a member attribute of a collection attribute, the keyword names of both the collection attribute and the member attribute are given separated by a period (.) character. For example, to make the “media” attribute of the “cover-front” collection attribute mandatory, supply the keyword value ‘cover-front.media’.

Note: As with "ipp-attribute-fidelity", the “job-mandatory-attributes” attribute does not determine whether the Printer overrides the PDL with the identified Job Template attributes, as that functionality is defined by the "pdl-override-supported" Printer Description attribute [STD92].

4.2 Document and Job Status Attributes

4.2.1 errors-count (integer(0:MAX))

This attribute reports the number of errors encountered processing the Job as a whole. An error is reported when some portion of the printed output is not present, such as a glyph encountered which isn't in a Printer's font or an image in a page was in a format that the Printer didn't support, though the Printer did support the overall Document format.

4.2.2 print-content-optimize-actual (1setOf type2 keyword)

This attribute reports the "print-content-optimize" value(s) that the Printer actually used to produce the Job.

4.2.3 warnings-count (integer(0:MAX))

This attribute reports the number of warnings encountered processing the Job as a whole. A warning is reported when no information is lost but the appearance of the printed output might not be as expected.

4.3 Document and Job Template Attributes

4.3.1 output-device (name(127))

This attribute requests a named Output Device for a Printer that fans-out to multiple devices. If omitted, the Printer selects the best Output Device for the Job in an implementation dependent manner.
4.3.2 print-content-optimize (type2 keyword)

This attribute specifies the type of content optimization to perform on the Document data. Keyword values specify the type of content to optimize, including:

'graphics': Graphs and line drawings.

'photo': Photographs.

'text': Text.

'text-and-graphics': Text and graphics.

4.4 Printer Description Attributes

4.4.1 document-charset-default (charset)

This attribute specifies the default charset that the Printer will assume for charset-ambiguous Document formats when the Client omits the "document-charset" operation attribute [PWG5100.5]. Printers that support the "document-charset" operation attribute MUST support this attribute.

4.4.2 document-charset-supported (1setOf charset)

This attribute lists the charsets that the Printer supports for charset-ambiguous Document formats. Printers that support the "document-charset" operation attribute [PWG5100.5] MUST support this attribute.

4.4.3 document-natural-language-default (naturalLanguage)

This attribute specifies the default natural language that the Printer will assume for Document data when the Client omits the "document-natural-language" operation attribute [STD92]. Printers that support the "document-natural-language" attribute MUST support this attribute.

4.4.4 document-natural-language-supported (1setOf naturalLanguage)

This attribute lists the natural languages supported for Printer-supported Document formats. Printers that support the "document-natural-language" attribute MUST support this attribute.

4.4.5 job-mandatory-attributes-supported (boolean)

This attribute specifies whether the "job-mandatory-attributes" operation attribute (section 4.1.1) is supported. Printers that support the "job-mandatory-attributes" operation attribute SHOULD support this attribute.
4.4.6 output-device-supported (1setOf name(127))

This attribute lists the supported "output-device" values. Printers MUST support this attribute if the "output-device" Job Template attribute (section 4.3.1) is supported.

4.4.7 print-content-optimize-default (type2 keyword)

This attribute specifies the default "print-content-optimize" (section 4.3.2) value. Printers that support the "print-content-optimize" attribute MUST support this attribute.

4.4.8 print-content-optimize-supported (1setOf type2 keyword)

This attribute lists the supported "print-content-optimize" (section 4.3.2) values. Printers that support the "print-content-optimize" attribute MUST support this attribute.

5. New Values for Existing Attributes

5.1 job-state-reasons (1setOf type2 keyword)

This specification adds the following new keyword values for the "job-state-reasons" Job Status attribute [STD92]:

'digital-signature-did-not-verify': One or more documents in the Job contains a digital signature that could not be verified by the Printer.

'errors-detected': The Printer has detected one or more errors during processing of the Job.

'warnings-detected': The Printer has detected one or more warnings during processing of the Job.

5.2 media (type2 keyword | name(MAX))

This specification adds the following new keyword value for the "media" Job Template attribute [STD92]:

'choice_iso_a4_210x297mm_na_letter_8.5x11in': Print using US Letter or ISO A4 media (whichever is available).

Note: The semantics of the 'choice' prefix are documented in the PWG Media Standardized Names v2.0 (MSN2) specification [PWG5101.1].
6. New Status Codes

This section defines additional status code values.

6.1 server-error-too-many-jobs (0x050B)

The Client has attempted to create a Job using any of the Job Creation operations which would exceed the capacity of the Printer. The Client can retry the unmodified request.

