IPP Document Object v1.1 (DOCOBJECT)

Status: Prototype

Abstract: This specification defines the IPP Document object and its associated attributes, values, group, and operations.

This is a PWG Working Draft. For a definition of a "PWG Working Draft", see:


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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 extends the Internet Printing Protocol/1.1 [STD92] by defining the IPP Document object and its associated attributes, values, group, and operations. The IPP Job object is extended to contain zero or more addressable Document objects representing the Documents submitted for and operated on by the Job.

This specification obsoletes portions of the previous version of this specification [PWG5100.5-2003]. A list of changes can be found in section 15.

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 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 an endpoint device, e.g., a marking engine, a fax modem, etc.
2.3 Protocol Role Terminology

This specification also defines the following protocol roles to specify unambiguous conformance requirements:

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

- **Attribute Precedence**: The rules which dictate which attribute value takes precedence when the same attribute is supplied at different points in the workflow with different values, such as at both the Job Level and the Document Level.

- **Document Creation Operation**: Operations that create Document objects including Print-Job, Print-URI, Send-Document, and Send-URI as defined in the IPP/1.1 Model and Semantics [STD92].

- **Document Level**: Operation and Document Template attributes supplied in the Send-Document and Send-URI operations are referred to as being supplied at the Document Level. Attributes supplied in the Print-Job and Print-URI operations are considered as being supplied at the Job Level only, *not* also at the Document Level, even though Print-Job and Print-URI also create Document objects.

- **Document Template**: An attribute that the Client supplies in a Send-Document or Send-URI request in the Document attributes group, e.g., “media”.

- **Honor**: A Printer is said to honor an attribute supplied by the Client if the Printer supports the attribute and supplied value and conforms to the defined semantics.

- **Job Creation Operation**: Operations that create Job objects including Create-Job, Print-Job, and Print-URI as defined in the IPP/1.1 Model and Semantics [STD92].

- **Job Level**: Operation and Job Template attributes supplied in Print-Job, Print-URI, and Create-Job requests are referred to as being supplied at the Job Level.

2.5 Acronyms and Organizations

- **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 the IPP Model and Semantics, including abstract objects for a Printer that processes Jobs and the Jobs themselves which process Documents. Given the need to directly address Documents in a Job, the IPP Document Object v1.1 should:

1. Define an abstract IPP Document object and its attributes;
2. Define new IPP operations for the IPP Document object; and
3. Extend existing IPP operations as needed to support the IPP Document object.

3.2 Use Cases

3.2.1 Specify Per-Document Print Intent

Jane is printing a multi-volume report and would like the output printed together. She uses an application on her computer to select each volume in the report and a shipping envelope. She then initiates a print action, specifying the media and finishing processes for each volume and the media for the shipping envelope. The printer processes all of the documents as a single job, placing the hardcopy output in a mailbox together.

3.2.2 See a List of Documents in a Job

John has submitted a multi-document job to a printer but cannot remember if he included all of the documents needed. He uses an application on his mobile device to query the list of documents in the print job and display them on the screen.

3.2.3 Cancel a Single Document

Bob has submitted a multi-document job to a printer but realizes there was a typographical error in one of the documents that has not yet printed. He uses an application on his
computer to view the list of jobs on the printer, views the list of documents in the job he submitted, and initiates a cancel action for the document containing the error.

### 3.3 Exceptions

There are no exceptions defined for this specification.

### 3.4 Out of Scope

The following are considered out of scope for this specification:

1. Definition of copy or page level semantics; and
2. Definition of per-page or per-copy overrides.

### 3.5 Design Requirements

The design requirements for this specification are:

1. Define an abstract IPP Document object and its semantics;
2. Define an attribute group tag for attributes of an IPP Document object;
3. Define attributes and values to describe an IPP Document object;
4. Define operations for querying and manipulating IPP Document objects;
5. Extend existing operations to explicitly create IPP Document objects;
6. Define security requirements necessary to support IPP Document objects; and
7. Define sections to register all objects, attribute groups, attributes, values, and operations with IANA.
4. Model

The Internet Printing Protocol/1.1 [STD92] defines an object model containing a Printer that processes Jobs and a Job that processes Documents. This specification extends the Model with an addressable Document object with its own attributes and state. Printers MAY support multiple Documents per Job.

4.1 Document Object

The Document object represents a single Document in a Job that contains Document-specific Description, Status, and Template attributes. Document Description attributes provide information about the Document, Document Status attributes provide state information for the Document, and Document Template attributes override the corresponding Job Template attributes for the Document. A Document object also contains the Document data and/or a URI that references the Document data. Figure 1 shows the life cycle of the Document object.

![Figure 1 - Document Object Life Cycle](image)

4.2 Operations

The Print-Job and Print-URI operations [STD92] create a Job object containing a single Document object while the Create-Job operation [STD92] creates a Job object with no Document objects. The Send-Document and Send-URI operations [STD92] add Document objects to the specified Job object. Printers conforming to this specification MUST support the Create-Job and Send-Document operations.

This specification extends the Send-Document and Send-URI operations to accept Document Template attributes in the Document Attributes group. The Document Template...
attributes are applied to the Document object being created, overriding any corresponding Job Template attributes supplied at the Job Level which allows the Client to vary the Document Template attributes between Document objects in a single Job.

This specification also defines one new Job operation and four new Document operations. Table 1 lists the operations and their conformance requirements.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Target</th>
<th>Conformance</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel-Doc-Document</td>
<td>Document</td>
<td>MUST</td>
<td>Section 5.1.1</td>
</tr>
<tr>
<td>Create-Job</td>
<td>Printer</td>
<td>MUST</td>
<td>STD 92</td>
</tr>
<tr>
<td>Get-Doc-Attributes</td>
<td>Document</td>
<td>MUST</td>
<td>Section 5.1.2</td>
</tr>
<tr>
<td>Get-Documents</td>
<td>Job</td>
<td>MUST</td>
<td>Section 5.2.1</td>
</tr>
<tr>
<td>Print-Job</td>
<td>Printer</td>
<td>MUST</td>
<td>STD 92, Section 8.3</td>
</tr>
<tr>
<td>Print-URI</td>
<td>Printer</td>
<td>MAY</td>
<td>STD 92, Section 8.3</td>
</tr>
<tr>
<td>Send-Doc-Document</td>
<td>Job</td>
<td>MUST</td>
<td>STD 92, Section 8.4</td>
</tr>
<tr>
<td>Send-URI</td>
<td>Job</td>
<td>MAY</td>
<td>STD 92, Section 8.5</td>
</tr>
<tr>
<td>Set-Doc-Attributes</td>
<td>Document</td>
<td>MAY</td>
<td>Section 5.1.3</td>
</tr>
</tbody>
</table>

### 4.3 Job and Document Template Attributes

Clients OPTIONALLY supply Job Template attributes in Create-Job, Print-Job, and Print-URI requests, and OPTIONALLY supply Document Template attributes in Print-Job, Print-URI, Send-Document, and Send-URI requests. Job Template attributes apply to the Job as a whole. Document Template attributes apply only to the corresponding Document object.

