

Working Draft, December 1, 2003

Maturity Level: Stable

The Printer Working Group (PWG) Semantic Model

Abstract: This document is a high level overview of the Semantic Model defined by the PWG. This document briefly describes the semantic elements defined in various PWG documents and PWG documents submitted to the IETF. The Semantic Model also incorporates additions made by other groups addressing print systems. With every semantic element included a reference is provided to the document and section that details the semantic definition.

The Semantic Model contains a high level description of the Actions that operate on the objects and attributes in the model. This document does not describe the mapping of the semantics onto a specific protocol or network environment.



Working Draft, ~~December 1~~, 2003

The Printer Working Group (PWG) Semantic Model

This version of the PWG Proposed Standard is available electronically at:

<ftp://ftp.pwg.org/pub/pwg/Semantic-Model/wd-sm10-20031201.pdf>, .doc

This document is a Working Draft for an IEEE-ISTO PWG Candidate Standard. For a definition of a "PWG Candidate Standard" and its transition to a "PWG Standard", see: <ftp://ftp.pwg.org/pub/pwg/general/pwg-process.pdf>. After approval by the PWG (by a Last Call) to transition a PWG Working Draft to a PWG Candidate Standard, the resulting PWG Candidate Standard will be available electronically at: <ftp://ftp.pwg.org/pub/pwg/cs/>. After approval by the PWG (by a Last Call) to transition a PWG Candidate Standard to a PWG Standard, the resulting PWG Standard will be available electronically at: <ftp://ftp.pwg.org/pub/pwg/standards/>.

Copyright (C) 2003, IEEE ISTO. All rights reserved.

This document may be copied and furnished to others, and derivative works that comment on, or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice, this paragraph and the title of the Document as referenced below are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the IEEE-ISTO and the Printer Working Group, a program of the IEEE-ISTO.

Title: The Printer Working Group Semantic Model

The IEEE-ISTO and the Printer Working Group DISCLAIM ANY AND ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED INCLUDING (WITHOUT LIMITATION) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The Printer Working Group, a program of the IEEE-ISTO, reserves the right to make changes to the document without further notice. The document may be updated, replaced or made obsolete by other documents at any time.

The IEEE-ISTO takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights.

The IEEE-ISTO invites any interested party to bring to its attention any copyrights, patents, or patent applications, or other proprietary rights which may cover technology that may be required to implement the contents of this document. The IEEE-ISTO and its programs shall not be responsible for identifying patents for which a license may be required by a document and/or IEEE-ISTO Industry Group Standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention. Inquiries may be submitted to the IEEE-ISTO by e-mail at:

ieee-isto@ieee.org.

The Printer Working Group acknowledges that the IEEE-ISTO (acting itself or through its designees) is, and shall at all times, be the sole entity that may authorize the use of certification marks, trademarks, or other special designations to indicate compliance with these materials.

Use of this document is wholly voluntary. The existence of this document does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to its scope.

About the IEEE-ISTO

The IEEE-ISTO is a not-for-profit corporation offering industry groups an innovative and flexible operational forum and support services. The IEEE-ISTO provides a forum not only to develop standards, but also to facilitate activities that support the implementation and acceptance of standards in the marketplace. The organization is affiliated with the IEEE (<http://www.ieee.org/>) and the IEEE Standards Association (<http://standards.ieee.org/>).

For additional information regarding the IEEE-ISTO and its industry programs visit <http://www.ieee-isto.org>.

About the IEEE-ISTO PWG

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

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

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

Contact information:

Semantic Model Web Page: <http://www.pwg.org/sm/>
Semantic Model Mailing List: sm@pwg.org

To subscribe to the Semantic Model mailing list, send the following email:

- 1) send it to majordomo@pwg.org
- 2) leave the subject line blank
- 3) put the following two lines in the message body:
subscribe sm
end

Implementers of this specification are encouraged to join the Semantic Model Mailing List in order to participate in any discussions of clarifications or review of registration proposals for additional names. Requests for additional extensions, for inclusion in this specification, should be sent to the Semantic Model Mailing list for consideration. In order to reduce spam the mailing list rejects mail from non-subscribers, so you must subscribe to the mailing list in order to send a question or comment to the mailing list.

Table of Contents

105			
106	1	Introduction.....	9
107	2	Terminology.....	9
108	3	Model Overview.....	10
109	4	Data Classes.....	11
110	4.1	Naming of Classes, Elements and Values.....	12
111	4.2	Printer Object Class	13
112	4.2.1	Printer Status Elements	13
113	4.2.2	Printer Description Elements	14
114	4.2.3	Printer Defaults, Supported and Ready Processing Elements	15
115	4.3	Job Object Class.....	16
116	4.3.1	Job Status Elements	16
117	4.3.2	Job Description Elements	17
118	4.4	Document Object Class.....	18
119	4.4.1	Document Status Elements	18
120	4.4.2	Document Description Elements	20
121	4.5	Processing Elements	20
122	4.5.1	Job Processing Elements	20
123	4.5.2	Document Processing Elements.....	21
124	4.6	Processing Actual Elements.....	22
125	4.6.1	Job Processing Actual Elements	22
126	4.6.2	Document Processing Actual Elements	22
127	5	Actions	23
128	5.1	Job Creation and document submission Actions	24
129	5.1.1	CreateJob.....	25
130	5.1.2	CloseJob	25
131	5.1.3	PrintJob	25
132	5.1.4	PrintUri.....	25
133	5.1.5	SendDocument.....	26
134	5.1.6	SendUri	26
135	5.1.7	ValidateDocument	26
136	5.1.8	ValidateJob.....	26

137	5.2	Job and Document Control Actions.....	26
138	5.2.1	CancelCurrentJob.....	26
139	5.2.2	CancelDocument.....	27
140	5.2.3	CancelJob.....	27
141	5.2.4	DeleteDocument.....	27
142	5.2.5	HoldJob.....	27
143	5.2.6	PromoteJob.....	27
144	5.2.7	ReleaseJob.....	27
145	5.2.8	ReprocessJob.....	27
146	5.2.9	RestartJob.....	27
147	5.2.10	ResumeJob.....	27
148	5.2.11	ScheduleJobAfter.....	27
149	5.2.12	SetDocumentElements.....	27
150	5.2.13	SetJobElements.....	28
151	5.2.14	SuspendCurrentJob.....	28
152	5.3	Status and information Actions.....	28
153	5.3.1	GetDocumentElements.....	28
154	5.3.2	GetDocuments.....	28
155	5.3.3	GetJobElements.....	28
156	5.3.4	GetJobs.....	28
157	5.3.5	GetPrinterElements.....	28
158	5.3.6	GetPrinterSettableElementValues.....	28
159	5.4	Printer Control Actions.....	29
160	5.4.1	ActivatePrinter.....	29
161	5.4.2	DeactivatePrinter.....	29
162	5.4.3	DisablePrinter.....	29
163	5.4.4	EnablePrinter.....	29
164	5.4.5	HoldNewJobs.....	29
165	5.4.6	PausePrinter.....	29
166	5.4.7	PausePrinterAfterCurrentJob.....	29
167	5.4.8	PurgeJobs.....	29
168	5.4.9	ReleaseHeldNewJobs.....	29
169	5.4.10	RestartPrinter.....	30

170	5.4.11	ResumePrinter.....	30
171	5.4.12	SetPrinterElements.....	30
172	5.4.13	ShutdownPrinter.....	30
173	5.4.14	StartupPrinter.....	30
174	6	Globalization.....	30
175	7	Summary of elements.....	31
176	7.1	Processing Elements (Job and Document).....	31
177	7.2	Job Elements (Status and Description).....	41
178	7.3	Document Elements (Status and Description).....	47
179	7.4	Printer Elements (Status and Description).....	53
180	8	Status Strings.....	60
181	9	Change Log.....	64
182	10	References.....	67
183	11	Author's Addresses	68
184	11.1	Other Participants.....	68
185	12	Appendix A – UPnP Definitions.....	69
186	12.1	DeviceId	69
187	13	Appendix B – IPP Mapping.....	69
188	13.1	Changes to remove some IPP specific aspects	69
189	13.2	Attribute Group Mapping.....	70

190

191

Table of Figures

192	Figure 1 Model Overview	11
193	Figure 2 Data Classes.....	12
194	Figure 3 Printer Status Elements.....	13
195	Figure 4 - The "PrinterState" element and the Printer Life Cycle	14
196	Figure 5 Printer Description Elements.....	14
197	Figure 6 Job Status Elements.....	16
198	Figure 7 The "JobState" Job Element and the Job object life cycle	17
199	Figure 8 Job Description Elements.....	18
200	Figure 9 Document Status Elements.....	19
201	Figure 10 "DocumentState" Element and Document object life Cycle	19
202	Figure 11 Document Description Elements.....	20

203	Figure 12 Job Processing Elements	21
204	Figure 13 Document Processing Elements	22
205	Figure 14 Processing Instruction Processing	24

206

207

Table of Tables

208	Table 1-Integer syntax whose ProcessingElementSupported syntax isn't RangeOfInteger.....	15
209	Table 2 - Summary of Actions	24
210	Table 3 - Processing Elements (Job and Document).....	31
211	Table 4- Job Elements (Status and Description).....	41
212	Table 5 – Document Elements (Status and Description).....	47
213	Table 6 - Printer Elements (Status and Description)	54
214	Table 7 Status strings indicating some degree of success.....	60
215	Table 8 Status strings indicating error on the part of the Client.....	60
216	Table 9 Status strings indicating error on the part of the Printer.....	62

217

1 Introduction

This document is a high level overview of the Semantic Model defined by the PWG. This document briefly describes the semantic elements defined in various PWG documents and PWG documents submitted to the IETF.

The PWG Semantic Model is primarily based on the model used by IPP. IPP Objects, Attributes and Operations are mapped to Objects, Elements and Actions in the PWG Semantic model. This specification does not augment or change the definition of IPP in any way. See IPP mapping details in section 13.

Deleted:

The Semantic Model also incorporates additions made by other groups addressing print systems. With every semantic element included a reference is provided to the document and section that details the semantic definition.

The Semantic Model contains a high level description of the Actions that operate on the objects and Elements in the model. This document does not describe the mapping of the semantics onto a specific protocol or network environment.

2 Terminology

Action	A request that a Print Client makes to an object to perform some activity. The object returns a response to the Print Client that contains some information about the effect of the action on the object.
Data Class	A template for data describing an object and representing its state. Each Element in the data class represents a semantic element of the associated object.
Document	An object containing descriptive and state information for a logical unit of information to be printed. The object may contain processing information. The document content is represented by a single data (e.g. PDL, image) file and contains Pages.
Document Processing Elements	Document Elements supplied by the Print Client to direct the printing of a Document that the Printer copies to the Document. Examples: Copies, Finishings, Media, NumberUp.
End User	A print client that has no special rights on the printer. The End User typically submits jobs. The End User is allowed to query the printer, jobs and documents and control jobs based on policy.
Element	In this Document <i>element</i> is used to describe a characteristic of an object. (In XML an element is a construct that defines a component of an object.)
Impression	Everything printed on a single side of a media
Job	An object that represents the submission of work for the printer. It contains descriptive and state information as well as default Document Processing Elements. Jobs contain one or more Documents
Job Description Elements	Job Elements supplied by the Print Client to describe the Job. Examples: JobName, RequestingUserName, JobRecipient
Job Processing Elements	Job Elements supplied by the Print Client to direct the printing of the Job as a whole that the Printer copies to the Job. Examples: JobHoldUntil, JobPriority, JobCopies, JobFinishings.
Object	A entity that instantiates a data class and implements the appropriate actions.

Operator	A print client that has special rights on the printer. The Operator typically oversees the printer. The Operator is allowed to query and control the printer, jobs and documents based on site policy.
MediaSheet	A sheet of paper, or other material, used for printing
Page	A logical entity that represents the information contained on a single side of a sheet of media. Note that this is the electronic form and that multiple pages can be rendered into a single impression through N-Up printing
PDL	(Page Description Language) A language that describes the content to be printed and how it will be laid out on a page (e.g. Adobe PostScript®, Hewlett Packard PCL®).
Print Client	An application or network entity that performs actions
Printer	An object that represents a printing device, set of printing devices, or a printing service and contains zero or more Jobs
Type 1 keyword	All the values are defined in the specification. Additional values require a new specification.
Type 2 keyword	An initial set of values is defined in the specification. This working group registers additional values after review. The initial versions of the specification will contain the values registered so far. After the specification is approved, this working group will register additional values after approval.
Type 3 keyword	An initial set of values is defined in the specification. Additional values are registered without working group review. The initial versions of the specification contain the values registered so far. After the specification is approved, this working group will register additional values without approval.

3 Model Overview

The Printer Working Group (PWG) has defined a simplified printing model. It represents printing in either a client/server print paradigm or a peer-to-peer print paradigm. The PWG model describes the device as a Printer object. A Printer object may represent one or more physical Printers. Another object is the Job. A Printer can contain zero or more Jobs and a Job is contained in only one Printer. Each Job can contain zero or more documents. A Job can contain zero or more Documents and a Document is contained in only one Printer. The PWG model contains methods that act upon these objects.

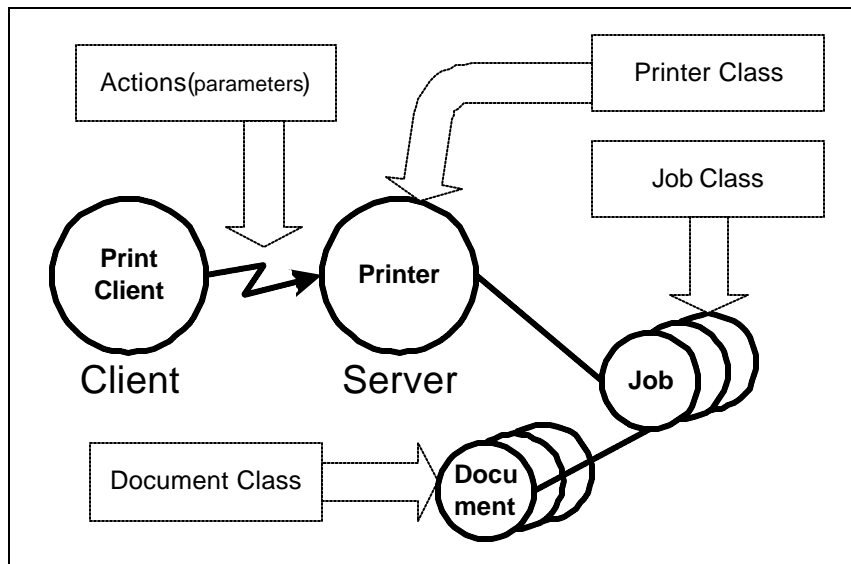


Figure 1 Model Overview

The objects are represented in the semantic model as data classes. The methods are represented as a set of actions that act upon those data classes. The actions permit the creation and control of Jobs and documents as well as the submission of Document data. The content of a Document is included in the submission or can be accessed via a URL reference. There are also actions to query a Printer, Job or Document to access their Elements or to list their contained objects.

The model uses a number of terms with specific meaning for a printer.