6.2 server-error-too-many-documents (0x050C)

The Client has attempted to create a Document using any of the Document Creation operations which would exceed the capacity of the Printer for this Job. The Client can retry the unmodified request.

7. Obsolete Attributes

7.1 Obsolete Operation Attributes

The following operation attributes from the previous version of this specification [PWG5100.7-2003] are now obsolete:

- "document-digital-signature" (type2 keyword): This attribute only identifies the type of signature that is present in the Document data, but that information can be determined by examining the Document data.

- "document-format-details" (1setOf collection): The member attributes and values cause serious interoperability and privacy issues.

- "document-format-version" (text(127)): Free form text values cause serious interoperability issues when used as identifiers for processing data.

7.2 Obsolete Job Status Attributes

The following Job Status attributes from the previous version of this specification [PWG5100.7-2003] are now obsolete:

- "compression-supplied" (type2 keyword): Data compression is used over the HTTP transport during the submission of Document data. Auditing of Printer bandwidth usage requires additional information such as the size of the IPP request and attached compressed document data.

- "document-charset-supplied" (charset): This attribute has been superseded by the "document-charset" Document Status attribute.
"document-digital-signature-supplied" (type2 keyword): The corresponding Job Template attribute is obsolete.

"document-format-details-supplied" (1setOf collection): The corresponding Job Template attribute is obsolete.

"document-format-supplied" (mimeMediaType): This attribute has been superseded by the "document-format" Document Status attribute [PWG5100.5].

"document-format-version-supplied" (text(127)): The corresponding Job Template attribute is obsolete.

"document-message-supplied" (text(MAX)): This attribute has been superseded by the "document-message" Document Status attribute [PWG5100.5].

"document-name-supplied" (name(MAX)): This attribute has been superseded by the "document-name" Document Status attribute [PWG5100.5].

"document-natural-language-supplied" (naturalLanguage): This attribute has been superseded by the "document-natural-language" Document Status attribute [PWG5100.5].

"ipp-attribute-fidelity" (boolean): This attribute is only used at time of Job creation. The "xxx-actual" Job Status attributes provide a receipt of attributes and values that were used when processing a Job and thus provide the necessary auditing information.

"job-copies-actual" (integer(1:MAX)): The corresponding Job Template attribute is obsolete.

"job-cover-back-actual" (collection): The corresponding Job Template attribute is obsolete.

"job-cover-front-actual" (collection): The corresponding Job Template attribute is obsolete.

"job-finishings-actual" (1setOf type2 enum): The corresponding Job Template attribute is obsolete.

"job-finishings-col-actual" (1setOf collection): The corresponding Job Template attribute is obsolete.

"job-mandatory-attributes" (1setOf keyword): This attribute is only used at time of Job creation. The "xxx-actual" Job Status attributes provide a receipt of attributes and values that were used when processing a Job and thus provide the necessary auditing information.
"output-device-actual" (1setOf name(127)): This attribute is redundant with the "output-device-assigned" attribute [STD92].

7.3 Obsolete Job Template Attributes

The following Job Templates attributes from the previous version of this specification [PWG5100.7-2003] are now obsolete:

"job-copies" (integer(1:MAX)): This attribute has poor interoperability with the "copies" Job Template attribute [STD92].

"job-cover-back" (collection): This attribute has poor interoperability with the "cover-back" Job Template attribute [PWG5100.3].

"job-cover-front" (collection): This attribute has poor interoperability with the "cover-front" Job Template attribute [PWG5100.3].

"job-finishings" (1setOf type2 enum): This attribute has poor interoperability with the "finishings" Job Template attribute [STD92].

"job-finishings-col" (1setOf collection): This attribute has poor interoperability with the "finishings-col" Job Template attribute [PWG5100.3].

7.4 Obsolete Printer Description Attributes

The following Printer Description attributes from the previous version of this specification [PWG5100.7-2003] are now obsolete:

"document-digital-signature-default" (type2 keyword): The corresponding Job Template attribute is obsolete.

"document-digital-signature-supported" (1setOf type2 keyword): The corresponding Job Template attribute is obsolete.

"document-format-details-default" (collection): The corresponding operation attribute is obsolete.

"document-format-details-supported" (1setOf keyword): The corresponding operation attribute is obsolete.

"document-format-version-default" (text(127)): The corresponding operation attribute is obsolete.

"document-format-version-supported" (1setOf text(127)): The corresponding operation attribute is obsolete.
"job-copies-default" (integer(1:MAX)): The corresponding Job Template attribute is obsolete.

"job-copies-supported" (rangeOfInteger(1:MAX)): The corresponding Job Template attribute is obsolete.