Printers MUST support the following Attribute Precedence from highest to lowest when processing a Document:

1. Document Level - The Document Template attributes supplied in the Document Creation request or a subsequent Set-Document-Attributes request;
2. Job Level - The Job Template attributes supplied in the Job Creation request or a subsequent Set-Job-Attributes request; and
3. Printer Default - The Printer Default attributes as supplied by the manufacturer or configured by the operator or administrator using a Set-Printer-Attributes request.

Note: Depending on the value of the "pdl-override-supported" Printer Description attribute [STD92], device commands embedded in the Document data could override attributes specified at any of the previous levels.
5. New Operations

This section defines the new IPP operations for this specification.

Note: The Internet Printing Protocol/1.1 [STD92] deprecates the "job-uri" operation attribute for specifying the target Job and recommends that Clients send the "printer-uri" and "job-id" operation attributes instead.

5.1 Document Operations

5.1.1 Cancel-Document

This REQUIRED Document operation allows a Client to cancel a specified Document in a specified Print Job any time from the time the Document is created up to, but not including, the time that the Document is completed, canceled, or aborted. Since a Document might already be printing by the time a Cancel-Document request is received, some media sheet pages might be printed before the Document processing is actually terminated.

The Cancel-Document operation does not remove the Document from the Job and Printer, but only sets the specified Document’s “document-state” Document Status attribute to ‘canceled’ and the Document’s “document-state-reasons” Document Status attribute with ‘canceled-by-user’ or ‘canceled-by-operator’. If the Job object is printed again using operations such as Resubmit-Job [PWG5100.11], any canceled Documents are also printed again. Thus Cancel-Document has the same semantics as Cancel-Job [STD92] which only cancels the processing of the Job and doesn’t delete the Job object itself.

The Printer MUST accept or reject the request based on the Document’s current state and transition the Document to the indicated new state as shown in Table 2.

Access Rights: Only the Job Owner or an Operator or Administrator of the Printer can perform this operation. Otherwise, the Printer MUST reject the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.
Table 2 - Document State Transitions for Cancel-Document

<table>
<thead>
<tr>
<th>Current &quot;document-state&quot;</th>
<th>New &quot;document-state&quot;</th>
<th>Printer's response status code and action:</th>
</tr>
</thead>
<tbody>
<tr>
<td>'pending'</td>
<td>'canceled'</td>
<td>'successful-ok'</td>
</tr>
<tr>
<td>'processing'</td>
<td>'canceled'</td>
<td>'successful-ok'</td>
</tr>
<tr>
<td>'processing'</td>
<td>'processing'</td>
<td>'successful-ok' (note 1)</td>
</tr>
<tr>
<td>'processing'</td>
<td>'processing'</td>
<td>'client-error-not-possible' (note 2)</td>
</tr>
<tr>
<td>'completed'</td>
<td>'completed'</td>
<td>'client-error-not-possible'</td>
</tr>
<tr>
<td>'canceled'</td>
<td>'canceled'</td>
<td>'client-error-not-possible'</td>
</tr>
<tr>
<td>'aborted'</td>
<td>'aborted'</td>
<td>'client-error-not-possible'</td>
</tr>
</tbody>
</table>

Note 1: If the implementation requires some measurable time to cancel the Document in the 'processing' state, the Printer MUST add the 'processing-to-stop-point' value to the Document's "document-state-reasons" attribute and then transition the Document to the 'canceled' state when the processing ceases.

Note 2: If the Document object already has the 'processing-to-stop-point' value in its "document-state-reasons" attribute, then the Printer MUST reject the Cancel-Document request.

5.1.1.1 Cancel-Document Request

The following groups of attributes are part of the Cancel-Document request:

Group 1: Operation Attributes

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92].

Target:

Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri" (uri) operation attribute(s) [STD92] which define the target Job object for this operation, followed by the "document-number" (integer(1:MAX)) operation attribute which defines the target Document object for this operation. If the Client omits the "document-number" operation attribute, the Printer MUST reject the request and return the 'client-error-bad-request' status code.

Requesting User Name:

The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the Client as described in [STD92].
"document-message" (text(MAX)):

The Client MAY supply this attribute. If supported by the Printer, the Printer MUST also support the corresponding "document-message" (text(MAX)) Document Status attribute (see section 6.2.3) and copy the value to the Document's "document-message" attribute.

5.1.1.2 Cancel-Document Response

The following groups of attributes are part of the Cancel-Document response:

Group 1: Operation Attributes

Status Message:

In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as described in [STD92].

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92].

Group 2: Unsupported Attributes

See [STD92] for details on returning Unsupported Attributes.

5.1.2 Get-Document-Attributes

This REQUIRED Document operation allows a Client to request the values of selected attributes of a Document object. The Printer MUST only return attributes that were submitted by a Client or generated by the Printer.

The Client requests attributes using the "requested-attributes (keyword)" operation attribute [STD92] which lists the attribute names and groups of interest. For Document objects the possible names of attribute groups are:

'document-template': The subset of Document Template that the implementation supports for Document objects.

'document-description': The subset of Document Description and Document Status attributes that the implementation supports for Document objects.

'all': All attributes that the implementation supports for Document objects.
Since a Client MAY request specific attributes or named groups, there is a potential that there is some overlap. For example, if a Client requests 'document-name' and 'document-description', the Client is actually requesting the "document-name" attribute once by naming it explicitly and once by inclusion in the 'document-description' group. In such cases, the Printer returns the attribute only once in the response even if it is requested multiple times. The Client SHOULD NOT request the same attribute in multiple ways.

Printers MUST support all group names and MUST return all supported attributes belonging to the group.

Access Rights: Only the Job Owner or an Operator or Administrator of the Printer can perform this operation. Otherwise, the Printer MUST reject the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

**5.1.2.1 Get-Document-Attributes Request**

The following groups of attributes are part of the Get-Document-Attributes request:

**Group 1: Operation Attributes**

- **Natural Language and Character Set:**
  - The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92].

- **Target:**
  - Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri" (uri) operation attribute(s) [STD92] which define the target Job object for this operation, followed by the “document-number” (integer(1:MAX)) operation which defines the target Document object for this operation. If the Client omits the “document-number” operation attribute, the Printer MUST reject the request and return the ‘client-error-bad-request’ status code.

- **Requesting User Name:**
  - The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the Client as described in [STD92].