4 Data Classes

This section describes the data classes in the PWG semantic model. Some of the classes are taken from the model and semantics of IPP [rfc2911]. Figure 2 shows the data classes, their elements and the containment relationship between the classes

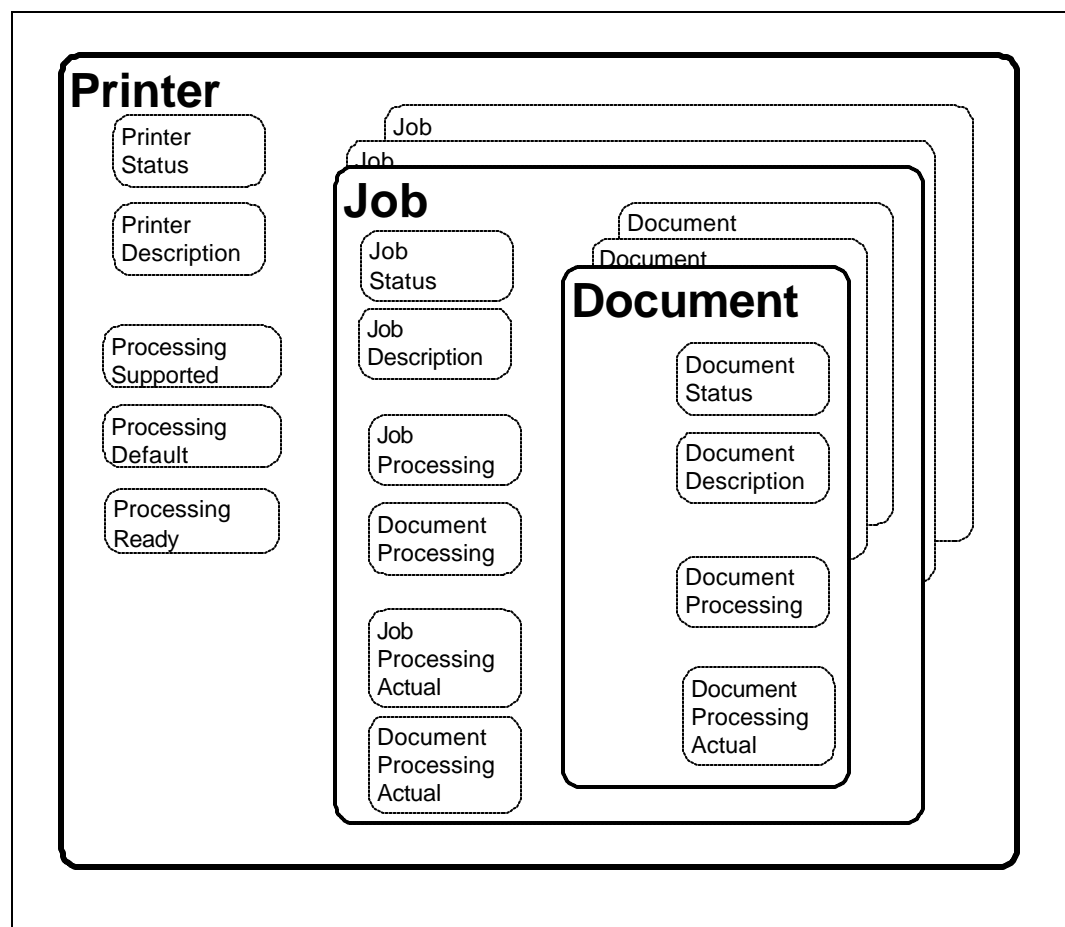


Figure 2 Data Classes

4.1 Naming of Classes, Elements and Values

The Action, Class, Element and Value keywords are shown here with mixed case for readability. For the purpose of matching, the case can be ignored. The names of classes, elements and values must differ by more than just case. For example there can not be two values for JobStateReasons that differ only by case such as JobPrinting and jobprinting.

Specific mapping, of the Semantic Model, can mandate policy on case sensitivity. Mappings that impose case sensitivity for matching, such as XML, may simplify their implementations.

Mappings that ignore case results in a server that will accept slightly malformed (i.e. case does not agree) requests. In either mapping, the keywords are semantically identical.

4.2 Printer Object Class

The Printer class is represented by a collection of elements as shown in Figure 2. The Printer Elements are presented in detail in Table 6. The printer object also contains elements that describe the valid processing element values. (See section 4.5 for processing elements) The Printer class is the container for Jobs.

4.2.1 Printer Status Elements

Figure 3 below shows the Printer Status Elements. These elements represent the state of the printer such as the number of jobs or existing error conditions. Automata change the values of the elements in this group. End Users cannot directly modify their values. The End User can affect the values of these elements through actions (e.g. PausePrinter can change the value of PrinterIsAcceptingJobs). The semantics of the elements are summarized in Table 6.

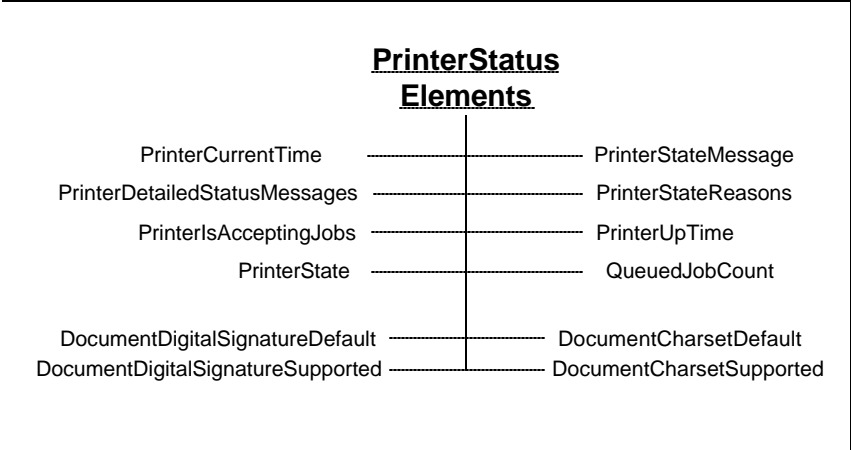


Figure 3 Printer Status Elements

The "PrinterState" element is one of the most important Printer Status elements. Figure 4 shows the values of the "PrinterState" element and the Printer life cycle as affected by actions on the Printer and job processing.

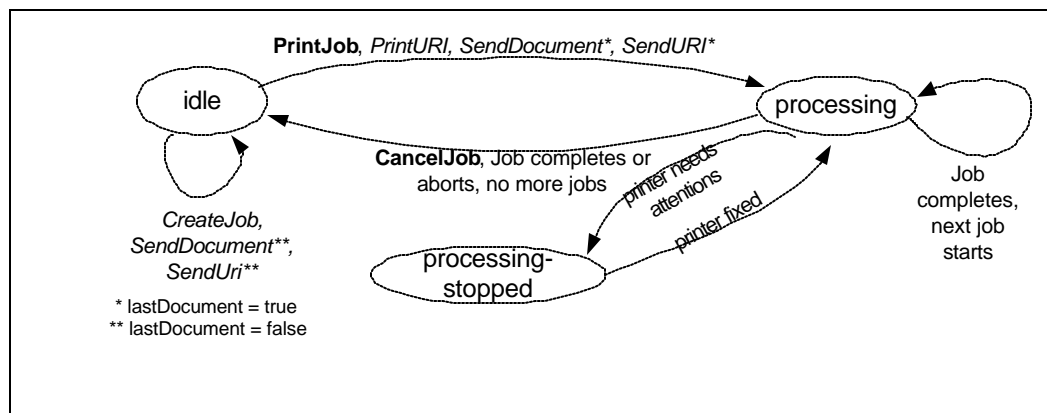


Figure 4 - The "PrinterState" element and the Printer Life Cycle

4.2.2 Printer Description Elements

Figure 5 below shows the Printer Description Elements. These elements contain information that describes the printer such as its make, where it's located and its speed. An automaton controls some of the elements in this group (e.g. "PagesPerMinute"). Others elements in this group can be modified by Operators or Administrators (e.g. "PrinterName"). The semantics of the elements are summarized in Table 6.

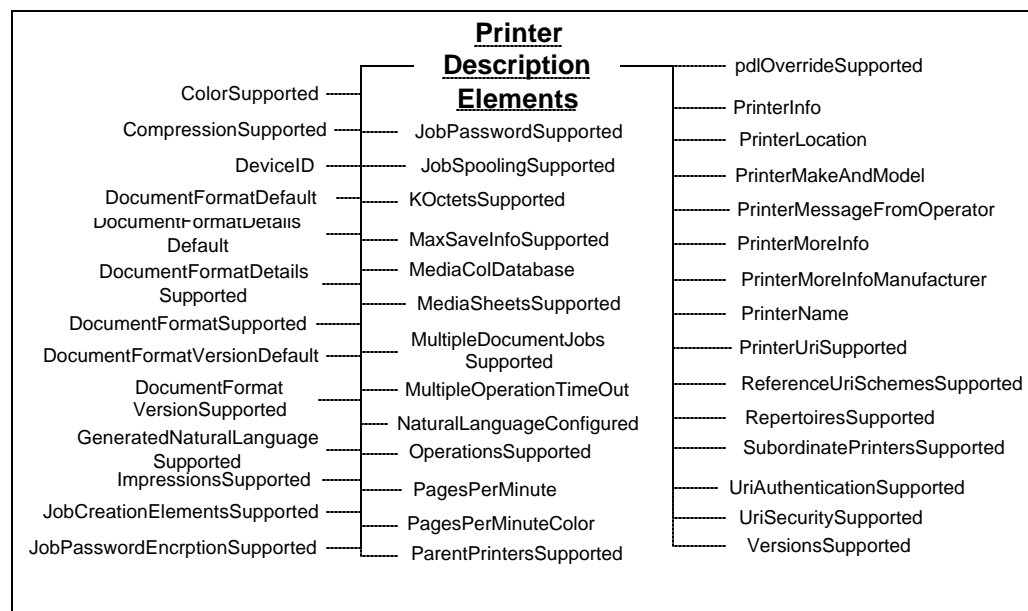


Figure 5 Printer Description Elements

2003, IEEE Industry Standards and Technology Organization. All rights reserved.
The IEEE-ISTO is affiliated with the IEEE and the IEEE Standards Association.
IEEE-ISTO 5100.n is a trademark of the IEEE-ISTO.

4.2.3 Printer Defaults, Supported and Ready Processing Elements

See section 4.5 below for the elements that may comprise these groups. Processing Elements are the union of Job Processing Elements and Document Processing Elements. If a Processing element (e.g. Media) is supported, the Printer must have an associated Processing Supported Element (e.g. MediaSupported) and Processing Default Element (e.g. MediaDefault) Printer element. There may be an associated Processing Ready Element (e.g. MediaReady) Printer element. By retrieving the Printer Processing elements, a Client can determine all the Job and Document Processing elements and values that may be used in creating Jobs and Documents.

All Processing Supported, Processing Ready and Processing Default Elements have an associated Processing Element. There are Printer Description Elements with a “Supported” suffix (e.g. ImpressionsSupported). While they do list the valid values for the base element (e.g. Impressions), they are not Processing Supported Elements. The difference is the containing group for the base element. Note that the Impressions element is a member of the Job and Document Description groups.

4.2.3.1 Processing Supported Elements

These elements list all the currently configured valid values for each Job Processing Element and Document Processing Element. Though the Printer is configured to support the feature, human intervention may be required to process the job (e.g. selected paper may have to be loaded into a tray).

The syntax for Processing Elements Supported is multi-valued when the associated processing element is a string. When syntax of the processing element is an integer, the syntax of the corresponding Processing Supported Element is usually RangeOfInteger that indicates the minimum and maximum values supported by the Printer. However, there are some exceptions as indicated in Table 1.

Table 1-Integer syntax whose ProcessingElementSupported syntax isn’t RangeOfInteger

“xxx” element name	“xxx” syntax	“xxxSupported ” syntax
JobPriority	Integer	Integer (Max value)
Copies	Integer	Integer (Max value)
PageRanges	RangeOfInteger (Multivalued)	Boolean (are PageRanges supported)

4.2.3.2 Processing Default Elements

These elements give the default value for the associated processing instruction if the Processing Element of the job and document are not supplied and the instructions is not embedded in the PDL. The syntax for the Processing Default Elements is the same as the corresponding Processing Element. The only exception is that the PageRanges element does not have a PageRangesDefault element.

4.2.3.3 Processing Ready Elements

These elements give the features available without human intervention. The syntax for a Processing Ready Element is the same as the corresponding Processing Element.

4.3 Job Object Class

The Job object class is represented by a collection of elements divided into six groups as shown in Figure 2. The Job class also contains the document class

Job Status Elements – See Section 4.3.1

Job Description Elements – See section 4.3.2.

Job Processing Elements – See section 4.5.1

Document Processing Elements – See section 4.5.2

Job Processing Actual Elements – See section 4.6.1

Document Processing Actual Elements – See section 4.6.2

4.3.1 Job Status Elements

Figure 6 below shows the Job Status Elements. These elements reflect the status of the Job as a whole. Automata primarily control the elements in this group. Clients cannot directly modify their values. The Client can affect the values of these elements through actions (e.g. CancelJob can change the value of JobStateReasons). The semantics of the Job Status elements are summarized in Table 4.

Deleted: Figure 6

Formatted: Font: Not Bold

Formatted: Font: Not Bold

Deleted: Table 4

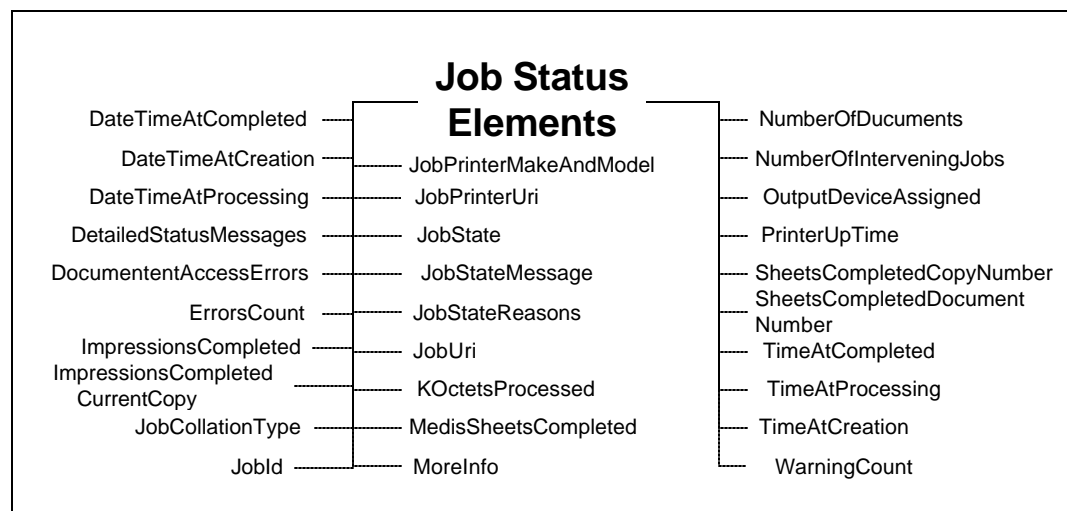


Figure 6 Job Status Elements

4.3.1.1 The Job Life Cycle

The “JobState” element is one of the most important Job Status elements. Figure 7 shows the values of the “JobState” element and the Job life cycle as affected by actions on the Job, Printer, and job processing.