"job-cover-back-default" (collection): The corresponding Job Template attribute is obsolete.

"job-cover-back-supported" (1setOf keyword): The corresponding Job Template attribute is obsolete.

"job-cover-front-default" (collection): The corresponding Job Template attribute is obsolete.

"job-cover-front-supported" (1setOf keyword): The corresponding Job Template attribute is obsolete.

"job-finishings-default" (1setOf type2 enum): The corresponding Job Template attribute is obsolete.

"job-finishings-ready" (1setOf type2 enum): The corresponding Job Template attribute is obsolete.

"job-finishings-supported" (1setOf type2 enum): The corresponding Job Template attribute is obsolete.

"job-finishings-col-default" (1setOf collection): The corresponding Job Template attribute is obsolete.

"job-finishings-col-ready" (1setOf collection): The corresponding Job Template attribute is obsolete.

"job-finishings-col-supported" (1setOf keyword): The corresponding Job Template attribute is obsolete.

8. Obsolete Values

8.1 Obsolete "job-state-reasons" Values

The following keyword values from the previous version of this specification [PWG5100.7-2003] are now obsolete:

'digital-signature-type-not-supported': This value is obsolete because the corresponding "document-digital-signature" Job Template attribute is obsolete.
'job-digital-signature-wait': This value is obsolete because the corresponding "document-digital-signature" Job Template attribute is obsolete.

9. Additional Semantics for Existing Operations

9.1 Create-Job, Print-Job, Print-URI, Validate-Job: job-mandatory-attributes

This specification extends the Create-Job, Print-Job, Print-URI, and Validate-Job operations to support the "job-mandatory-attributes" operation attribute (section 4.1.1) in the request sent by the Client, which specifies a list of Job Template attributes that MUST be supported by the Printer for the request to be accepted.

If the "job-mandatory-attributes" operation attribute is supported, the Client MAY supply and the Printer MUST accept the "job-mandatory-attributes" operation attribute in any Job Creation or Validate-Job request.

The Printer MUST reject the Job Creation request if the Client supplies an unsupported Job Template attribute or value in the request that is included in this list of "job-mandatory-attributes" values.

If the Client supplies both the "job-mandatory-attributes" and "ipp-attribute-fidelity" operation attributes, the Printer MUST ignore the "job-mandatory-attributes" attribute.

9.2 Create-Job, Print-Job, Print-URI: server-error-too-many-jobs Status Code

This specification extends the Job Creation operations to return the 'server-error-too-many-jobs' status code value when the Printer is currently unable to create a new Job object.


This specification extends the Document Creation operations to return the 'server-error-too-many-documents' status code value when the Printer is currently unable to create a new Document object.

10. Conformance Requirements

10.1 Printer Conformance Requirements

In order for a Printer to claim conformance to this specification, a Printer MUST support:
1. The Job Status attributes defined in section 4.2 that correspond to any supported Job Template attributes defined in section 4.3;
2. The Document Status attributes defined in section 4.2 that correspond to any supported Document Template attributes defined in section 4.3;
3. The Printer Description attributes defined in section 4.4 that correspond to any supported Document/Job Template attributes defined in section 4.3;
4. The additional values defined in section 5;
5. The internationalization considerations defined in section 11; and
6. The security considerations defined in section 12.

Printers that support the "job-mandatory-attributes" operation attribute (section 4.1.1) MUST also support the additional semantics defined in section 9.1.

10.2 Client Conformance Requirements

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

1. The internationalization considerations defined in section 11; and
2. The security considerations defined in section 12.

11. Internationalization Considerations

For interoperability and basic support for multiple languages, conforming implementations MUST support:

1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8) [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
2. The Unicode Format for Network Interchange [RFC5198] which requires transmission of well-formed UTF-8 strings and recommends transmission of normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

Unicode NFC is defined as the result of performing Canonical Decomposition (into base characters and combining marks) followed by Canonical Composition (into canonical composed characters wherever Unicode has assigned them).

WARNING – Performing normalization on UTF-8 strings received from Clients and subsequently storing the results (e.g., in Job objects) could cause false negatives in Client searches and failed access (e.g., to Printers with percent-encoded UTF-8 URIs now 'hidden').

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 Character Property Model [UTR23] – character properties
Unicode Conformance Model [UTR33] – Unicode conformance basis

12. Security Considerations

The IPP extensions defined in this document require the same security considerations as defined in the Internet Printing Protocol/1.1 [STD92].