- **"requested-attributes" (1setOf keyword):**
  - The Client OPTIONALLY supplies and the Printer MUST support this attribute, which is a list of Document attribute names and/or attribute group names that are returned to the Client for each Document object. If the Client does not supply this attribute, the Printer MUST respond as if the Client had supplied this attribute with the single value 'all'.
5.1.2.2 Get-Document-Attributes Response

The following groups of attributes are part of the Get-Document-Attributes response:

Group 1: Operation Attributes

Status Message:

In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as described in [STD92].

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92]. The "attributes-natural-language" MAY be the natural language of the Document object rather than the one in the Get-Document-Attributes request.

Group 2: Unsupported Attributes

See [STD92] for details on returning Unsupported Attributes.

The response MAY contain the "requested-attributes" operation attribute with any supplied values (attribute keywords) that were requested by the Client but are not supported by the Printer. If the Printer does return unsupported attributes referenced in the "requested-attributes" operation attribute and that attribute included group names such as 'all', the unsupported attributes MUST NOT include attributes described in the standard but not supported by the implementation.

Group 3: Document Attributes

The Printer responds with the Document Description, Document Status, and Document Template attributes for each returned Document object as requested by the "requested-attributes" operation attribute supplied by the Client in the request. The Printer ignores (does not respond with) any requested attribute or value which is not supported or which is restricted by the security policy in force, including whether the requesting user is the Job owner. However, the Printer MUST respond with the 'unknown' out of band value [STD92] for any supported attribute (including all REQUIRED attributes) for which the Printer does not know the value, unless it would violate the security policy.
5.1.3 Set-Document-Attributes

This OPTIONAL Document operation allows a Client to set the values of the attributes of a Document object after the Document object is submitted to the Printer. In the request, the Client supplies the set of Document attributes and values that are to be set. In the response, the Printer returns success or rejects the entire request with indications of which attribute or attributes could not be set.

This operation is similar to the Set-Job-Attributes operation [RFC3380] and follows the same rules for validation. As with the Set-Job-Attributes operation, the Set-Document-Attributes operation can add a new attribute, replace the value of an existing attribute, or remove an attribute using 'delete-attribute' out-of-band value.

If the Client supplies an attribute in a Set-Document-Attributes request with the 'delete-attribute' out-of-band value and that attribute is not present on the Document object, the Printer ignores the attribute and does not return the attribute in the Unsupported Attributes group. The Printer also returns the 'successful-ok' status code if there are no other problems with the request.

The Printer MUST accept or reject this operation when the Document's "document-state" attribute has the values shown in Table 3 but MUST NOT change the state of the Document object since the Document is a passive object and the Document state is a subset of the Job State. For example, in the case where the operation creates a request for unavailable resources, the Job (but not the Document) transitions to a new state.

<table>
<thead>
<tr>
<th>&quot;document-state&quot;</th>
<th>Printer's response status code and &quot;action&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>'pending'</td>
<td>'successful-ok'</td>
</tr>
<tr>
<td>'pending'</td>
<td>'successful-ok' - needed resources are not ready (the Job MAY change state)</td>
</tr>
<tr>
<td>'processing'</td>
<td>'successful-ok' or 'client-error-not-possible' depending on implementation, including the attributes being set, whether the document has started marking media, etc.</td>
</tr>
<tr>
<td>'completed'</td>
<td>'client-error-not-possible'</td>
</tr>
<tr>
<td>'canceled'</td>
<td>'client-error-not-possible'</td>
</tr>
<tr>
<td>'aborted'</td>
<td>'client-error-not-possible'</td>
</tr>
</tbody>
</table>

This operation MUST NOT change the value of attributes not specified in the operation unless the definition of the attribute explicitly specifies such side effects. In general, Document attributes that are settable do not define side effects on other attributes that are settable, only side effects on READ-ONLY attributes, if any.

If the Printer supports the Set-Document-Attributes operation, then it SHOULD support setting of all Document Description and Document Template attributes that the
implementation supports. Document Status attributes are READ-ONLY and cannot be set directly using this operation.

Note: There is no way for the Client to set all of a Job's Document objects to the same attribute values in a single operation. Either a) the Client sets the corresponding attribute in each Document object in the Job with separate Set-Document-Attributes requests, or b) the Client sets the corresponding attribute at the Job Level using the Set-Job-Attributes operation. Setting the corresponding attribute at the Job Level (or supplying that attribute initially in the Job Creation operation) causes each Document object to inherit the Job Level attribute value, if the Document object doesn't have a corresponding explicit attribute supplied at the Document Level. In other words, supplying an attribute at the Job Level will affect all the Job's Document objects that don't have that attribute also explicitly supplied at the Document Level.

Access Rights: Only the Job Owner or an Operator or Administrator of the Printer can perform this operation. Otherwise, the Printer MUST reject the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

5.1.3.1 Set-Document-Attributes Request

The following groups of attributes are part of the Set-Document-Attributes request:

Group 1: Operation Attributes

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92].

Target:

Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri" (uri) operation attribute(s) [STD92] which define the target Job object for this operation, followed by the "document-number" (integer(1:MAX)) operation which defines the target Document object for this operation. If the Client omits the “document-number” operation attribute, the Printer MUST reject the request and return the 'client-error-bad-request' status code.

Requesting User Name:

The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the Client as described in [STD92].

Group 2: Document Attributes
The Client supplies one or more Document Description or Document Template attributes. If supported, the Printer MUST either add the attribute (if it does not already exist in the Document object), replace all values for the attribute (if it already exists in the Document object), or remove the attribute (if the 'delete-attribute' out-of-band value is supplied by the Client).

5.1.3.2 Set-Document-Attributes Response

The Printer returns the following groups of attributes as part of the Set-Document-Attributes response:

Group 1: Operation Attributes

Status Message:

In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) Operation attribute as described in [STD92].

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92].

Group 2: Unsupported Attributes

See [STD92] for details on returning Unsupported Attributes.

If some of the attributes in the operation fail to validate, the Printer MUST reject the operation, MUST NOT change any Document attributes, and MUST return the indicated status code below. In this group, the Printer MUST also return all attributes that fail to validate. The following are the reasons that an attribute fails to validate and the value returned for the attribute, along with the indicated status code and order of detection:

1. The number of attributes supplied by the client exceeds the maximum number that the Printer supports in a Set-Document-Attributes request: return the 'client-error-request-entity-too-large' status code [STD92].

2. The Printer doesn't support the attribute: return the attribute with the 'unsupported' out-of-band attribute value and the 'client-error-attributes-or-values-not-supported' status code [STD92].

3. The attribute is READ-ONLY (in its definition) or is not-settable in this implementation: return the attribute with the 'not-settable' out-of-band...
attribute value and the 'client-error-attributes-not-settable' status code [RFC3380].