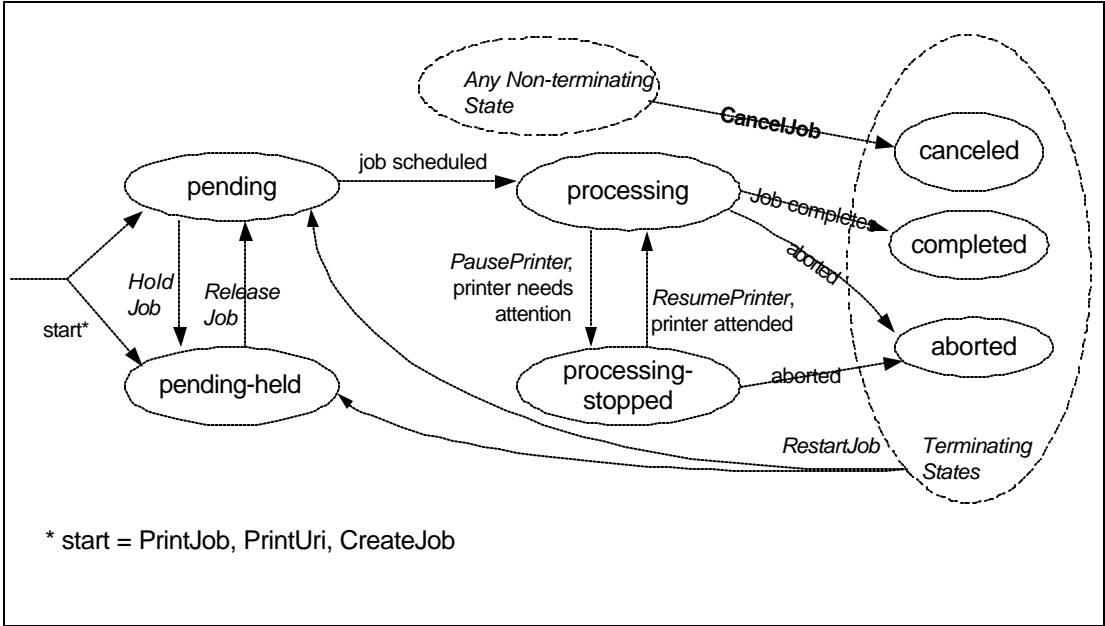


Figure 7 The "JobState" Job Element and the Job object life cycle

4.3.2 Job Description Elements

Figure 8 below shows the Job Description Elements. These elements contain information supplied by the Client at Job creation that describes the Job such as its name. The Printer may modify the value of some of the elements in this group (e.g. “KOctets”) if more reliable data is obtained. The semantics of the Job Description elements are summarized in Table 4.

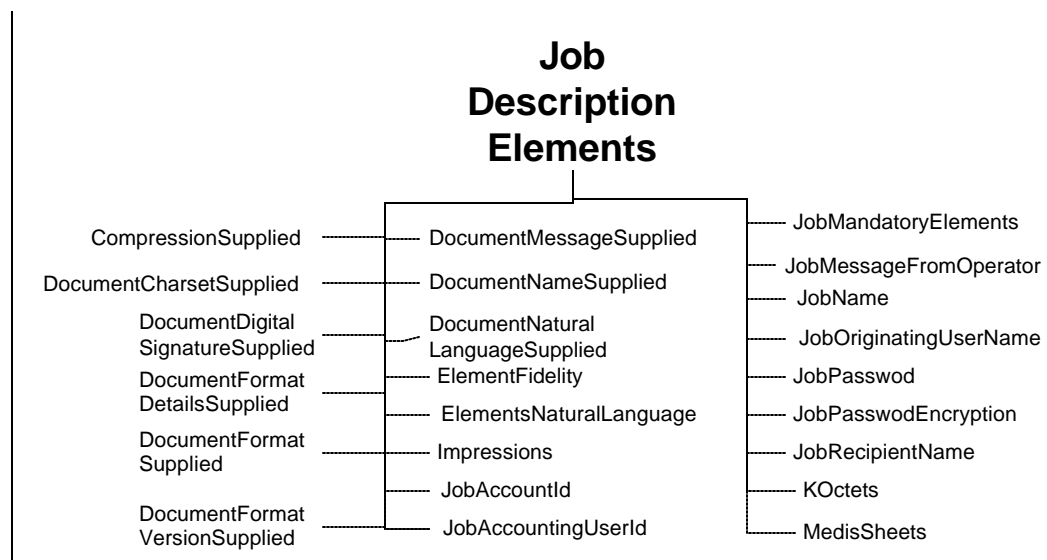
Deleted: Figure 8

Formatted: Font: Not Bold

Formatted: Font: Not Bold

Deleted: Table 4

359



360
361

Figure 8 Job Description Elements

362

4.4 Document Object Class

363

The Document object class is represented by a collection of elements divided into four groups as shown in Figure 2. The Document class contains the document class

364

365

Document Status Elements – See Section 4.4.1.

366

Document Description Elements – See section 4.4.2

367

Document Processing Elements – See section 4.5.2

368

Document Processing Actual Elements – See section 4.6.2

369

4.4.1 Document Status Elements

370

Figure 9 shows the Document Status Elements. These elements reflect the status of each Document individually. Automata primarily control the elements in this group. Clients cannot directly modify their values. The Client can affect the values of these elements through actions (e.g. CancelDocument can change the value of DocumentState”). The semantics of the Document Status elements are summarized Table 5.

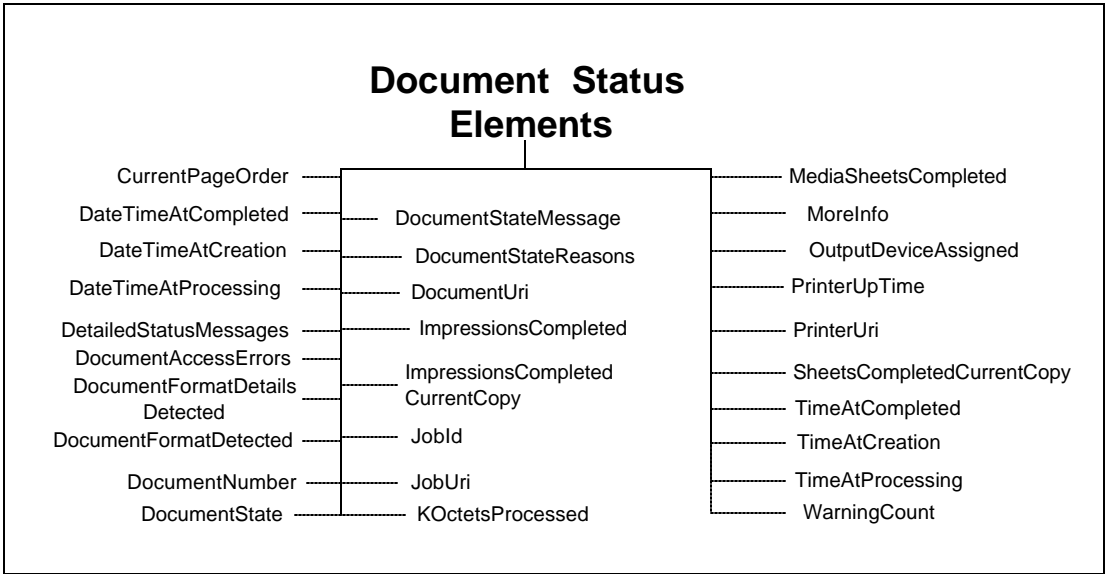
371

372

373

374

375



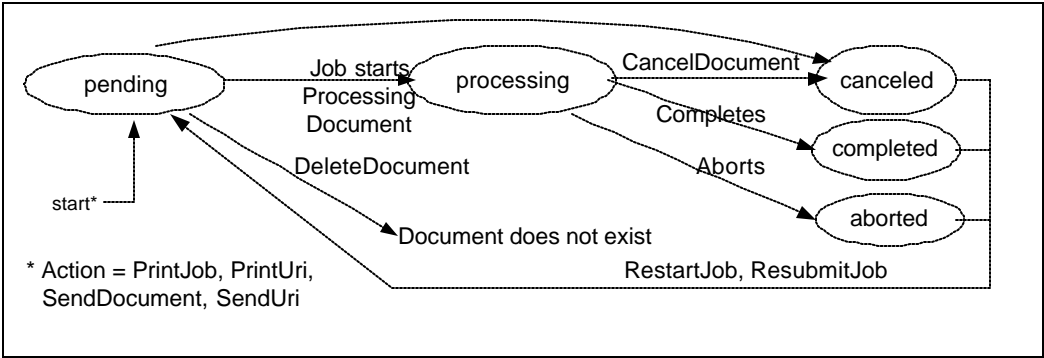
376
377

378 **Figure 9 Document Status Elements**

379 **4.4.1.1 The Document Life Cycle**

380 The “DocumentState” element is one of the most important Document Status Elements. Figure 10
381 shows the values of the “DocumentState” element and the Document life cycle as affected by
382 Actions and job processing. Documents are not active objects and their life cycle is closely tied to
383 the lifecycle of a Job. Documents basically have three states. The first is waiting to be processed
384 by a Job (i.e., pending). The second state is from the time the Job first starts processing the
385 Document (i.e., processing) and until it reaches its terminating state. The last state for a Document
386 is its terminal state (i.e., completed, canceled, aborted)

387
388



389 **Figure 10 "DocumentState" Element and Document object life Cycle**

4.4.2 Document Description Elements

Figure 11 below shows the Document Description Elements. These elements contain information supplied by the Client at Document creation that describes the document such as its size. The Printer may modify the value of some of the elements in this group (e.g. "KOctets") if more reliable data is obtained. The semantics of the Document Description elements are summarized in

Table 5.

Deleted: Table 5

Formatted: Font: Not Bold

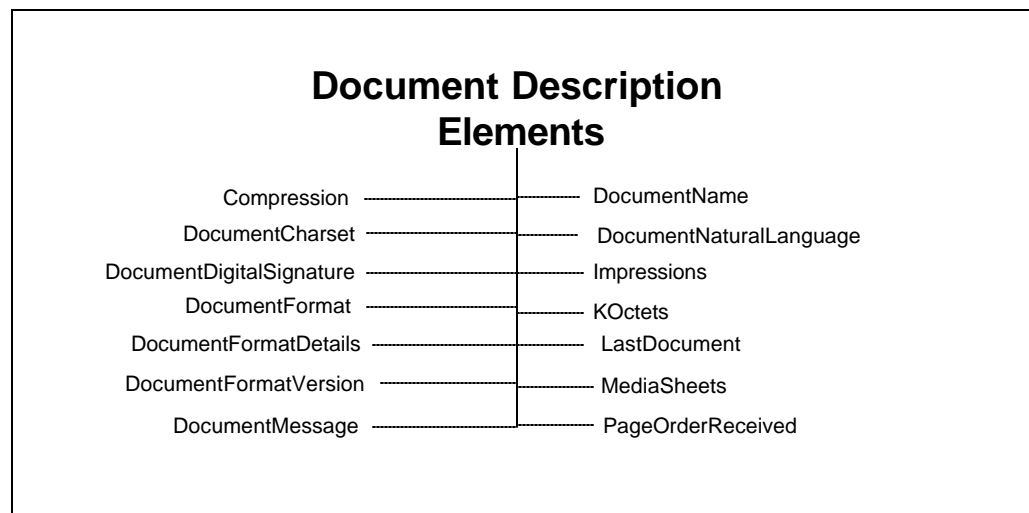


Figure 11 Document Description Elements

4.5 Processing Elements

Processing elements are instructions that the Client supplies to the Printer to be applied to jobs and documents. They indicate such things as the priority for scheduling a job or the number of copies for a document. A Printer should support each Processing Element that represents a feature of the Printer. The Processing elements are split into two groups. One group applies to Jobs and the other to Documents.

- 1) Job Processing Elements are processing instructions applied the Job level. See section 4.5.1.
- 2) Document Processing Elements are specific to documents. See section 4.5.2.

4.5.1 Job Processing Elements

Figure 12 shows the Job Processing Elements. These elements define features supplied by the Client at Job creation. The Printer applies these elements to the Job as a whole (e.g., "JobPriority") as opposed to each document in the Job (e.g., "Media"). The semantics of the Job Processing elements are summarized in Table 3.

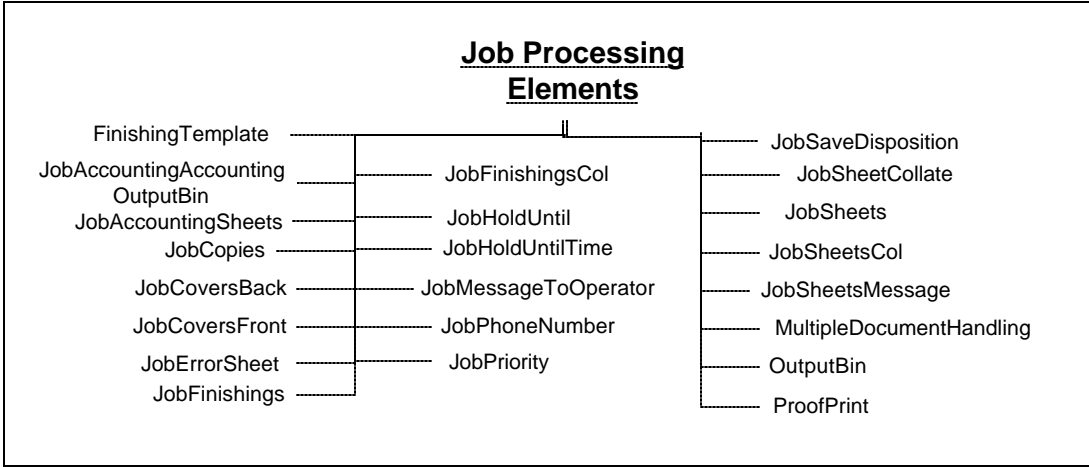


Figure 12 Job Processing Elements

4.5.2 Document Processing Elements

Figure 13 shows the Document Processing Elements. These elements define features supplied by the Client at Document creation. The Printer applies these element to each Document individually (e.g. “copies”) to create final output products. Included in these elements is how multiple physical sheets are manipulated or how the logical pages look on the output media or they determine the quality and resolution of how marks are made on a page. The semantics of the Document Processing elements are summarized in Table 3.

The Client supplies Document Processing Elements at the Job or Document level. If these elements are supplied at the Job level, the Printer applies them as the default values for all the Documents in the Job. If the elements are supplied at the Document level, the Printer applies them only to that Document.