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


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

13. IANA Considerations

13.1 Attribute Registrations

The attributes defined in this specification will be published by IANA according to the procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

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

The registry entries will contain the following information:

<table>
<thead>
<tr>
<th>Document Status attributes:</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>---------------------------</td>
<td>-----------</td>
</tr>
</tbody>
</table>
Job Template attributes:

- compression-supplied (obsolete) (type2 keyword) [PWG5100.7]
- document-charset-supplied (obsolete) (charset) [PWG5100.7]
- document-digital-signature-supplied (obsolete) (type2 keyword) [PWG5100.7]
- document-format-details-supplied (obsolete) (1setOf collection) [PWG5100.7]
- document-format-supplied (obsolete) (mimeMediaType) [PWG5100.7]
- document-format-version-supplied (obsolete) (text(127)) [PWG5100.7]
- document-message-supplied (obsolete) (text(MAX)) [PWG5100.7]
- document-name-supplied (obsolete) (name(MAX)) [PWG5100.7]
- document-natural-language-supplied (obsolete) (naturalLanguage) [PWG5100.7]
- errors-count (integer(0:MAX)) [PWG5100.7]
- output-device-actual (obsolete) (1setOf name(127)) [PWG5100.7]
- print-content-optimize-actual (1setOf type2 keyword) [PWG5100.7]
- warnings-count (integer(0:MAX)) [PWG5100.7]

Document Template attributes:

- Document Template attributes: Reference
- output-device (name(127)) [PWG5100.7]
- print-content-optimize (type2 keyword) [PWG5100.7]

Job Status attributes:

- compression-supplied (obsolete) (type2 keyword) [PWG5100.7]
- document-charset-supplied (obsolete) (charset) [PWG5100.7]
- document-digital-signature-supplied (obsolete) (type2 keyword) [PWG5100.7]
- document-format-details-supplied (obsolete) (1setOf collection) [PWG5100.7]
- document-format-supplied (obsolete) (mimeMediaType) [PWG5100.7]
- document-format-version-supplied (obsolete) (text(127)) [PWG5100.7]
- document-message-supplied (obsolete) (text(MAX)) [PWG5100.7]
- document-name-supplied (obsolete) (name(MAX)) [PWG5100.7]
- document-natural-language-supplied (obsolete) (naturalLanguage) [PWG5100.7]
- errors-count (integer(0:MAX)) [PWG5100.7]
- ipp-attribute-fidelity (obsolete) (boolean) [PWG5100.7]
- job-copies-actual (obsolete) (integer(1:MAX)) [PWG5100.7]
- job-cover-back-actual (obsolete) (collection) [PWG5100.7]
- job-cover-front-actual (obsolete) (collection) [PWG5100.7]
- job-finishings-actual (obsolete) (1setOf type2 enum) [PWG5100.7]
- job-mandatory-attributes (obsolete) (1setOf keyword) [PWG5100.7]
- output-device-actual (obsolete) (1setOf name(127)) [PWG5100.7]
- print-content-optimize-actual (1setOf type2 keyword) [PWG5100.7]
- warnings-count (integer(0:MAX)) [PWG5100.7]

Job Template attributes:

- Job Template attributes: Reference
- job-copies (obsolete) (integer(1:MAX)) [PWG5100.7]
- job-cover-back (obsolete) (collection) [PWG5100.7]
- job-cover-front (obsolete) (collection) [PWG5100.7]
- job-finishings (obsolete) (1setOf type2 enum) [PWG5100.7]
- job-finishings-col (obsolete) (1setOf collection) [PWG5100.7]
- output-device (name(127)) [PWG5100.7]
13.2 Attribute Value Registrations

The keyword values defined in this specification will be published by IANA according to the procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

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

The registry entries will contain the following information:

Attributes (attribute syntax)  Reference  
---------------------------------------  ------  
print-content-optimize (type2 keyword)  [PWG5100.7]
job-state-reasons (1setOf type2 keyword)
  digital-signature-did-not-verify [RFC8011]
  digital-signature-type-not-supported (obsolete) [PWG5100.7]
  errors-detected [PWG5100.7]
  job-digital-signature-wait (obsolete) [PWG5100.7]
  warnings-detected [PWG5100.7]

media (type2 keyword | name(MAX))
  choice_iso_a4_210x297mm_na_letter_8.5x11in [PWG5100.7]

print-content-optimize (type2 keyword)
  graphics [PWG5100.7]
  photo [PWG5100.7]
  text [PWG5100.7]
  text-and-graphics [PWG5100.7]

print-content-optimize-actual (1setOf type2 keyword)
  <Any "print-content-optimize" value> [PWG5100.7]

print-content-optimize-default (type2 keyword)
  <Any "print-content-optimize" value> [PWG5100.7]

print-content-optimize-supported (1setOf type2 keyword)
  <Any "print-content-optimize" value> [PWG5100.7]
13.3 Operation Registrations