4. The Printer doesn't support the value: if the attribute in the operation has a single value, return it. If the attribute in the operation is multi-valued, return only those values in a 1setOf that are not supported. Return the 'client-error-attributes-or-values-not-supported' status code [STD92].

5. The values of some of the supplied attributes conflict with one another and/or other Document attribute values not being set: if the conflicting attribute in the operation has a single value, return the attribute and the value. If the attribute in the operation is multi-valued, return only the attribute and those values in a 1setOf that are conflicting with other attributes. Return the 'client-error-conflicting-attributes' status code [STD92].

5.2 Job Operations

5.2.1 Get-Documents

This REQUIRED Job operation allows a Client to retrieve the list of Document objects belonging to the target Job object. The Client MAY also supply a list of Document attribute names and/or attribute group names. A group of Document object attributes will be returned for each Document object in the Job.

This operation is similar to the Get-Document-Attributes operation (see section 5.1.2), except that this operation returns attributes from all Document objects contained in the Job object instead of from a single selected Document object in the Job object. As with the Get-Document-Attributes operation, the Printer MUST only return attributes that were submitted by a Client or generated by the Printer.

This operation is also similar to the Get-Jobs operation [STD92] except that there are no equivalents to the "which-jobs" and "my-jobs" operation attributes.

It is not an error for the Printer to return 0 Documents. If the response returns 0 Documents because there are no Documents in the Job, then the status code for 0 Documents MUST be 'successful-ok'.

Access Rights: Only the Job Owner or an Operator or Administrator of the Printer can perform this operation. Otherwise, the Printer MUST reject the operation and return 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.
5.2.1.1 Get-Documents Request

The following groups of attributes are part of the Get-Documents request:

Group 1: Operation Attributes

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes [STD92]

Target:

Either a) the "printer-uri" (uri) and "job-id" (integer(1:MAX)) or b) the "job-uri" (uri) operation attribute(s) [STD92] which define the target Job object for this operation.

Requesting User Name:

The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the Client as described in [STD92].

"limit" (integer(1:MAX)):

The client OPTIONALLY supplies and the Printer MUST support this operation attribute, which determines the maximum number of Documents that a Client will receive from the Printer. The limit is a "stateless limit" in that if the value supplied by the Client is 'N', then only the first 'N' Documents are returned in the Get-Documents Response. There is no mechanism to allow for the next 'M' Documents after the first 'N' Documents. If the Client does not supply the "limit" attribute, the Printer responds with all Documents in the Job.

"requested-attributes" (1setOf keyword):

The client OPTIONALLY supplies and the Printer MUST support this attribute, which is a list of Document attribute names and/or attribute group names that are returned to the Client for each Document object. The allowed attribute group names are the same as those defined in the Get-Documents Attributes operation in section 5.1.2. If the Client does not supply this attribute, the Printer MUST respond as if the Client had supplied this attribute with the single value 'document-number'.

5.2.1.2 Get-Documents Response

The following groups of attributes are part of the Get-Documents request:
Group 1: Operation Attributes

Status Message:

In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a "status-message" (text(255)) and/or a "detailed-status-messages" (text(MAX)) operation attribute as described in [STD92].

Natural Language and Character Set:

The "attributes-charset" and "attributes-natural-language" attributes as described in [STD92].

Group 2: Unsupported Attributes

See [STD92] for details on returning Unsupported Attributes.

The response MAY contain the "requested-attributes" operation attribute with any supplied values (attribute keywords) that were requested by the Client but are not supported by the Printer. If the Printer does return unsupported attributes referenced in the "requested-attributes" operation attribute and that attribute included group names such as 'all', the unsupported attributes MUST NOT include attributes described in the standard but not supported by the implementation.

Groups 3 to N: Document Attributes

The Printer responds with the Document Description, Document Status, and Document Template attributes for each returned Document object as requested by the "requested-attributes" operation attribute supplied by the Client in the request. The Printer ignores (does not respond with) any requested attribute or value which is not supported or which is restricted by the security policy in force, including whether the requesting user is the Job owner. However, the Printer MUST respond with the 'unknown' out of band value [STD92] for any supported attribute (including all REQUIRED attributes) for which the Printer does not know the value, unless it would violate the security policy.

The Printer MUST return the groups in order of increasing "document-number" value.
6. New Attributes

6.1 Document Description Attributes

6.1.1 document-name (name(MAX))

This REQUIRED Document Description attribute specifies the name of the document and is copied from the "document-name" operation attribute [STD92] supplied by the Client in the Document Creation request.

6.2 Document Status Attributes

Table 4 lists the Document Status attributes defined by this specification. Printers that support a given operation or Job Status attribute MUST support the corresponding Document Status attribute.