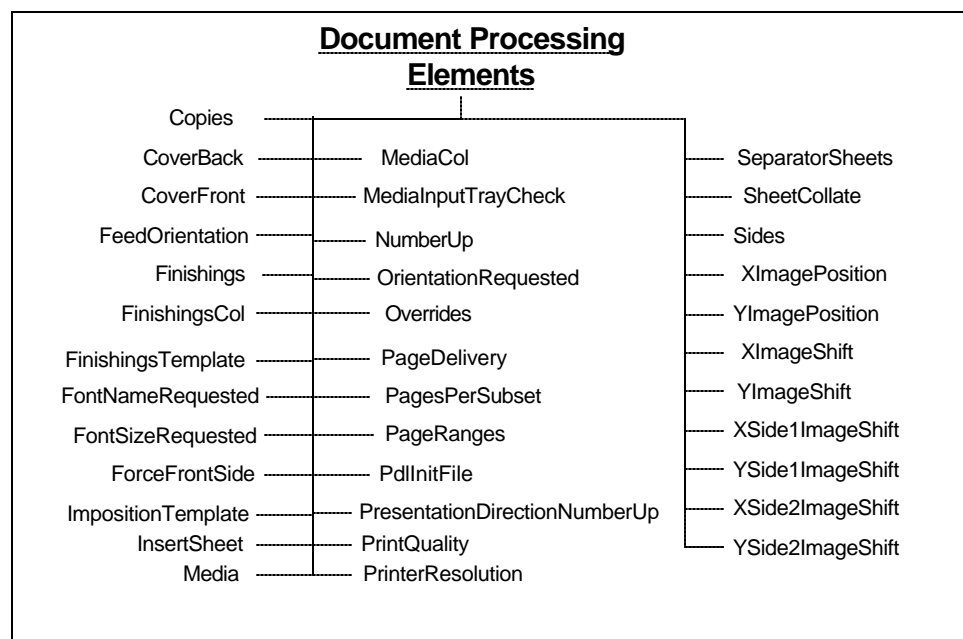


Figure 13 Document Processing Elements

4.6 Processing Actual Elements

See section 4.5 above for the elements that may map to elements in these groups. The Processing Actual elements are optional Job and Document element that records what processing elements were used in a Job and its Documents. The mapping between the Processing element and the Processing Actual element is by taking the Processing element name and appending the suffix "Actual". The Processing Actual elements are always multivalued.

Any Processing element may have a related ProcessingActual element that shows what was applied to the Job or Document. It is not necessary for the Printer to support the Processing element for it to support the associated ProcessingActual element. By retrieving the Printer Processing Actual elements after a job completes, a Client can determine all the Job and Document Processing elements and values that were used in processing the Job and its Documents. (See [actual])

4.6.1 Job Processing Actual Elements

See section 4.5.1 above for the base elements that map to elements in this group. The Job Processing Actual Element can only appear in the Job object.

4.6.2 Document Processing Actual Elements

See section 4.5.2 above for the base elements that map to elements in this group. The Document Processing Actual Element can appear in the Job and Document objects.

5 Actions

The PWG has defined a number of operations that affect Printers, Jobs and their document. Below is a description of the semantics of these Actions. Naturally different protocol bindings will use differing subsets of the Actions or define new ones. Another difference will be the precise parameters to the Actions. Below is an abstract definition of the Actions. Action Summary

The Print Service Interface [PSI] has introduced additional operations or PSI specific mappings of existing actions. These are included below to show a concrete mapping of the PWG Semantic Model and an application specific extension of the model. Consult the PSI specification [PSI] for the exact definitions.

This table summarizes the actions defined for the Job and Printer. The rest of section 5 provides more details on the semantic of the actions.

Job Creation and Document submission	Job and Document Control	Status and Information access	Printer Control
CreateJob	CancelCurrentJob	GetDocumentElements	ActivatePrinter
PrintJob	CancelDocument	GetDocuments	DeactivatePrinter
PrintUri	CancelJob	GetJobElements	DisablePrinter
SendDocument	DeleteDocument	GetJobs	EnablePrinter
SendURI	HoldJob	GetPrinterElements	HoldNewJobs
ValidateDocument	PromoteJob	GetPrinterSettableElement Values	PausePrinter
ValidateJob	ReleaseJob		PausePrinterAfter CurrentJob
	ReprocessJob		PurgeJobs
	RestartJob		ReleaseHeldNew Jobs
	ResumeJob		RestartPrinter
	ScheduleJobAfter		ResumePrinter
	SetDocumentElements		SetPrinterElements
	SetJobElements		ShutdownPrinter
	SuspendCurrentJob		StartupPrinter

Table 2 - Summary of Actions

5.1 Job Creation and document submission Actions

This section describes the Job Creation actions that create a Job and the ones that create add Document to a Job. The Job Creation actions are: PrintJob, PrintUri, and CreateJob. The PrintJob action also submits the Document. The PrintUri action submits a URI reference to the Document that the Printer then retrieves when needed at a later time. The CreateJob action only creates the job and the Client must issue subsequent SendDocument and SendUri actions in order to submit document content or a URI reference, respectively, for a job.

Processing instructions and descriptive information contained in the arguments of the Job Creation action are combined with Printer supplied information to create a Job instance.

The last action in this section is ValidateJob. This operation allows a Client to send a request with all the information to create a Job, except the document content. The Printer does not create a Job but informs the client whether a CreateJob, PrintJob or PrintUri with the same information would have succeeded. This is useful for allowing a Client to verify the processing instructions before sending a large PrintJob request.

A concept that is important in the PWG model is a set of instructions that can be applied to a print job. Examples of these instructions include the number of copies and the media to use. These instructions are referred to as Processing Elements. The Processing Elements are made up of the Job Processing Elements (see section 4.5.1) and the Document Processing Elements (see section 4.5.2) sent in a Job or Document Creation Action.

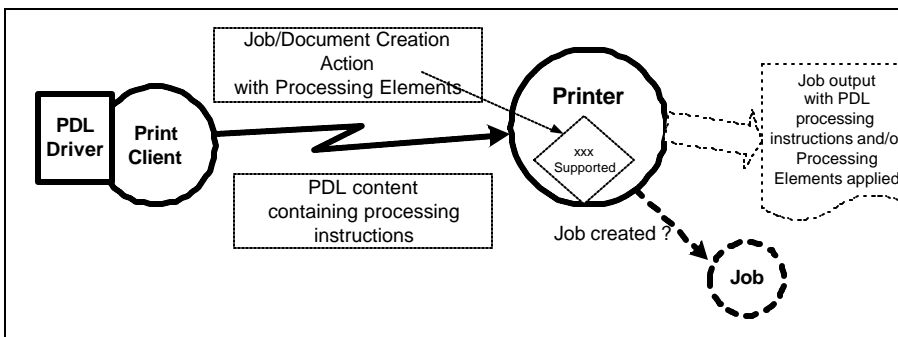


Figure 14 Processing Instruction Processing

In the real world, processing instructions are also contained in the document content for a job. Page Description Languages (PDL) such as PostScript® and PCL® often contain processing instructions. Some environments use a printer specific driver to generate the PDL stream based on feature selections made through a user interface. Given that processing instructions can occur in both the PDL and in an associated Job, the PWG model allows a Printer to declare its capability to resolve this conflict. The Printer's element "PdIOverride" declares if an attempt will be made to override the instructions in the PDL with the instructions in the Job.

There are a wide variety of capabilities in Printers. An instance of a Printer is to subject to changes in its configured capabilities. An example would be an administrative change in the media the

Printer supports or disabling two-sided printing. Clients need not check the capabilities of a Printer before creating their Job Processing Elements and submitting a job. Since this is a client/server paradigm, it is always possible that the capabilities could change after checking a Printer's capabilities and before a Job is submitted. On the other hand, a client may use the Printer's configured capabilities to create their Job Processing Elements and submit a job.

The PWG model allows a client to control the Printer's acceptance of a job submission based on the job request and the Printer's current configured capabilities as follows. When the client supplies a 'true' value for the "ElementFidelity" Job Processing element, the Printer must reject the job unless the Printer supports *all* of the supplied Job Processing elements and values. When the client supplies a 'false' value or omits the element, the Printer must accept the job submission and ignore or substitute elements and values, respectively, that it does not support. Note that the "ElementFidelity" Job Processing element covers only the creation of the Job. It is implementation specific how a Printer handles processing a job when the Printer encounters unsupported processing instructions in the document content.

5.1.1 CreateJob

([rfc2911] §3.2.4) Similar to the PrintJob operation (see section 5.1.3), except that in the CreateJob request the Client does not supply Document Data. The client supplies a single set of Job Processing elements that the Printer applies to the Output Document(s) of the job. The "MultipleDocumentHandling" Job Processing element controls whether the Printer produces separate Output Documents or combines the Input Documents into a single Output Document (see section 26).

Deleted: 25

5.1.2 CloseJob

([PWG5100.5] section 4.3) Closes a print job that was created with a CreateJob operation (see section 5.1.1) and one or more SendDocument and/or SendUri operations (see sections 5.1.5 and 5.1.6) This action sets the LastDocument element (see section 4.4.2) of the last Document in the Job to 'true'. CloseJob is semantically equivalent to a SendDocument or SendUri action with the LastDocument element set to True. An explicit CloseJob is preferable to the implied closing of a Job using SendDocument or SendUri and the LastDocument element set to True.

Deleted: doc-obj

5.1.3 PrintJob

([rfc2911] §3.2.1) Submit a print job with only one document and supply the document content data. If the Printer accepts the job, it creates the Job object and returns a unique "JobId" element for the Printer and a globally unique "JobUri" element. The Printer also sets the corresponding Job elements with these values.

5.1.4 PrintUri

([rfc2911] §3.2.2) Identical to the PrintJob operation (see section 5.1.3) except that a client supplies a URI reference to the document data.

5.1.4.1 The “MultipleDocumentHandling” Job Processing element

When a client submits a job with more than one Input Document, the “MultipleDocumentHandling” Job element allows the client to specify whether the Printer is to (1) produce corresponding separate Output Documents or (2) combine the Input Documents into a single Output Document. For example, the ‘single-document’ and ‘single-document-new-sheet’ values allow the client to staple all of the Input Documents into a single Output Document, with the latter value forcing each Input Document to start on a new sheet (useful when doing two-sided printing). When requesting multiple Copies, the ‘separate-document-uncollated-Copies’ value results in the Copies of each Input Document being together in an Output set, while the ‘separate-document-collated-Copies’ value keeps a copy of each Input Document together in an Output set. For example, a job with Input Documents A, B, C and “Copies” = 2 will result in A, A, B, B, C, C or A, B, C, A, B, C, respectively. If the Printer supports multiple documents per job, the Printer must support this Job Processing element with at least one value.

5.1.5 SendDocument

([rfc2911] §3.3.1, [PWG5100.5] §3) Submits the entire Document Content for the next Input Document of a job created by a previous CreateJob action (see section 5.1.1).

Deleted: doc-obj

5.1.6 SendUri

([rfc2911] §3.3.2, [PWG5100.5] §3) Identical to the SendDocument operation (see section 5.1.5) except that a client supplies a URI reference to the Document Content data, instead of supplying the document content.

Deleted: doc-obj

5.1.7 ValidateDocument

([PWG5100.5] §3) This operation is used only to verify capabilities of a Printer object against whatever elements are supplied by the client in the ValidateDocument request. By using the ValidateDocument action a client can validate that an identical SendDocument or SendUri would be accepted.

Deleted: doc-obj

5.1.8 ValidateJob

([rfc2911] §3.2.3) This operation is used only to verify capabilities of a Printer object against whatever elements are supplied by the client in the ValidateJob request. By using the ValidateJob action a client can validate that an identical PrintJob, PrintUri or CreateJob would be accepted.

5.2 Job and Document Control Actions

This section describes the actions that allow a client to control a Job after it has been submitted: CancelJob, HoldJob, ReleaseJob, and RestartJob.

5.2.1 CancelCurrentJob

([admin-ops] §4.2) Allows a client to cancel the current Job in the “processing” or “processing-stopped” state.

560 5.2.2 CancelDocument

561 ([PWG5100.5] §3) Prevents the processing of the specified Document if the Document has not yet
562 been processed. Stops the processing of any active Document in an implementation specific
563 manner.

Deleted: doc-obj

564 5.2.3 CancelJob

565 ([rfc2911] §3.3.3) Allows a client to cancel a Print Job from the time the Job is created up to the
566 time it is completed, canceled, or aborted.

567 5.2.4 DeleteDocument

568 ([PWG5100.5] §3) Removes the Document and its content from the Job.

Deleted: doc-obj

569 5.2.5 HoldJob

570 ([rfc2911] §3.3.5) Allows a client to hold a pending Job in the Printer so that it is not eligible for
571 scheduling.

572 5.2.6 PromoteJob

573 ([admin-ops] §4.4.1) Allows a client to make the pending target job be processed after the current
574 job completes.

575 5.2.7 ReleaseJob

576 ([rfc2911] §3.3.6) Release a previously held Job so that it is again eligible for scheduling.

577 5.2.8 ReprocessJob

578 ([admin-ops] §4.1) Allows a client to re-process a copy of a job retained after processing was
579 completed. This operation is the similar to RestartJob except that a new job that is a copy of the
580 target job is created and processed.

581 5.2.9 RestartJob

582 ([rfc2911] §3.3.7) Restart a job that is retained in the Printer after processing has completed.

583 5.2.10 ResumeJob

584 ([admin-ops] §4.3.2) Resume the job at the point where it was suspended.

585 5.2.11 ScheduleJobAfter

586 ([admin-ops] §4.4.2) Request the target job be processed immediately after the specified job

587 5.2.12 SetDocumentElements

588 ([PWG5100.5] §3) Set the values of the supplied Document Processing and Document Description
589 elements of the indicated Document. (SetDocumentAttributes in IPP)

Deleted: doc-obj

Deleted: Was

5.2.13 SetJobElements

([rfc3380] §4.2) Set the values of the supplied Job Processing, Document Processing and Job Description elements of the indicated Job. (SetJobAttributes in IPP)

Deleted: Was

5.2.14 SuspendCurrentJob

([admin-ops] §4.4.2) Stop the current job and allow other jobs to be processed instead.

5.3 Status and information Actions

This section describes the actions that allow a client to obtain status and elements of Jobs and Printers: GetJobs, GetPrinterElements, GetJobElements and GetPrinterSupportedValues.

5.3.1 GetDocumentElements

([PWG5100.5] §3) Returns the requested Document elements or element groups in the indicated Document in the indicated Job. (GetDocumentAttributes in IPP)

Deleted: doc-obj

Deleted: Was

5.3.2 GetDocuments

([PWG5100.5] §3) Returns the requested Document elements or element groups in all Documents in the indicated Job.

Deleted: doc-obj

5.3.3 GetJobElements

([rfc2911] §3.3.4) Returns the values of the requested job elements and/or element groups of a Job (i.e., Job Description, Job Status, Job Processing and Document Processing). (GetJobAttributes in IPP)

Deleted: Was

5.3.4 GetJobs

([rfc2911] §3.3.4) Retrieve the list of Jobs belonging to the Printer. The Client may supply some simple filters (e.g. "MyJobs, "Limit) to control which jobs will be returned. The Client may supply a list of Job element and/or element group names to be returned in the response (See 5.3.3). A group of Job elements will be returned for each returned Job.

5.3.5 GetPrinterElements

([rfc2911] §3.2.5) Returns the values of the requested printer elements and/or element groups of a Printer (i.e. Printer Status, Printer Description, Processing Supported, Processing Default, Processing Ready). (GetPrinterAttributes in IPP)

Deleted: Was

5.3.6 GetPrinterSettableElementValues

([rfc3380] §4.3) Returns the possible values of each of the requested Printer Processing and Printer Description elements that may be set with the SetPrinterElements action. (GetPrinterSupportedValues in IPP)

Deleted: Was

5.4 Printer Control Actions

This section describes actions which allow a client to control a Printer and may require operator credentials: PausePrinter, ResumePrinter, PurgeJobs, DisablePrinter, EnablePrinter, and SetPrinterElements.