The operations defined in this specification will be published by IANA according to the procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

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

The registry entries will contain the following information:

<table>
<thead>
<tr>
<th>Operation Name</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create-Job(Extension)</td>
<td>[PWG5100.7]</td>
</tr>
<tr>
<td>Print-Job(Extension)</td>
<td>[PWG5100.7]</td>
</tr>
<tr>
<td>Print-URI(Extension)</td>
<td>[PWG5100.7]</td>
</tr>
<tr>
<td>Send-Document(Extension)</td>
<td>[PWG5100.7]</td>
</tr>
<tr>
<td>Send-URI(Extension)</td>
<td>[PWG5100.7]</td>
</tr>
<tr>
<td>Validate-Job(Extension)</td>
<td>[PWG5100.7]</td>
</tr>
</tbody>
</table>

13.4 Status Code Registrations

The status codes defined in this specification will be published by IANA according to the procedures in the Internet Printing Protocol/1.1 [STD92] in the following file:

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

The registry entries will contain the following information:

<table>
<thead>
<tr>
<th>Value</th>
<th>Status Code Name</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0500:0x05FF - Server Error: 0x050B server-error-too-many-jobs</td>
<td>[PWG5100.7]</td>
<td></td>
</tr>
<tr>
<td>0x050C server-error-too-many-documents</td>
<td>[PWG5100.7]</td>
<td></td>
</tr>
</tbody>
</table>
14. Overview of Changes

14.1 IPP Job Extensions v1.1

The following changes were made to the previous version of this specification [PWG5100.7-2003]:

- A rationale section was added, including use cases, exceptions, and requirements;
- References now point to the current versions of dependent documents and specifications at the time of publication;
- Read-only attributes are now defined and registered as status attributes;
- A RECOMMENDED "job-mandatory-attributes-supported" Printer Description attribute has been added;
- The "document-charset" operation attribute and corresponding operation semantics are now defined in PWG 5100.5: IPP Document Object v1.1;
- The "document-digital-signature" operation attribute and corresponding Document Status, Job Status, and Printer Description attributes have been made obsolete;
- The "document-format-details" operation attribute and corresponding Document Status, Job Status, and Printer Description attributes have been made obsolete;
- The "document-format-version" operation attribute and corresponding Document Status, Job Status, and Printer Description attributes have been made obsolete;
- The "job-copies" Job Template attribute and corresponding Job Status and Printer Description attributes have been made obsolete;
- The "job-cover-back" Job Template attribute and corresponding Job Status and Printer Description attributes have been made obsolete;
- The "job-cover-front" Job Template attribute and corresponding Job Status and Printer Description attributes have been made obsolete;
- The "job-finishings" Job Template attribute and corresponding Job Status and Printer Description attributes have been made obsolete;
- The "job-finishings-col" Job Template attribute and corresponding Job Status and Printer Description attributes have been made obsolete; and
- The 'digital-signature-type-not-supported' and 'job-digital-signature-wait' values for the "job-state-reasons" attribute have been made obsolete.
15. References

15.1 Normative References


15.2 Informative References


16. Author's Address

Primary author:

Michael Sweet
Apple Inc.
One Apple Park Way
MS 111-HOMC
Cupertino CA 95014
USA

Send comments to the PWG IPP Mailing List:
ipp@pwg.org (subscribers only)

To subscribe, see the PWG web page:
http://www.pwg.org/

Implementers of this specification document are encouraged to join the IPP Mailing List in order to participate in any discussions of clarification issues and review of registration proposals for additional attributes and values.

The editors would like to especially thank the following individuals who also contributed significantly to the development of this document:

Tom Hastings (author of v1.0)
Peter Zehler (author of v1.0)
17. Change History

17.1 October 23, 2018

- Status: Interim
- Updated references to the first version of 5100.7 to include year and exclude the full name.
- Abstract and intro: Clarified that this specification is defining attributes and values.
- Editorial changes
- Added reference to the MSN2 spec.

17.2 September 26, 2018

- Brought back the job-mandatory-attributes operation attribute, which is still needed.
- Added a rationale, use case, and design requirement for selective fidelity/job-mandatory-attributes.
- Added Additional Semantics and Operation Registrations sections for using job-mandatory-attributes with job creation/validation operations.
- Added Additional Semantics and Operation Registrations sections for returning the too-many-jobs/documents status codes.

17.3 September 25, 2018

Initial revision.