<table>
<thead>
<tr>
<th>Document Attribute</th>
<th>Operation/Job Attribute</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>attributes-charset (charset)</td>
<td>attributes-charset</td>
<td>[STD92]</td>
</tr>
<tr>
<td>attributes-natural-language</td>
<td>attributes-natural-language</td>
<td>[STD92]</td>
</tr>
<tr>
<td>current-page-order (type2 keyword)</td>
<td>current-page-order</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>date-time-at-completed (dateTime)</td>
<td>date-time-at-completed</td>
<td>[STD92]</td>
</tr>
<tr>
<td>date-time-at-creation (dateTime)</td>
<td>date-time-at-creation</td>
<td>[STD92]</td>
</tr>
<tr>
<td>date-time-at-processing (dateTime)</td>
<td>date-time-at-processing</td>
<td>[STD92]</td>
</tr>
<tr>
<td>detailed-status-messages</td>
<td>job-detailed-status-messages</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-access-errors</td>
<td>job-document-access-errors</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-charset (charset)</td>
<td>document-charset</td>
<td>Sections 6.2.1 and 6.4.1</td>
</tr>
<tr>
<td>document-format (mimeMediaType)</td>
<td>document-format</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-format-detected (mimeMediaType)</td>
<td>&lt;none&gt;</td>
<td>Section 6.2.2</td>
</tr>
<tr>
<td>document-job-id (integer(1:MAX))</td>
<td>job-id</td>
<td>[STD92]</td>
</tr>
<tr>
<td>Document Attribute</td>
<td>Operation/Job Attribute</td>
<td>Reference</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>document-job-uri (uri)</td>
<td>job-uri</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-message (text(MAX))</td>
<td>&lt;none&gt;</td>
<td>Section 6.2.3</td>
</tr>
<tr>
<td>document-natural-language (naturalLanguage)</td>
<td>document-natural-language</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-number (integer(1:MAX))</td>
<td>&lt;none&gt;</td>
<td>Section 6.2.4</td>
</tr>
<tr>
<td>document-printer-uri (uri)</td>
<td>job-printer-uri</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-state (type1 enum)</td>
<td>job-state (note 1)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-state-message (text(MAX))</td>
<td>job-state-message</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-state-reasons (1setOf type2 keyword)</td>
<td>job-state-reasons</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-uri (uri)</td>
<td>document-uri (note 2)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>impressions (integer(0:MAX))</td>
<td>job-impressions</td>
<td>[STD92]</td>
</tr>
<tr>
<td>impressions-completed (integer(0:MAX))</td>
<td>job-impressions-completed</td>
<td>[STD92]</td>
</tr>
<tr>
<td>k-octets (integer(0:MAX))</td>
<td>job-k-octets</td>
<td>[STD92]</td>
</tr>
<tr>
<td>k-octets-processed (integer(0:MAX))</td>
<td>job-k-octets-processed</td>
<td>[STD92]</td>
</tr>
<tr>
<td>last-document (boolean)</td>
<td>&lt;none&gt;</td>
<td>Section 6.2.5</td>
</tr>
<tr>
<td>media-sheets (integer(0:MAX))</td>
<td>job-media-sheets</td>
<td>[STD92]</td>
</tr>
<tr>
<td>media-sheets-completed (integer(0:MAX))</td>
<td>job-media-sheets-completed</td>
<td>[STD92]</td>
</tr>
<tr>
<td>more-info (uri)</td>
<td>job-more-uri</td>
<td>[STD92]</td>
</tr>
<tr>
<td>output-device-assigned (name(MAX))</td>
<td>output-device-assigned</td>
<td>[STD92]</td>
</tr>
<tr>
<td>printer-up-time (integer(1:MAX))</td>
<td>job-printer-up-time</td>
<td>[STD92]</td>
</tr>
<tr>
<td>time-at-completed (integer(MIN:MAX))</td>
<td>time-at-completed</td>
<td>[STD92]</td>
</tr>
<tr>
<td>time-at-creation (integer(MIN:MAX))</td>
<td>time-at-creation</td>
<td>[STD92]</td>
</tr>
<tr>
<td>time-at-processing (integer(MIN:MAX))</td>
<td>time-at-processing</td>
<td>[STD92]</td>
</tr>
</tbody>
</table>

Note 1: The "document-state" attribute supports all of the "job-state" values except '4' (pending-held).

6.2.1 document-charset (charset)

This RECOMMENDED Document Status attribute specifies the charset used in the Document data. The Printer sets this attribute from the corresponding operation attribute supplied by the Client in the Document Creation request. Printers that support the "document-charset" operation attribute MUST support this attribute.

6.2.2 document-format-detected (mimeMediaType)

This Document Status attribute is generated by the Printer to indicate the format of the Document object content as detected by the Printer.

6.2.3 document-message (text(MAX))

This Document Status attribute contains a message from either a) the User to the Operator about the Document or b) from the Operator, Administrator, or "intelligent" process to indicate to the End User the reasons for modification or other management action taken on the Document. The Printer populates this attribute from the "document-message" operation attribute value supplied by the Client in any of the Document Creation requests or in a Cancel-Document request.

6.2.4 document-number (integer(1:MAX))

This REQUIRED Document Status attribute is the ordinal number of the Document within the Job, and determines its order of being printed in a multi-Document Job. The Printer MUST generate the values monotonically increasing from 1 for each Job.

6.2.5 last-document (boolean)

This REQUIRED Document Status attribute indicates whether this Document is the last Document in the Job [STD92]. The Printer sets this attribute from the corresponding operation attribute supplied by the Client in the Document Creation request, when the Client sends a Close-Job request [PWG5100.11], or when the "multiple-operation-time-out" time interval has passed.

6.3 Document Template Attributes

This specification defines Document Template attributes for every Job Template attribute that does not apply to the whole Job. Table 5 lists the new attributes.
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>copies (integer(1:MAX))</td>
<td>[STD92]</td>
</tr>
<tr>
<td>cover-back (collection)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>cover-front (collection)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>finishings (1setOf type2 enum)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>finishings-col (1setOf collection)</td>
<td>[PWG5100.1]</td>
</tr>
<tr>
<td>force-front-side (1setOf integer(1:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>imposition-template (type2 keyword</td>
<td>name(MAX))</td>
</tr>
<tr>
<td>media (type2 keyword</td>
<td>name(MAX))</td>
</tr>
<tr>
<td>media-col (collection)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>media-input-tray-check (type2 keyword</td>
<td>name(MAX))</td>
</tr>
<tr>
<td>number-up (integer(1:MAX))</td>
<td>[STD92]</td>
</tr>
<tr>
<td>orientation-requested (type2 enum)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>output-bin (type2 keyword</td>
<td>name(MAX))</td>
</tr>
<tr>
<td>page-delivery (type2 keyword)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>page-order-received (type2 keyword)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>page-ranges (1setOf rangeOfInteger(1:MAX))</td>
<td>[STD92]</td>
</tr>
<tr>
<td>presentation-direction-number-up (type2 keyword)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>print-quality (type2 enum)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>printer-resolution (resolution)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>sides (type2 keyword)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>x-image-position (type2 keyword)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>x-image-shift (integer(MIN:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>x-side1-image-shift (integer(MIN:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>x-side2-image-shift (integer(MIN:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>y-image-position (type2 keyword)</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>y-image-shift (integer(MIN:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>y-side1-image-shift (integer(MIN:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
<tr>
<td>y-side2-image-shift (integer(MIN:MAX))</td>
<td>[PWG5100.3]</td>
</tr>
</tbody>
</table>

6.4 Operation Attributes

6.4.1 document-charset (charset)

This RECOMMENDED operation attribute specifies the character set used by the Document data.

6.4.2 document-number (integer(1:MAX))

This REQUIRED operation attribute specifies the ordinal number of the Document within the Job.
6.5 Printer Description Attributes

6.5.1 document-creation-attributes-supported (1setOf type2 keyword)

This REQUIRED attribute lists the keyword names of the Document Template and operation attributes that the Printer will accept in the Send-Document and Send-URI Document Creation operations. Implementations that support the Send-URI operation MUST include the ‘document-uri’ keyword in “document-creation-attributes-supported”. Implementations that do not support Send-URI MUST NOT include the ‘document-uri’ keyword in “document-creation-attributes-supported”.

Note: The “document-uri” attribute is specific to the Send-URI operation. Inclusion of the ‘document-uri’ keyword in “document-creation-attributes-supported” does not imply that the “document-uri” attribute is valid for the Send-Document operation.