5.4.1 ActivatePrinter

([admin-ops] §3.4.2) The Printer will now start sending jobs to its Output Devices or Subordinate Printers and begin accepting all requests.

5.4.2 DeactivatePrinter

([admin-ops] §3.4.1) The Printer will now stop sending any more jobs to its Output Devices or Subordinate Printers and begin refusing all requests except ActivatePrinter, SendDocument, and SendUri requests and query requests.

5.4.3 DisablePrinter

([adm-ops] §3.1.1) Prevents the Printer from accepting any more Job Creation operations. The Printer sets the PrinterIsAcceptingJobs Printer Status element to 'false'.

5.4.4 EnablePrinter

([adm-ops] §3.1.2) Allows the Printer to start accepting Job Creation operations. The Printer sets the PrinterIsAcceptingJobs Printer Status element to 'true'.

5.4.5 HoldNewJobs

([admin-ops] §3.3.1) Complete the current 'pending' and 'processing' Jobs but do not start processing any subsequently created Jobs.

5.4.6 PausePrinter

([rfc2911] §3.2.7) Stops the Printer object from scheduling jobs. Job processing should also cease.

5.4.7 PausePrinterAfterCurrentJob

([admin-ops] §3.2.1) Stops the Printer from starting to send jobs to any of its Output Devices or Subordinate Printers.

5.4.8 PurgeJobs

([rfc2911] §3.2.9) Removes all jobs from the Printer, regardless of their state.

5.4.9 ReleaseHeldNewJobs

([admin-ops] §3.3.2) Undo the effect of HoldNewJobs and release all Jobs held as a consequence of HoldNewJobs.

651 **5.4.10 RestartPrinter**

652 ([admin-ops] §3.5.1) This action has the effect of a software re-boot.

653 **5.4.11 ResumePrinter**

654 ([rfc2911] §3.2.8) Resume the processing and scheduling of Jobs in the Printer.

655 **5.4.12 SetPrinterElements**

656 ([rfc3380] §4.1) Set the values of the supplied Printer Processing and Printer Description elements.

657 (SetPrinterAttributes in IPP)

Deleted: Was

658 **5.4.13 ShutdownPrinter**

659 ([admin-ops] §3.5.2) Stop processing jobs without losing any jobs and make the Printer no longer
660 available for any Actions.

661 **5.4.14 StartupPrinter**

662 ([admin-ops] §3.5.3) Allows a hosted implementation of the Printer to be started after the host is
663 available.

664 **6 Globalization**

665 The two aspects of globalization being addressed are the character sets and natural language of the
666 human readable strings. Determining what character set is being used is left up to the protocol
667 mapping of this semantic model. The natural language being used is represented in the Printer and
668 the Job. The Printer declares the natural language it uses for all its semantic elements of type
669 string. Administrators are free to change the localization and the values in the string elements.
670 Each job creator declares the natural language for the Job and all its contained Documents. Not all
671 string elements are treated the same.

672 Any semantic element that is labeled type1, type2 or type3 keyword in the constraint column is the
673 following tables do not have any globalization issues from the Printer's point of view. They are
674 simply a sequence of octets that have a semantic meaning attached to them. The fact that the
675 sequence of octets can be interpreted as ASCII strings is unimportant. The keywords are intended
676 for consumption by automata. We leave it to Client implementations to determine how the
677 keywords will be presented to end-users.

678 There are also strings with specific formats. These formats are URI, URI Scheme, MIME, IEEE
679 1284 and DateTime. Any semantic element whose string value must adhere to one of the previous
680 formats is excluded from this discussion.

681 There are a few elements whose value is set by automata. Those values are "JobStateMessage",
682 "DocumentStateMessage" and "PrinterStateMessage". If the semantic model is mapped to a
683 protocol that allows the Client to request a language, the Printer will return these strings in the
684 requested language if possible.

685 All the remaining Printer element strings are assumed to be in the Printer's language. All the
686 remaining Job element strings are assumed to be in the language of the Job.

7 Summary of elements

This section summarizes the elements for the Document, Job and Printer objects. Included in the definition are the processing elements that can be applied at either the Job or Document level. For each element, the tables contain the element name, whether the element is multi-valued, its syntax, constraints, a short description and a reference to the Document where the semantics of the element is completely specified. The basic syntax types are “Boolean”, “String” and “Integer”. “Complex” types are a container for elements of any type. Members are listed in the description field. “RangeOfInteger” is a complex type that contains “Upperbound” and “Lowerbound” integer value members. “Resolution” is a complex type that contains “CrossFeedDir” and “FeedDir” integer value members and a “Units” string value member.

7.1 Processing Elements (Job and Document)

* Group key: J=Job Processing Elements, D=Document Processing Elements

Table 3 - Processing Elements (Job and Document)

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
Copies		Integer	1:MAX	D	[rfc2911] §4.2.5
The number of copies of the Output Document(s) to be printed. (See also JobCopies Job element)					
CoverBack		<i>complex</i>		D	[PWG5100.3] §3.1
The back cover to apply this Document. (Includes Media/MediaCol, CoverType)					
CoverFront		<i>complex</i>		D	[PWG5100.3] §3.1
The front cover to apply to this Document. (Includes Media/MediaCol, CoverType)					
CoverType		String	Type2 keyword	D	[PWG5100.3] §3.1.2
Indicates if covers are requested and which sides will contain print stream pages. (Keywords: NoCover, PrintNone, PrintFront, PrintBack, PrintBoth) (See CoverBack & CoverFront for use)					
DocumentCopies	Yes	RangeOfInteger		J	[PWG5100.4] §5.1.3
Specifies which copies of a Document to apply the override Processing elements. (See Overrides for use)					
DocumentNumbers	Yes	RangeOfInteger	1:MAX	D	[PWG5100.4] §5.1.2
Specifies the documents in a Job for override processing. (See Overrides for use)					
FeedOrientation		String	Type3 keyword	D	[prod-print2] §5.1
Specifies the media edge that is fed into the print engine from the paper tray. (Keywords: LongEdgeFirst, ShortEdgeFirst).					

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
Finishings	Yes	String	Type2 keyword	D	[rfc2911] §4.2.6 [PWG5100.1] §2
Identifies the finishings that the Printer uses for each copy of the Output Document. (See also JobFinishings Job element) (<i>Keywords: Bale, Bind, BindBottom, BindLeft, BindRight, BindTop, BookletMaker, Cover, EdgeStitch, EdgeStitchBottom, EdgeStitchLeft, EdgeStitchRight, EdgeStitchTop, Fold, JogOffset, None, Punch, SaddleStitch, Staple, StapleBottomLeft, StapleBottomRight, StapleDualBottom, StapleDualLeft, StapleDualRight, StapleDualTop, StapleTopLeft, StapleTopRight, Trim</i>)					
FinishingsCol		complex		D	[PWG5100.3] §3.2
Enables an end user to specify detailed finishing options not possible with the “Finishings” element for the Output Document. (See also JobFinishingsCol Job element) (<i>Includes FinishingTemplate, Stitching</i>)					
FinishingTemplate		String	Maxlength=1023	J,D	[PWG5100.3] §3.2.1
A string specifying some particular finishing operation. (See FinishingsCol/JobFinishingsCol for use)					
FontNameRequested		String	Maxlength=255	D	[prod-print2] §5.2
Specifies the font name if the document data is in a format that does not have inherent font information (e.g., ‘text/plain’), otherwise, this element is ignored.					
FontSizeRequested		Integer	1:MAX	D	[prod-print2] §5.3
Specifies the font size in points (1/72 of an inch) if the document data is in a format that does not have inherent font information (e.g., ‘text/plain’), otherwise, this element is ignored.					
ForceFrontSide	Yes	Integer	1:MAX	D	[PWG5100.3] §3.3
Forces the specified pages to be printed on the front side of a sheet of media. The pages of the output document start at 1.					
ImpositionTemplate		String	Type2 keyword	D	[PWG5100.3] §3.4
Specifies imposition method for laying out finished page images onto the surface of output media. (<i>Keywords: None, Signature</i>)					
InsertAfterPageNumber		Integer	0:MAX	D	[PWG5100.3] §3.5.1
Specifies the input page after which the Insert Sheet will be placed. Pages are numbered starting at 1. A 0 value means in front of the first page. (See InsertSheet for use)					
InsertCount		Integer	0:MAX	D	[PWG5100.3] §3.5.2
Specifies the number of Insert Sheet to insert. (See InsertSheet for use)					

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
InsertSheet	Yes	complex		D	[PWG5100.3] §3.5
Specifies how Insert Sheets are to be inserted into the sequence of media sheets that are produced for each copy of the documents. (Includes <i>InsertAfterPageNumber</i> , <i>InsertCount</i> , <i>Media/MediaCol</i>)					
JobAccountingOutputBin		String	Type3 keyword	J	[PWG5100.3] §3.8.3
Specifies the output bin where the accounting sheet is to be placed. (See <i>JobAccountingSheet</i> for use) (Keywords: <i>Top</i> , <i>Middle</i> , <i>Bottom</i> , <i>Side</i> , <i>Left</i> , <i>Right</i> , <i>Center</i> , <i>Rear</i> , <i>FaceUp</i> , <i>FaceDown</i> , <i>LargeCapacity</i> , <i>MyMailbox</i> , <i>StackerN</i> , <i>MailboxN</i> , <i>TrayN</i> *Note: <i>N</i> is replaced by a cardinal number, *Note: See [PWG5100.2 §2.1 for description of keywords)					
JobAccountingSheets		complex		J	[PWG5100.3] §3.8
Specifies the accounting sheet for a job. (Includes <i>JobAccountingSheetsType</i> , <i>Media/MediaCol</i> , <i>JobAccountingOutputBin</i>).					
JobAccountingSheetsType		String	Type3 keyword	J	[PWG5100.3] §3.8.1
Specifies the accounting sheet format for a job. (See <i>JobAccountingSheets</i> for use) (Keywords: <i>None</i> , <i>Standard</i>)					
JobCopies		Integer	1:MAX	J	[PWG5100.7] §4.1.1
The number of copies of the Job to be printed. (See also <i>Copies Document Processing</i> element)					
JobCoverBack		complex		J	[PWG5100.7] §4.1.2
The back cover to apply this Job. (Includes <i>Media/MediaCol</i> , <i>CoverType</i>)					
JobCoverFront		complex		J	[PWG5100.7] §4.1.3
The front cover to apply to this Job. (Includes <i>Media/MediaCol</i> , <i>CoverType</i>)					
JobErrorSheet		complex		J	[PWG5100.3] §3.9
Specifies the error sheet for a job. (Includes <i>JobErrorSheetType</i> , <i>JobErrorSheetWhen</i> , <i>Media/MediaCol</i>).					
JobErrorSheetType		String	Type3 keyword	J	[PWG5100.3] §3.9.1
Specifies the error sheet format for a job. (See <i>JobErrorSheet</i> for use) (Keywords: <i>None</i> , <i>Standard</i>)					
JobErrorSheetWhen		String	Type2 keyword	J	[PWG5100.3] §3.9.2
Specifies the accounting sheet format for a job. (See <i>JobErrorSheet</i> for use) (Keywords: <i>OnError</i> , <i>Always</i>)					

Deleted: [jobx]

Deleted: [jobx]

Deleted: [jobx]

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
JobFinishings	Yes	String	Type2 keyword	J	[PWG5100.7] §4.1.4
Identifies the finishing that the Printer uses for each job copy of the Job. (See also Finishings Document element) (<i>Keywords: None, Staple, Punch, Cover, Bind, SaddleStitch, EdgeStitch, StapleTopLeft, StapleBottomLeft, StapleTopRight, StapleBottomRight, EdgeStitchLeft, EdgeStitchTop, EdgeStitchRight, EdgeStitchBottom, StapleDualLeft, StapleDualTop, StapleDualRight, StapleDualBottom</i>)					
JobFinishingCol		complex		J	[PWG5100.7] §4.1.5
Enables an end user to specify detailed finishing options not possible with the "JobFinishings" element. (See also FinishingsCol Document element) (<i>Includes FinishingTemplate, Stitching</i>)					
JobHoldUntil		String	Type3 keyword	J	[rfc2911] §4.2.2
Specifies the named time period during which the Job must become a candidate for printing. (<i>keywords: NoHold, Indefinite, DayTime, Evening, Night, Weekend, SecondShift, ThirdShift</i>)					
JobHoldUntilTime		String	DateTime [rfc1123]	J	[prod-print2] §5.4
Specifies the date and time after which the Job must become a candidate for printing. (example: Fri, 03 May 2002 08:49:37 GMT)					
JobMessageToOperator		String	Maxlength=1023	J	[PWG5100.3] §3.10
Message from the end user to indicate something about the processing of this Job. (example: "Call 555-1234 before running this job")					
JobPhoneNumber		String	Maxlength=127	J	[prod-print2] §5.5
Contains the contact telephone number for this Job.					
JobPriority		Integer	1:100	J	[rfc2911] §4.2.1
Priority for scheduling the Job. A higher value specifies a higher priority.					
JobSaveDisposition		Complex		J	[prod-print2] §5.7
Specifies that the Printer is to save the job as a file that can be re-printed on demand anytime in the future using the Print-URI operation (see section 5.1.4). (<i>Includes SaveDisposition, SaveInfo</i>)					
JobSheets		String	type3 keyword	J	[rfc2911] §4.2.3 [PWG5100.3] §6.2
Specifies which job start/end sheet(s), will be printed with a job. (<i>Keywords: None, Standard, JobStartSheet, JobEndSheet, JobBothSheets, FirstPrintStreamPage</i>)					
JobSheetsCol		complex		J	[PWG5100.3] §3.11
Allows the client to specify the media for the JobSheet. (<i>Includes JobSheets, Media/MediaCol</i>)					

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
JobSheetMessage		String Maxlength=1023	J		[PWG5100.3] §3.12
Conveys a message that is delivered with the job.					
Media		String type3 keyword	D		[rfc2911] §4.2.11
The name of the medium that the Printer uses for all impressions of the Job. (<i>Keyword examples: na_letter_8.5x11in, iso_a4_210x297mm, na_monarch_3.875x7.5in, choice_iso_a4_210x297mm_na_letter_8.5x11in. See [pwg5101.1]</i>)					
MediaCol		complex		D	[PWG5100.3] §3.13
Enables a client end user to submit a list of media characteristics to the Printer as a way to more completely specify the media to be used than the Media element. (<i>Includes MediaBackCoating, MediaColor, MediaFrontCoating, MediaGrain, MediaHoleCount, MediaInfo, MediaKey, MediaMaterial, MediaOrderCount, MediaPrePrinted, MediaRecycled, MediaSize, MediaThickness, MediaTooth, MediaType, MediaWeightMetric</i>)					
MediaBackCoating		String Type3 keyword	D		[PWG5100.3] §3.13.10
Indicates the pre-process coating applied to the back of the media. (See MediaCol for use) (<i>Keywords: None, Glossy, HighGloss, SemiGloss, Satin, Matte</i>)					
MediaColor		String Type3 keyword	D		[PWG5100.3] §3.13.4
Indicates the desired color of the media being specified. (See MediaCol for use) (<i>Keywords: no-color, white, pink, yellow, blue, green, buff, goldenrod, red, gray, ivory, orange (See [pwg5101.1] §4)</i>)					
MediaFrontCoating		String Type3 keyword	D		[PWG5100.3] §3.13.10
Indicates the pre-process coating applied to the front of the media. (See MediaCol for use) (<i>Keywords: None, Glossy, HighGloss, SemiGloss, Satin, Matte</i>)					
MediaGrain		String Type3 keyword	D		[prod-print2] §8.4.2
Indicates the grain of the media. (See MediaCol for use) (<i>Keywords: XDirection, YDirection</i>)					
MediaHoleCount		Integer 0:MAX	D		[PWG5100.3] §3.13.6
Indicates the number of pre-drilled holes in the desired media. (See MediaCol for use)					
MediaInfo		String Maxlength=255	D		[PWG5100.3] §3.13.3
Specifies information that helps describe the media instance. Intended for human consumption. (See MediaCol for use)					
MediaInputTrayCheck		String Type3 keyword	D		[PWG5100.3] §3.14
Indicates that the characteristics of the media in the identified input tray must match the characteristics of the media identified by the "media" or "media-col" element. (<i>Keywords: Top, Middle, Bottom, Side, LargeCapacity, Envelope, Main, Manual. See [RFC2911] Appendix C</i>)					