7. New Attribute Group Tags

7.1 document-attributes-tag

The document-attributes-tag (0x09) attribute group tag is used to delimit Document object attributes in IPP messages.
8. Additional Semantics for Existing Operations

8.1 Cancel-Job: "document-state" and "document-state-reasons"

This REQUIRED operation sets the “document-state” Document Status attribute to ‘canceled’ and the “document-state-reasons” Document Status attribute with ‘canceled-by-user’ or ‘canceled-by-operator’ for all Document objects in the identified Job that have not yet reached a terminating state (‘completed’, ‘canceled’, or ‘aborted’).

8.2 Hold-Job and Release-Job: "document-state-reasons"

These OPTIONAL operations affect the state of the target Job. The values of the Documents’ “document-state-reasons” Document Status attributes MUST NOT be affected by these operations.

8.3 Print-Job, Print-URI: Document Object and Attributes

This specification extends the REQUIRED Print-Job and OPTIONAL Print-URI operations [STD92] to explicitly create a Document object and copy the request operation attributes listed in Table 6 to the corresponding Document attributes. Printers MUST NOT copy Job Template attributes to the created Document object. Printers can also return the attributes listed in
Table 7 in the Document attributes group after the Job attributes group.

<table>
<thead>
<tr>
<th>Operation Attribute</th>
<th>Document Attribute</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>attributes-charset</td>
<td>attributes-charset</td>
<td>[STD92]</td>
</tr>
<tr>
<td>attributes-natural-language</td>
<td>attributes-natural-language</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-charset</td>
<td>document-charset</td>
<td>Sections 6.2.1 and 6.4.1</td>
</tr>
<tr>
<td>document-format</td>
<td>document-format</td>
<td>[STD92]</td>
</tr>
<tr>
<td></td>
<td>document-format-detected</td>
<td>Section 6.2.2</td>
</tr>
<tr>
<td>document-message</td>
<td>document-message</td>
<td>Section 6.2.3</td>
</tr>
<tr>
<td>document-name</td>
<td>document-name</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-natural-language</td>
<td>document-natural-language</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-uri</td>
<td>document-uri</td>
<td>[STD92]</td>
</tr>
<tr>
<td>job-impressions</td>
<td>impressions</td>
<td>[STD92], Section 6.2</td>
</tr>
<tr>
<td>job-k-octets</td>
<td>k-octets</td>
<td>[STD92], Section 6.2</td>
</tr>
<tr>
<td>job-media-sheets</td>
<td>media-sheets</td>
<td>[STD92], Section 6.2</td>
</tr>
</tbody>
</table>
Table 7 - Returned Document Status Attributes

<table>
<thead>
<tr>
<th>Document Status Attribute</th>
<th>Print-xxx Conformance</th>
<th>Send-xxx Conformance</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>document-number</td>
<td>OPTIONAL</td>
<td>REQUIRED</td>
<td>Section 6.2.4</td>
</tr>
<tr>
<td>document-state</td>
<td>OPTIONAL</td>
<td>REQUIRED</td>
<td>Section 6.2</td>
</tr>
<tr>
<td>document-state-message</td>
<td>OPTIONAL</td>
<td>OPTIONAL</td>
<td>Section 6.2</td>
</tr>
<tr>
<td>document-state-reasons</td>
<td>OPTIONAL</td>
<td>REQUIRED</td>
<td>Section 6.2</td>
</tr>
</tbody>
</table>

8.3.1 Print-Job/Print-URI Response

The following sets of attributes are part of the Print-Job and Print-URI responses:

Group 1: Operation Attributes

As specified in [STD92].

Group 2: Unsupported Attributes

As specified in [STD92].

Group 3: Job Object Attributes

As specified in [STD92].

Group 4: Document Object Attributes (new)

"document-number" (integer(1:MAX)):

The Printer MAY return the number of this Document object that was assigned by the Printer starting with 1 for each Job.

"document-state" (type1 enum):

The Printer MAY return the state of this Document object.

"document-state-reasons" (1setOf type2 keyword):

The Printer MAY return the associated state reasons for this Document.

"document-state-message" (text(MAX)):

The Printer MAY return the localized description of the “document-state” and “document-state-reasons” values for this Document.
8.4 Send-Document: Document Object and Attributes

This specification extends the REQUIRED Send-Document operation [STD92] to explicitly create a Document object and copy the operation attributes listed in Table 6 to the corresponding Document attributes.

The Send-Document request is also extended to support an additional Document Template attribute group after the operation attribute group. Document Template attributes are copied to the Document object after validation as described in section 4.3. Printers MUST NOT copy Document Template attributes to the Job object.

Finally, Printers also return the attributes listed in
Table 7 in the Document attributes group after the Job attributes group.

8.4.1 Send-Documen Request

The following attribute sets are part of the Send-Documen request:

Group 1: Operation Attributes
- As specified in [STD92].

Group 2: Document Template Attributes (new)
- The Client OPTIONALLY supplies and the Printer MUST support a set of Document Template attributes. If the Client is not supplying any Document Template attributes in the request, the Client SHOULD omit Group 2 rather than sending an empty group. However, a Printer MUST be able to accept an empty group.

Group 3: Document Data
- As specified in [STD92].

8.4.2 Send-Documen Response

The following sets of attributes are part of the Send-Documen response:

Group 1: Operation Attributes
- As specified in [STD92].

Group 2: Unsupported Attributes
- As specified in [STD92].

Group 3: Job Object Attributes
- As specified in [STD92].

Group 4: Document Object Attributes (new)
- "document-number" (integer(1:MAX)):
- The Printer MUST return the number of this Document object that was assigned by the Printer starting with 1 for each Job.
- "document-state" (type1 enum):
The Printer MUST return the state of this Document object.

"document-state-reasons" (1setOf type2 keyword):

The Printer MUST return the associated state reasons for this Document.

"document-state-message" (text(MAX)):

The Printer MAY return the localized description of the “document-state” and “document-state-reasons” values for this Document.

8.5 Send-URI: Document Object and Attributes

This specification extends the OPTIONAL Send-URI operation [STD92] to explicitly create a Document object and copy the operation attributes listed in Table 6 to the corresponding Document attributes.

The Send-URI request is also extended to support an additional Document Template attribute group after the operation attribute group. Document Template attributes are copied to the Document object after validation as described in section 4.3. Printers MUST NOT copy Document Template attributes to the Job object.

Finally, Printers also return the attributes listed in
819 Table 7 in the Document attributes group after the Job attributes group.

820 **8.5.1 Send-URI Request**

821 The following attribute sets are part of the Send-URI request:

822 Group 1: Operation Attributes

823 As specified in [STD92].

824 Group 2: Document Template Attributes (new)

825 The Client OPTIONALLY supplies and the Printer MUST support a set of Document Template attributes. If the Client is not supplying any Document Template attributes in the request, the Client SHOULD omit Group 2 rather than sending an empty group. However, a Printer MUST be able to accept an empty group.

829 **8.5.2 Send-URI Response**

830 The following sets of attributes are part of the Send-URI response:

831 Group 1: Operation Attributes

832 As specified in [STD92].

834 Group 2: Unsupported Attributes

835 As specified in [STD92].

836 Group 3: Job Object Attributes

837 As specified in [STD92].

838 Group 4: Document Object Attributes (new)

839 "document-number" (integer(1:MAX)):

840 The Printer MUST return the number of this Document object that was assigned by the Printer starting with 1 for each Job.

842 "document-state" (type1 enum):

843 The Printer MUST return the state of this Document object.

844 "document-state-reasons" (1setOf type2 keyword):
The Printer MUST return the associated state reasons for this Document.

"document-state-message" (text(MAX)):

The Printer MAY return the localized description of the “document-state” and “document-state-reasons” values for this Document.

9. Additional Values for Existing Attributes

9.1 operations-supported (1setOf type2 enum)

Table 8 lists the “operation-id” values for the new operations defined in this specification.

<table>
<thead>
<tr>
<th>Value</th>
<th>Operation Name</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0033</td>
<td>Cancel-Document</td>
<td>Section 5.1.1</td>
</tr>
<tr>
<td>0x0034</td>
<td>Get-Document-Attributes</td>
<td>Section 5.1.2</td>
</tr>
<tr>
<td>0x0035</td>
<td>Get-Documents</td>
<td>Section 5.2.1</td>
</tr>
<tr>
<td>0x0036</td>
<td>Delete-Document (obsolete)</td>
<td>Section 10.1</td>
</tr>
<tr>
<td>0x0037</td>
<td>Set-Document-Attributes</td>
<td>Section 5.1.3</td>
</tr>
</tbody>
</table>

9.2 requested-attributes (1setOf type2 keyword)

This specification defines the following additional values for the "requested-attributes" operation attribute [STD92]:

'document-description': All Document Description and Document Status attributes.

'document-template': All Document Template and Printer "xxx-supported" attributes.
10. Obsolete Operations and Attributes

10.1 Obsolete Delete-Document Operation

The obsolete Delete-Document operation removes the specified Document object and its data immediately from the specified Job. This operation is obsolete because it destroys accounting information about the target Document and MUST NOT be supported by new implementations of this specification.

10.2 Obsolete Document Status Attributes

Table 9 lists the obsolete Document Status attributes that were defined in the previous version of this specification [PWG5100.5-2003].

Note: This specification does not change the status of the original operation or Job Status attributes.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>compression (type2 keyword)</td>
<td>[STD92]</td>
</tr>
<tr>
<td>document-digital-signature (type2 keyword)</td>
<td>[PWG5100.7-2003]</td>
</tr>
<tr>
<td>document-format-details (1setOf collection)</td>
<td>[PWG5100.7-2003]</td>
</tr>
<tr>
<td>document-format-details-detected (1setOf collection)</td>
<td>[PWG5100.7-2003]</td>
</tr>
<tr>
<td>document-format-version (text(127))</td>
<td>[PWG5100.7-2003]</td>
</tr>
<tr>
<td>document-format-version-detected (text(127))</td>
<td>[PWG5100.7-2003]</td>
</tr>
<tr>
<td>impressions-completed-current-copy (integer(0:MAX))</td>
<td>[RFC3381- OBSOLETE]</td>
</tr>
<tr>
<td>sheet-completed-copy-number (integer(0:MAX))</td>
<td>[RFC3381- OBSOLETE]</td>
</tr>
</tbody>
</table>

11. Conformance Requirements

11.1 Printer Conformance Requirements

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

1. The required operations defined in section 5;
2. The required attributes and values defined in section 6;
3. The new attribute group tag defined in section 7;
4. The additional semantics defined in section 8;
5. The additional values defined in section 9;
6. The internationalization considerations defined in section 12; and
7. The security considerations defined in section 13.

11.2 Client Conformance Requirements

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

1. The required operations defined in section 5;
2. The required attributes and values defined in section 6;
3. The new attribute group tag defined in section 7;
4. The additional values defined in section 9;
5. The internationalization considerations defined in section 12; and
6. The security considerations defined in section 13.

12. 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

13. Security Considerations

The IPP extensions defined in this specification 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