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
MediaKey		String	Type3 keyword	D	[PWG5100.3] §3.13.1
The name of the media represented as a keyword. The media that MediaKey represents is a named collection of MediaCol elements and their values. Identical values of MediaKey and the Media Document Processing element represent the same media. (See MediaCol for use)					
MediaMaterial		String	Type3 keyword	D	[prod-print] §8.4.3
The material of the media. (See MediaCol for use) (<i>Keywords: Aluminum, DryFilm, Paper, Polyester, WetFilm</i>)					
MediaOrderCount		Integer	1:MAX	D	[PWG5100.3] §3.13.7
Indicates the number of sheets, within an ordered sequence of sheets; after which the sequence begins to repeat. (See MediaCol for use)					
MediaPrePrinted		String	Type3 keyword	D	[PWG5100.3] §3.13.11
Indicates the pre-printed characteristics of the desired media. (See MediaCol for use) (<i>Keywords: Blank, PrePrinted, LetterHead</i>)					
MediaRecycled		String	Type3 keyword	D	[PWG5100.3] §3.13.10
Indicates the recycled characteristics of the media. (See MediaCol for use) (<i>Keywords: None, Standard</i>)					
MediaSize		Complex		D	[PWG5100.3] §3.13.8
Explicitly specifies the numerical media width and height dimensions in hundredth of a millimeter. (See MediaCol for use) (<i>Includes XDimension, YDimension</i>)					
MediaSizeName		String	Type3 keyword	D	[PWG5100.5] §8.1.
The medium size that the Printer uses for all impressions of the Job. (See MediaCol for use) (<i>Keywords: na_letter_8.5x11in. See [pwg5101.1] §5</i>)					
MediaThickness		Integer	1:MAX	D	[prod-print2] §8.4.4
The thickness of the media in units of one hundredth of a millimeter. This unit is equivalent to 1/2540 th of an inch. (See MediaCol for use)					
MediaTooth		String	Type3 keyword	D	[prod-print2] §8.4.1
The tooth (or roughness) of the media. (See MediaCol for use) (<i>Keywords: Fine, Medium, Coarse</i>)					
MediaType		String	Type3 keyword	D	[PWG5100.3] §3.13.2
The medium type that the Printer uses for all impressions of the Job. (See MediaCol for use) (<i>Keywords: stationery, transparency envelope, envelopeplain, envelope-window, continuous, continuous-long, continuous-short, tab-stock, pre-cut-tabs, full-cut-tabs, multi-part-forms, labels, multi-layer, screen, screen-paged, photographic, cardstock, other See also [pwg5101.1] §3</i>)					
MediaWeightMetric		Integer	0:MAX	D	[PWG5100.3] §3.13.9
Indicates the weight of the desired media rounded to the nearest whole number of grams per square meter. (See MediaCol for use)					

Deleted: doc-obj

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
MultipleDocumentHandling		String type2 keyword	J		[rfc2911] §4.2.4
	Controls whether Input Document in multi-Documents are combined into a single Output Document or are kept as separate Output Documents. Useful for application of Finishings and the placement of one or more print-stream pages into impressions and onto media sheets for multi-Documents. (<i>Keywords: SingleDocument, SeparateDocumentUncollatedCopies, SeparateDocumentCollatedCopies, SingleDocumentNewSheet</i>)				
NumberUp		Integer	1:MAX	D	[rfc2911] §4.2.9
	Indicates the number of Input pages that the Printer is to image on one impression.				
OrientationRequested		String type2 keyword	D		[rfc2911] §4.2.10
	The desired orientation for printed pages for document formats that don't have a built-in orientation. (<i>Keywords: Portrait, Landscape, ReverseLandscape, ReversePortrait</i>)				
OutputBin		String Type2 keyword	J,D		[PWG5100.2] §2.1 [PWG5100.5] §8.1
	Specifies the output bin where the job is to be delivered. (<i>Keywords: Bottom, Center, FaceDown, FaceUp, LargeCapacity, Left, MailboxN*, Middle, MyMailbox, Rear, Right, Side, StackerN*, Top, TrayN*</i> . *Note: N is replaced by a cardinal number)				
OutputDevice		String Maxlength=255	J,D		[PWG5100.7] §4.2.1 [PWG5100.5] §8.1
	Specifies the device where the pages of a Job/Document will be printed.				
Overrides	Yes	complex	D		[PWG5100.4] §5.2
	Provides for the overriding of processing instructions on a page basis. (<i>Includes Pages DocumentNumbers, DocumentCopies and any processing element that affects pages</i>)				
PageDelivery		String Type2 keyword	D		[PWG5100.3] §3.15
	Indicates whether the pages of the job are to be delivered to the output bin or finisher in the same page order as the original document and face up or face down. . See the PageOrderReceived Document Description element and the CurrentPageOrder Document Status element. (<i>Keywords: ReverseOrderFaceDown, ReverseOrderFaceUp, SameOrderFaceDown, SameOrderFaceUp, SystemSpecified</i>)				
Pages	yes	RangeOfInteger	1:MAX	D	[PWG5100.4] §5.2.4
	Specifies a range of pages in the document PDL data. (See Overrides for use)				
PagesPerSubset	yes	Integer	1:MAX	D	[PWG5100.4] §5.3
	Combines all of the Pages of all of the Documents into a single stream of -Pages. Then the Printer partitions that single stream into contiguous subsets of -Pages according to the list of integers. The list of integers is cyclical. When the last integer in the list is reached, the next subset uses the first in the list. Common use of subsets is a single value in the list.				

Deleted: doc-obj

Deleted: [jobx]

Deleted: doc-obj

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
PageRanges	yes	RangeOfInteger	1:MAX	D	[RFC2911] §4.2.7
Specifies a range of pages in the document data to be output.					
PdInitFile	Yes	Complex		D	[prod-print2] §5.8
Controls initialization of the Printer's Page Description Language (PDL) interpreter. (Includes PdInitFileEntry, PdInitFileLocation, PdInitFileName)					
PdInitFileEntry		String	Maxlength=255	D	[prod-print2] §5.8.1.3
Specifies an entry point within the init file at which the PDL interpreter starts. (See PdInitFile for use)					
PdInitFileLocation		String	Maxlength=1023	D	[prod-print2] §5.8.1.1
Contains a URL that specifies the path to the directory where the initialization file for the Printer's PDL interpreter will be found. (See PdInitFile for use)					
PdInitFileName		String	Maxlength=255	D	[prod-print2] §5.8.1.2
Specifies the name of the PDL interpreter's initialization file within the directory specified by the PdInitFileLocation element. (See PdInitFile for use)					
PresentationDirectionNumberUp		String	Type2 keyword	D	[PWG5100.3] §3.17
Specifies the placement order of the page images on a Finished-Page Image with the "number-up" element. (<i>Keywords: TorightTobottom, TobottomToright, ToleftTobottom, TobottomToleft, TorightTotop, TotopToright, ToleftTotop</i>)					
PrintContent Optimize		String	type2 keyword	J,D	[PWG5100.7] §4.2.2 [PWG5100.5] §8.1
directs the type of optimization/processing that will be performed on the Document content. It does not necessarily mean the value describes the content.. (<i>Keywords: Photo, Graphics, Text, TextAndGraphics</i>)					
PrintQuality		String	type2 keyword	D	
The print quality that the Printer uses for the Job. (<i>Keywords: Draft, Normal, High</i>)					
PrinterResolution		resolution		D	[RFC2911] §4.2.12
The resolution that Printer uses for the Job in cross-feed and feed direction in units of dpi or dpcm.					
ProofPrint		Complex		J	[prod-print2] §5.9
Specifies the elements for zero or more proof prints of the job that are to be printed prior to the printing the full run of the job. (Includes ProofPrintCopies, Media/MediaCol and any other Processing elements).					

Deleted: [jobx]

Deleted: doc-obj

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
ProofPrintCopies		Integer	0:MAX	J	[prod -print2] §5.9.1
Specifies the number of proof prints to be printed prior to the printing the full run of the job. (See ProofPrint for use)					
SaveDisposition		String	type3 keyword	J	[prod -print2] §5.7.1.1
Specifies whether the Printer must print and/or save the job. (See JobSaveDisposition for use) (<i>Keywords: None, PrintSave, SaveOnly</i>)					
SaveDocumentFormat	String	MimeMediaType	J		[prod -print2] §5.7.1.2.3.3
Indicates the document format in which the Printer saves the Document Data. (See DocumentFormat Document Description element) (See SaveInfo for use)					
SaveInfo	Yes	complex		J	[prod -print2] §5.7.1.2
Contains sets of elements that each tells the Printer how to create each copy of the saved job. (See JobSaveDisposition for use) (<i>Includes SaveLocation, SaveName, SaveDocumentFormat</i>)					
SaveLocation		String	Maxlength=1023	J	[prod -print2] §5.7.1.2.3.1
Specifies the path to the directory as a URI where the Printer saves the Document Data and other Job information. (See SaveInfo for use)					
SaveName		String	Maxlength=255	J	[prod -print2] §5.7.1.2.3.2
Specifies the name of the saved job in the directory specified by the "save-location" member element. The value may be a relative path. (See SaveInfo for use)					
SeparatorSheets		complex		D	[PWG5100.3] §3.18
Specifies the separator sheets to be printed with the Document. (<i>Includes SeparatorSheetsType, Media/MediaCol</i>)					
SeparatorSheetsType		String	Type3 keyword	D	[PWG5100.3] §3.18.1
Specifies the separator sheets type. (See SeparatorSheets for use) (<i>Keywords: None, SlipSheets, StartSheet, EndSheet, BothSheets</i>)					
SheetCollate		String	Type2 keyword	D	[rfc3381] §3.1
Specifies if the media sheets of each copy of each printed document in a job are to be in sequence. (<i>Keywords: Uncollated, Collated</i>)					
Sides		String	type2 keyword	D	[rfc2911] §4.2.8
Indicates how an impression is to be placed upon the side(s) of the media. (<i>Keywords: OneSided, TwoSidedLongEdge, TwoSidedShortEdge, TwoSidedLongEdge</i>)					

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
Stitching		complex		D	[PWG5100.3] §3.2.2
Provides detailed stitching parameters. (See FinishingsCol/JobFinishingsCol for use) (<i>Includes StitchingReferenceEdge, StitchingOffset, StitchingLocations</i>)					
StitchingLocations	yes	Integer	0:MAX	D	[PWG5100.3] §3.2.2.3
The distance along the stitching axis where a stitch will be placed in hundredths of a millimeter. (See Stitching for use)					
StitchingOffset		Integer	0:MAX	D	[PWG5100.3] §3.2.2.2
The perpendicular distance from the reference edge to the stitching axis in hundredths of a millimeter. (See Stitching for use)					
StitchingReferenceEdge		String type2 keyword		D	[PWG5100.3] §3.2.2.1
Specifies the stitching reference edge of the output media. (See Stitching for use) (<i>Keyword: Bottom, Top, Left, Right</i>)					
XDimension		Integer	0:MAX	D	[PWG5100.3] §3.13.8.1
Size of the media in hundredths of a millimeter along the bottom edge. (See MediaSize for use)					
XImagePosition		String type2 keyword		D	[PWG5100.3] §3.19.2
Causes the specified point of the Finished -Page Image to be positioned at a specified location. (<i>Keywords: None, Center, Left, Right</i>)					
XImageShift		Integer	MIN:MAX	D	[PWG5100.3] §3.19.3
Causes the Finished-Page Image to be shifted in position with respect to the x-axis of the media. The unit of measure for this element is hundredths of a millimeter. The sign of the value indicates the direction of the shift.					
Xside1ImageShift		Integer	MIN:MAX	D	[PWG5100.3] §3.19.4
Causes each Finished-Page Image that would be placed on the front side of a sheet to be shifted in position with respect to the x-axis of the media. The unit of measure for this element is hundredths of a millimeter. The sign of the value indicates the direction of the shift.					
Xside2ImageShift		Integer	MIN:MAX	D	[PWG5100.3] §3.19.5
Causes each Finished-Page Image that would be placed on the backside of a sheet to be shifted in position with respect to the x-axis of the media. The unit of measure for this element is hundredths of a millimeter. The sign of the value indicates the direction of the shift.					
YDimension		Integer	0:MAX	D	[PWG5100.3] §3.13.8.2
Size of the media in hundredths of a millimeter along the left edge. (See MediaSize for use)					

Processing Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
YImagePosition		String type2 keyword	D	[PWG5100.3]	§3.19.6
Causes the specified point of the Finished -Page Image to be positioned at a specified location. (Keywords: None, Center, Top, Bottom)					
YImageShift		Integer	MIN:MAX	D	[PWG5100.3] §3.19.7
Causes the Finished-Page Image to be shifted in position with respect to the y-axis of the media. The unit of measure for this element is hundredths of a millimeter. The sign of the value indicates the direction of the shift.					
Yside1ImageShift		Integer	MIN:MAX	D	[PWG5100.3] §3.19.8
Causes each Finished-Page Image that would be placed on the front side of a sheet to be shifted in position with respect to the y-axis of the media. The unit of measure for this element is hundredths of a millimeter. The sign of the value indicates the direction of the shift.					
Yside2ImageShift		Integer	MIN:MAX	D	[PWG5100.3] §3.19.9
Causes each Finished-Page Image that would be placed on the backside of a sheet to be shifted in position with respect to the y-axis of the media. The unit of measure for this element is hundredths of a millimeter. The sign of the value indicates the direction of the shift.					

700

701 **7.2 Job Elements (Status and Description)**

702 * Group Key: S=Status, D=Description

703 **Table 4- Job Elements (Status and Description)**

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
CompressionSupplied		String	Type2 keyword	D	[PWG5100.7] §5.2.1
Default compression algorithm used for the Documents Data. (Keywords: None, Deflate, Gzip, Compress)					
DateTimeAtCompleted		String	DateTime [rfc1123]	S	[rfc2911] §4.3.14.7
Indicates the date and time at which the Job completed. (example: Fri, 03 May 2002 08:49:37 GMT)					
DateTimeAtCreation		String	DateTime [rfc1123]	S	[rfc2911] §4.3.14.5
Indicates the date and time at which the Job was created. (example: Fri, 03 May 2002 08:49:37 GMT)					

Deleted: [jobx]

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
DateTimeAtProcessing		String	DateTime [rfc1123]	S	[rfc2911] §4.3.14.6
Indicates the date and time at which the Job first began processing. (example: Fri, 03 May 2002 08:49:37 GMT)					
DetailedStatusMessage	Yes	String	Maxlength=1023	S	[rfc2911] §4.3.10
Specifies additional detailed and technical information about the job. Intended for use by the system administrator or other experienced technical persons and so is not localized by the Printer. (example: "PostScript error: stack overflow") (job-detailed-status-message in IPP)					
DocumentAccessErrors	Yes	String	Maxlength=1023	S	[rfc2911] §4.3.11
Information about each Document access error for this job encountered by the Printer. (example: "(404) http://www.company.com/pub/fileToPrint.pdf ") (job-document-access-errors in IPP)					
DocumentCharsetSupplied		String	Maxlength=63	D	[PWG5100.7] §5.2.2
The default charset of the Documents content					
DocumentDigitalSignatureSupplied		String	Type2 keyword	D	[PWG5100.7] §5.2.3
The type of digital signature, if any, used in the Document Content. (<i>Keywords: dss, none, pgp, smime, xmldsig</i>)					
DocumentFormatDetailsSupplied	Yes	Complex	Complex	D	[PWG5100.7] §5.2.4
Summarizes the default distinct contained document formats when Document contains multiple files, i.e., the Document is a container DocumentFormat, such as 'multipart/related' or 'application/zip'. For example, a container containing 100 PostScript files and 1 PCL file would have two sets of values. (<i>Includes DocumentSourceApplicationName, DocumentSourceApplicationVersion, DocumentSourceOsName, DocumentSourceOsVersion, DocumentFormat, DocumentFormatDeviceId, DocumentFormatVersion, DocumentNaturalLanguage</i>).					
DocumentFormatSupplied		String	MimeMediaType [rfc2046], [rfc2048]	D	[PWG5100.7] §5.2.5
The default Document format (i.e., PDL) for Documents in the Job. The value "application/octet-stream" has a special meaning. This value is used to indicate that a Printer is capable of auto-sensing the format of the Document. The values "application/zip" and "multipart/related" are container formats for which DocumentContainerSummary gives additional information about the contained files. (<i>Examples: application/octet-stream, application/postscript, application/vnd.hp-PCL, "text/plain; charset=utf-8", application/zip, multipart/related</i>)					

Deleted: Was

Deleted: J

Deleted: D

Deleted: S

Deleted: M

Deleted: (Was

Deleted: J

Deleted: D

Deleted: A

Deleted: E

Deleted: [jobx]

Deleted: [jobx]

Deleted: [jobx]

Deleted: [jobx]

Deleted: 10

Deleted: 24

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
DocumentFormatVersionSupplied		String Maxlength=127	D	[PWG5100.7] §5.2.6	
The default level or version of the DocumentFormat. Values are either from the prtInterpreterLangLevel [rfc1759] or a standard designation. (examples: "3" for DocumentFormat=application/postscript "5e" for DocumentFormat=application/vnd.hp-pcl; "ISO 12639-1:1996" for TIFF/IT Profile 1)					
DocumentMessageSupplied		String Maxlength=1023	D	[PWG5100.7] §5.2.7	
A message from either (1) the user to the operator about the Documents or (2) from the operator, system administrator, or "intelligent" process to indicate to the end user the reasons for modification or other management action taken on the Documents.					
DocumentNameSupplied		String Maxlength=255	D	[PWG5100.7] §5.2.8	
The default name for the Documents in the Job to be used in an implementation specific manner.					
DocumentNaturalLanguageSupplied		String Maxlength=127	D	[PWG5100.7] §5.2.9	
Identifies the default Natural Language for the Documents in the Job.					
ElementFidelity		Boolean	D	[rfc2911] §15.1, [PWG5100.5] §8.1.1	
Allows a user to control whether or not the Printer MUST honor <i>all</i> supplied Processing elements in the Job Creation operation. For a 'true' value the Printer rejects the job submission if any of the supplied Processing element values are unsupported. For a 'false' value the Printer MUST accept the job submission and do best effort. Default = 'false' NOTE: Use "JobMandatoryElements" to explicitly specify a <i>subset</i> of the supplied elements that the Printer MUST honor. (ipp-attribute-fidelity in IPP)					
ElementsNaturalLanguage		String Natural language	D	[rfc2911] §4.3.20	
Indicates the natural language of the elements with string syntax that were set by the End User. (attributes-natural-language in IPP)					
ErrorsCount		Integer MIN:MAX	S	[PWG5100.7] §5.1.1	
The total number of errors that a Printer has generated while processing and printing a Job's Document(s).					
Impressions		Integer 0:MAX	D	[rfc2911] §4.3.17.2	
The total size in number of impressions in all the Job's Document(s). (job-impressions in IPP)					

Deleted: [jobx]

Deleted: [jobx]

Deleted: [jobx]

Deleted: [jobx]

Deleted: doc-obj

Deleted: Was

Deleted: IPP

Deleted: A

Deleted: F

Deleted: Was

Deleted: A

Deleted: N

Deleted: L

Deleted: [jobx]

Deleted: Was

Deleted: J

Deleted: I

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
ImpressionsCompleted		Integer	0:MAX	S	[rfc2911] §4.3.18.2
The number of impressions completed for the Job so far. (job-impressions-completed in IPP)					
ImpressionsCompletedCurrentCopy		Integer	0:MAX	S	[rfc3381] §4.4
The number of impressions completed for the current iteration of this Job so far.					
JobAccountId		String	Maxlength=255	D	[PWG5100.3] §3.6
Account associated with this Job.					
JobAccountingUserID		String	Maxlength=255	D	[PWG5100.3] §3.7
Specifies the User ID associated with the "JobAccountId".					
JobCollationType		String	Type2 keyword	S	[rfc3381] §4.1
Identifies the collation type of the Job. (<i>Keywords: Other, Unknown, UncollatedSheets, UncollatedDocuments, CollatedDocuments</i>)					
JobId		Integer	1:MAX	S	[rfc2911] §4.3.2
The Printer sets this to the ID of this Job, which is unique for the Printer.					
JobMandatoryElements	Yes	String	Type3 keyword	D	[PWG5100.5] §8.1
Allows a user to list which Processing elements the Printer must honor. The Printer rejects the job submission if <i>any</i> of the listed elements are unsupported or contain values that the Printer does not support. All of the remaining supplied elements are best effort. This element is ignored if ElementFidelity is supplied with a 'true' value. (See [rfc2911] §15.1) (<i>Keywords: None and any Processing element names. Member elements of collection elements are named as Attr.Member. For example, JobSheetsCol.Media</i>) NOTE: New element to align fidelity with FSG work was JobMandatoryAttributes).					
JobMessageFromOperator		String	Maxlength=127	D	[rfc2911] §4.3.16
Message to the end user indicating the reasons for any management action taken on this Job. (example: "Job canceled due to length", "Pick job up in mailbox")					
JobName		String	Maxlength=255	D	[rfc2911] §4.3.5
The Printer sets this to the client-supplied end-user friendly name for the Job, else the Printer must generate a name from other information. (example: "license agreement memo")					
JobOriginatingUserName		String	Maxlength=255	D	[rfc2911] §4.3.6
The Printer sets this element to the most authenticated printable name that it can obtain (example: "John Doe", \authDomain\John Doe)					
JobPassword		String	Maxlength=255	D	[prod-print2] §4.1
Contains a password supplied by the client encrypted according to method specified by the client in the JobPasswordEncryption element.					

Deleted: Was

Deleted: J

Deleted: I

Deleted: C

Deleted: doc-obj

Deleted: 10

Deleted: 24

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
JobPasswordEncryption		String	Type3 keyword	D	[prod-print2] §4.2
	Specifies the type of encryption that the client is used for the supplied value of the JobPassword element. (<i>Keywords: None, Md2, Md4, Md5, Sha</i>)				
JobPrinterMakeAndModel		String	Maxlength=127	S	[prod-print] §6.1
	Identifies the make and model of the output device that saved this Job according to the JobSaveDisposition Job Processing element.				
JobPrinterUri		String	uri	S	[rfc2911] §4.3.3
	The Printer set this to the URI of Printer that created this Job. (example: ipp://www.company.com/printer)				
JobState		String	Type1 keyword	S	[rfc2911] §4.3.7
	The current state of this Job (see section 4.3.1.1). See also JobStateReasons element below. (<i>Keywords: Pending, Pending-Held, Processing, ProcessingStopped, Canceled, Aborted, Completed</i>)				
JobStateMessage		String	Maxlength=1023	S	[rfc2911] §4.3.6
	Specifies information about the "JobState" and "JobStateReasons" elements in human readable text localized by the Printer according to the natural language supplied in the client's query request. (example: "Job completed successfully with warnings" for an English request)				
JobStateReasons	Yes	String	type2 keyword	S	[rfc2911] §4.3.8 [prod-print2] §8.3.1 [PWG5100.7] §6.1 [pwg5100.5]
	Provides additional information about this Job's current state. (<i>Keywords: AbortedBySystem, CompressionError, DigitalSignatureDidNotVerify, DigitalSignatureTypeNotSupported, DocumentAccessError, DocumentFormatError, ErrorsDetected, JobCanceledAtDevice, JobCanceledByOperator, JobCanceledByUser, JobCompletedSuccessfully, JobCompletedWithErrors, JobCompletedWithWarnings, JobDataInsufficient, JobDigitalSignatureWait, JobHoldUntilSpecified, JobIncoming, JobInterpreting, JobOutgoing, JobPasswordWait, JobPrinting, JobQueued, JobQueuedForMarker, JobRestartable, JobResuming, JobSavedSuccessfully, JobSaveError, JobSaving, JobScheduling, JobSpooling, JobStreaming, JobSuspended, JobSuspendedByOperator, JobSuspendedBySystem, JobSuspendedByUser, JobSuspending, JobTransforming, None, PrinterStopped, PrinterStoppedPartly, ProcessingToStopPoint, ProofPrintWait, QueuedInDevice, ResourcesAreNotReady, ResourcesAreNotSupported, ServiceOffline, SubmissionInterrupted, UnsupportedCompression, UnsupportedDocumentFormat, WarningsDetected</i>)				

Formatted Table

Deleted: CanceledAtDevice,
CanceledByOperator, CanceledByUser,
CompletedSuccessfully,
CompletedWithErrors,
CompletedWithWarnings,

Deleted: Incoming, Interpreting,

Deleted: Outgoing,

Deleted: Printing

Deleted: Queued, QueuedForMarker,

Deleted: Spooling, Streaming,

Deleted: Transforming,

Deleted: 10

Deleted: 14

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
JobUri		String	uri	S	[rfc2911] §4.3.1
	The Printer sets this to the URI for this Job. (example: ipp://www.company.com/printer/jobs/22) The URI is globally unique.				
KOctets		Integer	0:MAX	D	[rfc2911] §4.3.17.1
	The total size of this Job's Document(s) in integral units of 1024 octets. (job-k-octets in IPP)				
KOctetsProcessed		Integer	0:MAX	S	[rfc2911] §4.3.18.1
	the total number of octets processed in integral units of 1024 octets so far. (job-k-octets-processed in IPP)				
MediaSheets		Integer	0:MAX	D	[rfc2911] §4.3.17.3
	The total number of media sheets to be produced for this Job's Document(s). (job-media-sheets in IPP)				
MediaSheetsCompleted		Integer	0:MAX	S	[rfc2911] §4.3.18.3
	The media-sheets completed marking and stacking so far. (job-media-sheets-completed in IPP)				
MoreInfo		String	uri	S	[rfc2911] §4.3.4
	URI used to obtain information intended for end user consumption about this specific Job/Document. (example: " http://www.company.com/printer/embeddedjobpage ") . (job-more-info in IPP)				
NumberOfDocuments		Integer	0:MAX	S	[rfc2911] §4.3.12
	The number of Documents in this Job.				
NumberOfInterveningJobs		Integer	0:MAX	S	[rfc2911] §4.3.15
	The number of jobs that are "ahead" of this Job assuming the current scheduled order.				
OutputDeviceAssigned		String	Maxlength=127	S	[rfc2911] §4.3.13
	Identifies the output device to which the Printer has assigned this Job (example: "Pete's Printer")				
PrinterUpTime		Integer	1:MAX	S	[rfc2911] §4.3.14.4
	The amount of time (in seconds) that the Printer has been up and running. See Printer element "PrinterUpTime" (job-printer-up-time in IPP)				
SheetsCompletedCopyNumber		Integer	0:MAX	S	[rfc3381] §4.2
	Number of the copy being stacked for the current Document.				
SheetsCompletedDocumentNumber		Integer	0:MAX	S	[rfc3381] §4.3
	Number of the document in this Job currently being stacked. . The Documents in a Job are numbered 1, 2, 3. A 0 value means no Document is currently being stacked.				

Deleted: Was

Deleted: J

Deleted: K

Deleted: O

Deleted: Was

Deleted: J

Deleted: KO

Deleted: P

Deleted: Was

Deleted: J

Deleted: M

Deleted: S

Deleted: Was

Deleted: J

Deleted: M

Deleted: S

Deleted: C

Deleted: Was

Deleted: J

Deleted: M

Deleted: I

Deleted: Was

Deleted: J

Deleted: P

Deleted: U

Deleted: T

Job Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
TimeAtCompleted		Integer	MIN:MAX	S	[rfc2911] §4.3.14.3
The time at which the Job completed in "PrinterUpTime" seconds.					
TimeAtCreation		Integer	MIN:MAX	S	[rfc2911] §4.3.14.1
The time at which the Job was created in "PrinterUpTime" seconds.					
TimeAtProcessing		Integer	MIN:MAX	S	[rfc2911] §4.3.14.2
The time at which the Job first began processing in "PrinterUpTime" seconds.					
WarningsCount		Integer	MIN:MAX	S	[PWG5100.4] §6.1
The total number of warnings that a Printer has generated while processing and printing a Job's Document(s). (job-warnings-count in IPP)					

Deleted: Was

Deleted: J

Deleted: W

Deleted: C

7.3 Document Elements (Status and Description)

* Group Key: S=Status, D=Description. Reference is given to the Job Description attribute in [rfc2911] and [pwg5100.n] even when the [PWG5100.5] has a corresponding Document Description attribute defined, since the definitions are so parallel. Reference is given to [PWG5100.5] when the element is defined therein only.