14. IANA Considerations

14.1 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 Description attributes:</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>document-name (name(MAX))</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Line</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>936</td>
<td>Document Status attributes:</td>
</tr>
<tr>
<td>937</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>938</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>939</td>
<td>attributes-charset (charset)</td>
</tr>
<tr>
<td>940</td>
<td>attributes-natural-language (naturalLanguage)</td>
</tr>
<tr>
<td>941</td>
<td>compression(obsolete) (type2 keyword)</td>
</tr>
<tr>
<td>942</td>
<td>current-page-order (type2 keyword)</td>
</tr>
<tr>
<td>943</td>
<td>date-time-at-completed (dateTime)</td>
</tr>
<tr>
<td>944</td>
<td>date-time-at-created (dateTime)</td>
</tr>
<tr>
<td>945</td>
<td>date-time-at-processing (dateTime)</td>
</tr>
<tr>
<td>946</td>
<td>detailed-status-messages (1setOf text(MAX))</td>
</tr>
<tr>
<td>947</td>
<td>document-access-errors (1setOf text(MAX))</td>
</tr>
<tr>
<td>948</td>
<td>document-charset (charset)</td>
</tr>
<tr>
<td>949</td>
<td>document-digital-signature(obsolete) (type2 keyword)</td>
</tr>
<tr>
<td>950</td>
<td>document-format (mimeMediaType)</td>
</tr>
<tr>
<td>951</td>
<td>document-format-details(obsolete) (1setOf collection)</td>
</tr>
<tr>
<td>952</td>
<td>document-format-details-detected(obsolete) (1setOf collection)</td>
</tr>
<tr>
<td>953</td>
<td>document-format-detected (mimeMediaType)</td>
</tr>
<tr>
<td>954</td>
<td>document-format-version(obsolete) (text(127))</td>
</tr>
<tr>
<td>955</td>
<td>document-format-version-detected(obsolete) (text(127))</td>
</tr>
<tr>
<td>956</td>
<td>document-job-id (integer(1:MAX))</td>
</tr>
<tr>
<td>957</td>
<td>document-job-uri (uri)</td>
</tr>
<tr>
<td>958</td>
<td>document-message (text(MAX))</td>
</tr>
<tr>
<td>959</td>
<td>document-message (text(MAX))</td>
</tr>
<tr>
<td>960</td>
<td>document-natural-language (naturalLanguage)</td>
</tr>
<tr>
<td>961</td>
<td>document-number (integer(1:MAX))</td>
</tr>
<tr>
<td>962</td>
<td>document-printer-uri (uri)</td>
</tr>
<tr>
<td>963</td>
<td>document-state (typeof enum)</td>
</tr>
<tr>
<td>964</td>
<td>document-state-message (text(MAX))</td>
</tr>
<tr>
<td>965</td>
<td>document-state-reasons (1setOf type2 keyword)</td>
</tr>
<tr>
<td>966</td>
<td>document-uri (uri)</td>
</tr>
<tr>
<td>967</td>
<td>impressions (integer(0:MAX))</td>
</tr>
<tr>
<td>968</td>
<td>impressions-completed (integer(0:MAX))</td>
</tr>
<tr>
<td>969</td>
<td>impressions-completed-current-copy(obsolete) (integer(0:MAX))</td>
</tr>
<tr>
<td>970</td>
<td>k-octets (integer(0:MAX))</td>
</tr>
<tr>
<td>971</td>
<td>k-octets-processed (integer(0:MAX))</td>
</tr>
<tr>
<td>972</td>
<td>last-document (boolean)</td>
</tr>
<tr>
<td>973</td>
<td>media-sheets (integer(0:MAX))</td>
</tr>
<tr>
<td>974</td>
<td>media-sheets-completed (integer(0:MAX))</td>
</tr>
<tr>
<td>975</td>
<td>more-info (uri)</td>
</tr>
<tr>
<td>976</td>
<td>output-device-assigned (name(MAX))</td>
</tr>
<tr>
<td>977</td>
<td>printer-up-time (integer(1:MAX))</td>
</tr>
<tr>
<td>978</td>
<td>sheet-completed-copy-number(obsolete) (integer(0:MAX))</td>
</tr>
<tr>
<td>979</td>
<td>time-at-completed (integer(MIN:MAX))</td>
</tr>
<tr>
<td>980</td>
<td>time-at-creation (integer(MIN:MAX))</td>
</tr>
<tr>
<td>981</td>
<td>time-at-processing (integer(MIN:MAX))</td>
</tr>
<tr>
<td>982</td>
<td>time-at-creation (integer(MIN:MAX))</td>
</tr>
<tr>
<td>983</td>
<td></td>
</tr>
<tr>
<td>984</td>
<td>Document Template attributes:</td>
</tr>
<tr>
<td>985</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>986</td>
<td>copies (integer(1:MAX))</td>
</tr>
<tr>
<td>987</td>
<td>cover-back (collection)</td>
</tr>
<tr>
<td>988</td>
<td></td>
</tr>
<tr>
<td>989</td>
<td>&lt;Member attributes are the same as the &quot;cover-back&quot; Job Template attribute&gt;</td>
</tr>
<tr>
<td>990</td>
<td>cover-front (collection)</td>
</tr>
</tbody>
</table>
14.2 Attribute Value Registrations

The attribute 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)  
Keyword Attribute Value  
Reference
14.3 Type2 enum Registrations

The enum 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:

<table>
<thead>
<tr>
<th>Attributes (attribute syntax)</th>
<th>Enum Value</th>
<th>Enum Symbolic Name</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>operations-supported (lsetOf type2 enum)</td>
<td>[STD92]</td>
<td>0x0033</td>
<td>Cancel-Document</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x0034</td>
<td>Get-Document-Attributes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x0035</td>
<td>Get-Documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x0036</td>
<td>Delete-Document(obsolete)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x0037</td>
<td>Set-Document-Attributes</td>
</tr>
</tbody>
</table>

14.4 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>Cancel-Document</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Cancel-Job(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Delete-Document(obsolete)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Get-Document-Attributes</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Get-Documents</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Hold-Job(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Print-Job(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Print-URI(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Release-Job(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Send-Document(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Send-URI(extension)</td>
<td>[PWG5100.5]</td>
</tr>
<tr>
<td>Set-Document-Attributes</td>
<td>[PWG5100.5]</td>
</tr>
</tbody>
</table>
14.5 Attribute Group Registrations

The attribute groups 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>Attribute Group Name</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x09</td>
<td>document-attributes-tag</td>
<td>[PWG5100.5]</td>
</tr>
</tbody>
</table>

15. Overview of Changes

15.1 IPP Document Object v1.1

The following changes were made to the previous version of this specification [PWG5100.5-2003]:

- Printers no longer need to support multiple Document Jobs;
- Rationale and model sections have been added;
- References now point to the current versions of dependent documents and specifications at the time of publication;
- The "document-charset" operation attribute has been added to this specification;
- The Delete-Document operation has been made obsolete;
- Additional semantics for the deprecated Reprocess-Job and Restart-Job operations have been removed;
- The "ipp-attribute-fidelity" and "job-mandatory-attributes" operation attributes are no longer (incorrectly) promoted to persistent Job and Document attributes;
- The "compression" Document Status attribute has been made obsolete because it serves no purpose;
- Several "document-format-xxx" Document Status attributes have been made obsolete because they have serious interoperability issues; and
• The "impressions-completed-current-copy" and "sheet-completed-copy-number" Document Status attributes have been made obsolete because the parent specification (RFC 3381) is obsolete.

16. References

16.1 Normative References


1161 16.2 Informative References

17. 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 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 specification:

- Dennis Carney (author of v1.0)
- Tom Hastings (author of v1.0)
- Ira McDonald (High North, Inc.)
- Peter Zehler (author of v1.0)

18. Change History

18.1 January 29, 2019

- Status: Prototype
- Fixed broken references throughout
- Section 10.2: Say "operation and Job Status" instead of "non-document"

18.2 October 22, 2018

- Status: Interim.
- Section 4: Changed to use "This specification" instead of "This document".
- Figure 1: Updated with the list of operations.
- Table 1: Added target object.
- Editorial changes throughout.
- Updated wording of the access rights section, per WG review comments on October 11, 2018
- Table 9: Changed "Reference" column title to "Origin"
- Updated references to the old PWG 5100.5 and 5100.7 to include the year, note they are obsolete.
- Updated RFC 3381 to note it is obsolete, obsoleted by RFC 8011
18.3 September 19, 2018

- Initial revision for v1.1.
- Updated to use new working draft template, section organizations.
- Updated references.
- Added Changes section.
- Added proper rationale and model sections.
- Printers no longer need to support multiple Document Jobs.
- Added the "document-charset" operation attribute from PWG 5100.7.
- Made the Delete-Document operation obsolete.
- Made the "compression" Document Status attribute obsolete because it serves no purpose.
- Made several "document-format-xxx" Document Status attributes from PWG 5100.7 obsolete because they have serious interoperability issues.
- Made the "impressions-completed-current-copy" and "sheet-completed-copy-number" Document Status attributes obsolete because the parent specification (RFC 3381) is obsolete.