Deleted: doc-obj

Deleted: doc-obj

Table 5 – Document Elements (Status and Description)

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
Compression		String	Type2 keyword	D	[rfc2911] §4.4.32
Compression algorithm used on the Document Data, if any. (<i>Keywords: None, Deflate, Gzip, Compress</i>)					
CurrentPageOrder		String	Type2 keyword	S	[PWG5100.3] §4.1
Indicates the page order of the pages in the document data. Initially set to PageOrderReceived and updated if data is transformed. (<i>Keywords: 1ToNOrder, NTo1Order</i>)					
DateTimeAtCompleted		String	DateTime	S	[rfc2911] §4.3.14.7
Indicates the date and time at which this Document completed. (example: Fri, 03 May 2002 08:49:37 GMT)					
DateTimeAtCreation		String	DateTime	S	[rfc2911] §4.3.14.5
Indicates the date and time at which this Document was created. (example: Fri, 03 May 2002 08:49:37 GMT)					

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
DateTimeAtProcessing		String	DateTime [rfc1123]	S	[rfc2911] §4.3.14.6
Indicates the date and time at which this Document first began processing. (example: Fri, 03 May 2002 08:49:37 GMT)					
DetailedStatusMessage	Yes	String	Maxlength=1023	S	[rfc2911] §4.3.10
Specifies additional detailed and technical information about this Document. Intended for use by the system administrator or other experienced technical persons. (example: "PostScript error: stack overflow") (job-detailed-status-message in IPP)					
DocumentAccessErrors	Yes	String	Maxlength=1023	S	[rfc2911] §4.3.11
Information about each Document access error for this Document encountered by the Printer. (example: "(404) http://www.company.com/pub/fileToPrint.pdf ") (job-document-access-errors in IPP)					
DocumentCharset		String	Maxlength=63	D	[PWG5100.7] §3.2.2 [PWG5100.5] §9.1.10
The charset of the Document content					
DocumentDigitalSignature		String	Type2 keyword	D	[PWG5100.7] §3.2.3 [PWG5100.5] §9.1.11
The type of digital signature, if any, used in the Document Content. (<i>Keywords: dss, none, pgp, smime, xmldsig</i>)					
DocumentFormat		String	MimeMediaType [rfc2046], [rfc2048]	D	[rfc2911] §3.2.1.1 [PWG5100.5] §9.1.12
The Document format (i.e., PDL) for this Document. The value "application/octet-stream" has a special meaning. This value is used to indicate that a Printer is capable of auto-sensing the format of the Document. The values "application/zip" and "multipart/related" are container formats for which DocumentContainerSummary gives additional information about the contained files. (Examples: <i>application/octet-stream, application/postscript, application/vnd.hp -PCL, "text/plain; charset=utf-8", application/zip, multipart/related</i>)					

Deleted: Was

Deleted: J

Deleted: D

Deleted: S

Deleted: M

Deleted: Was

Deleted: J

Deleted: D

Deleted: A

Deleted: E

Deleted: [jobx]

Deleted: doc-obj

Deleted: [jobx]

Deleted: doc-obj

Deleted: doc-obj

Deleted: 10

Deleted: 24

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
DocumentFormatDetails	Yes	Complex		D	[PWG5100.7] §3.2.5 [PWG5100.5] §9.1.13
Summarizes the distinct contained document formats when the Document contains multiple files, i.e., the Document is a container DocumentFormat, such as 'multipart/related' or 'application/zip'. For example, a container containing 100 PostScript files and 1 PCL file would have two sets of values. (Includes DocumentSourceApplicationName, DocumentSourceApplicationVersion, DocumentSourceOsName, DocumentSourceOsVersion, DocumentFormat, DocumentFormatDeviceId, DocumentFormatVersion, DocumentNaturalLanguage).					
DocumentFormatDetails Detected	Yes	Complex		S	[PWG5100.5] §9.1.14
Generated by the Printer to indicate the actual document format details of the Document object. (Includes DocumentCreatorApplicationName, DocumentCreatorApplicationVersion, DocumentCreatorOsName, DocumentCreatorOsVersion, DocumentFormat, DocumentFormatDeviceId, DocumentFormatVersion, DocumentNaturalLanguage).					
DocumentFormatDetected		String	mimeMediaType [rfc2046], [rfc2048]	S	[PWG5100.5] §9.1.15
The Printer sets this to the actual DocumentFormat that the Printer detects when auto-sensing the document format, i.e., when the DocumentFormat is omitted or supplied as 'application/octet-stream'. (example: 'application/postscript')					
DocumentFormatDeviceId		String	Maxlength=127	D	[PWG5100.5] §9.1.13
Identifies the type of device for which the document was formatted, including manufacturer and model, following the IEEE 1284-2000 Device ID string. (example: MANUFACTURER:ACME Co.;COMMAND SET:PS;MODEL:LaserBeam 9;) (See DocumentFormatDetails for use)					
DocumentFormatVersion		String	Maxlength=127	D	[PWG5100.5] §9.1.16
The level or version of the DocumentFormat. Values are either from the prtInterpreterLangLevel [rfc1759] or a standard designation. (examples: "3" for DocumentFormat=application/postscript "5e" for DocumentFormat=application/vnd.hp-pcl; "ISO 12639-1:1996" for TIFF/IT Profile 1)					

Deleted: [jobx]

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: 10

Deleted: 14

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
DocumentFormatVersion Detected		String	Maxlength=127	S	[PWG5100.5] §9.1.17
The Printer sets this to the actual DocumentFormat level or version that the Printer detects when auto-sensing the document format, i.e., when the DocumentFormat is omitted or supplied as 'application/octet-stream'. (examples: "3" for DocumentFormat=application/postscript' "5e" for DocumentFormat=application/vnd.hp-pcl; "ISO 12639-1:1996" for TIFF/IT Profile 1)					
DocumentMessage		String	Maxlength=1023	D	[PWG5100.5] §9.1.20
A message from either (1) the user to the operator about the Document or (2) from the operator, system administrator, or "intelligent" process to indicate to the end user the reasons for modification or other management action taken on the Document.					
DocumentName		String	Maxlength=255	D	[rfc2911] §3.2.1.1
Name for this Document to be used in an implementation specific manner.					
DocumentNaturalLanguage		String	Maxlength=127	D	[rfc2911] §3.2.1.1 [PWG5100.5] §9.1.22
Identifies the primary Natural Language of this Document.					
DocumentNumber		integer		S	[PWG5100.4] §9.2, [PWG5100.5] §9.1.23
The order of this document within a job starting at a base of 1.					
PrinterUri		String	Maxlength=1023	S	[PWG5100.5] §9.1.24
The Printer sets this to the URI of the Printer, i.e., a copy of the Job's JobPrinterUri element. (example: ipp://www.company.com/printers/myprinter) (document-printer-uri in IPP)					
DocumentSourceApplicationName		String	Maxlength=255	D	[PWG5100.5] §9.1.13
The name of the application that created the document, without its version number. (examples: "Photoshop", "Microsoft Word") (See DocumentFormatDetails for use)					
DocumentSourceApplicationVersion		String	Maxlength=127	D	[PWG5100.5] §9.1.13
The version of the application that created the document, without its name. (examples: 'V3.0.', 'V6.0') (See DocumentFormatDetails for use)					

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: was

Deleted: D

Deleted: P

Deleted: U

Deleted: doc-obj

Deleted: doc-obj

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
DocumentSourceOsName		String	Maxlength=40	D	[PWG5100.5] §9.1.13
The name of the operating system, without version number, on which the document was generated (see IANA [os-names]). (examples: 'LINUX', 'MACOS', 'NETWARE', 'WINDOWS') (See DocumentFormatDetails for use)					
DocumentSourceOsVersion		String	Maxlength=127	D	[PWG5100.5] §9.1.13
The version of the operating system, without its name, on which the document was generated (see IANA [os-names]). (examples: For LINUX = '1.0', '2.4'; For WINDOWS = '95', 'NT', 'NT-4', '2000', 'XP') (See DocumentFormatDetails for use)					
DocumentState		String	Type1 keyword	S	[PWG5100.5] §9.1.25
The current state of this Document. See also DocumentStateReasons element below. (Keywords: Pending, Processing, Canceled, Aborted, Completed)					
DocumentStateMessage		String	Maxlength=1023	S	[PWG5100.5] §9.1.26
Specifies information about the "DocumentState" and "DocumentStateReasons" elements of this Document in human readable text localized by the Printer according to the language supplied in the client's query request. (Example: "Document completed successfully with warnings" for an English request)					
DocumentStateReasons	Yes	String	type2 keyword	S	[PWG5100.5] §9.1.27
Provides additional information about this Document's current state. (Keywords: AbortedBySystem, CanceledAtDevice, CanceledByOperator, CanceledByUser, CompletedSuccessfully, CompletedWithErrors, CompletedWithWarnings, CompressionError, DocumentAccessError, DocumentFormatError, Incoming, Interpreting, None, Outgoing, Printing, PrinterStopedPartly, Printing, ProcessingToStopped, ProofPrintWait, Queued, QueuedForMarker, QueuedInDevice, ResourcesAreNotReady, ResourcesAreNotSupported, Spooling, Streaming, SubmissionInterrupted, Transforming, UnsupportedCompression, UnsupportedDocumentFormat, WarningsDetected)					
DocumentUri		String	Maxlength=1023	D	[rfc2911] §3.2.2 [PWG5100.5] §9.1.28
Reference to the Document to be printed (Print by reference) supplied by the Client.					

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: doc-obj

Deleted: None,

Deleted: doc-obj

Deleted: 10

Deleted: 14

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
ElementsCharset		String	Charset	D	[rfc2911] §4.3.19
	Indicates the coded character set and encoding method of the elements in this Document object with string syntax that were set by the End User. (attributes-charset in IPP)				
ElementsNaturalLanguage		String	Natural language	D	[rfc2911] §4.3.20
	Indicates the natural language of the elements in this Document object with string syntax that were set by the End User. (attributes-natural-language in IPP)				
ErrorsCount		Integer	MIN:MAX	S	[PWG5100.5] §9.1.29
	The total number of errors that a Printer has generated while processing and the Document.				
Impressions		Integer	0:MAX	D	[rfc2911] §4.3.17.2
	The total size in number of impressions in this Document. (job-impressions in IPP)				
ImpressionsCompleted		Integer	0:MAX	S	[rfc2911] §4.3.18.2
	The number of impressions completed for this Document so far. (job-impressions-completed in IPP)				
ImpressionsCompletedCurrentCopy		Integer	0:MAX	S	[rfc3381] §4.4
	The number of impressions completed for the current iteration of this Document so far.				
JobId		integer	1:MAX	S	[PWG5100.5] §9.1.18
	The Printer sets this to the ID of the Job containing this Document, i.e., a copy of the Job's JobId. The ID is unique for the Printer. (document-job-id in IPP)				
JobUri		String	Maxlength=1023	S	[PWG5100.5] §9.1.19
	The Printer sets this to the URI for the job, i.e., a copy of the Job's JobUri. The URI is globally unique. (example: ipp://www.company.com/printers/myprinter/jobs/22) (document-job-uri in IPP)				
KOctets		Integer	0:MAX	D	[rfc2911] §4.3.17.1
	The total size of this Document in integral units of 1024 octets. (job-k-octets in IPP)				
KOctetsProcessed		Integer	0:MAX	S	[rfc2911] §4.3.18.1
	the total number of octets processed in integral units of 1024 octets so far. (job-k-octets-processed in IPP)				
LastDocument		Boolean		D	[rfc2911] §3.3.1
	Has a 'true' value if this Document is the last Input Document for the Job. Default = 'false'.				

Deleted: Was

Deleted: A

Deleted: C

Deleted: Was

Deleted: A

Deleted: N

Deleted: L

Deleted: doc-obj

Deleted: Was

Deleted: J

Deleted: I

Deleted: Was

Deleted: J

Deleted: I

Deleted: C

Deleted: doc-obj

Deleted: Was

Deleted: D

Deleted: J

Deleted: I

Deleted: doc-obj

Deleted: Was

Deleted: D

Deleted: J

Deleted: U

Deleted: Was

Deleted: J

Deleted: K

Deleted: O

Deleted:

Deleted: Was

Deleted: J

Deleted: KO

Deleted: P

Deleted: 10

Deleted: 24

Document Element Name	Multivalued	Syntax	Constraint	Group*	Reference
Description (values)					
MediaSheets		Integer	0:MAX	D	[rfc2911] §4.3.17.3
The total number of media sheets to be produced for this Document. (job-media-sheets in IPP)					
MediaSheetsCompleted		Integer	0:MAX	S	[rfc2911] §4.3.18.3
The media-sheets completed marking and stacking for this Document so far. (job-media-sheets-completed in IPP)					
MoreInfo		String	uri	S	[rfc2911] §4.3.4
URI used to obtain information intended for end user consumption about this specific Document. (example: "http://www.company.com/printer/embeddedjobpage") . (job-more-info in IPP)					
OutputDeviceAssigned		String	Maxlength=127	S	[rfc2911] §4.3.19
Identifies the output device to which the Printer has assigned this Job (example: "Pete's Printer")					
PageOrderReceived		String	Type2 keyword	D	[PWG5100.3] §3.16
Indicates the order of pages in this Document data as supplied with the job. (Keywords: <i>1ToNOrder</i> , <i>NTolOrder</i>)					
PrinterUpTime		Integer	1:MAX	S	[rfc2911] §4.3.14.4
The amount of time (in seconds) that the Printer has been up and running. (See Printer element "PrinterUpTime") (job-printer-up-time)					
SheetsCompletedCopyNumber		Integer	0:MAX	S	[rfc3381] §4.2
Number of the copy being stacked for this Document.					
TimeAtCompleted		Integer	MIN:MAX	S	[rfc2911] §4.3.14.3
The time at which this Document completed.					
TimeAtCreation		Integer	MIN:MAX	S	[rfc2911] §4.3.14.1
The time at which this Document was created in "PrinterUpTime" seconds.					
TimeAtProcessing		Integer	MIN:MAX	S	[rfc2911] §4.3.14.2
The time at which this Document first began processing.					
WarningCount		Integer	MIN:MAX	S	[PWG5100.4] §6.1
The total number of warnings that a Printer has generated while processing and printing the Document. (job-warning-count in IPP)					

Deleted: was

Deleted: J

Deleted: M

Deleted: S

Deleted: Was

Deleted: J

Deleted: M

Deleted: S

Deleted: C

Deleted: Was

Deleted: J

Deleted: M

Deleted: I

Deleted: Was

Deleted: J

Deleted: P

Deleted: U

Deleted: T

Deleted: Was

Deleted: J

Deleted: W

Deleted: C

711

712 7.4 Printer Elements (Status and Description)

713 * Group Key: S=Status, D=Description

714

Table 6 - Printer Elements (Status and Description)

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
ColorSupported		boolean	D		[rfc2911] §4.4.26
Indicates if this Printer is capable of any type of color printing at all, including highlight color.					
CompressionSupported	Yes	String	Type3 keyword	D	[rfc2911] §4.4.32
Identifies the set of Compression algorithms for Document content that this Printer supports. (Keywords: None, Deflate, Gzip, Comp res)					
DeviceId		String	IEEE 1284	D	See Appendix 12/1
An identifier based on IEEE 1284 to identify the device that the Printer represents. Often used to load an appropriate driver on the client device. (example: "MANUFACTURER:ACME;COMMAND SET:PCL,PJL,PS,XHTML-Print+xml;MODEL:LaserBeam 9;COMMENT:example;ACTIVE COMMAND SET:PCL")					
DocumentCharsetDefault		String	Maxlength=63	S	[PWG5100.7] §7.1
The default charset for Document content					
DocumentCharsetSupported	Yes	String	Maxlength=63	S	[PWG5100.7] §7.2
The allowed charsets for Document content					
DocumentCreationElementsSupported	Yes	String	Type2 keyword	S	[PWG5100.5] §10.1
The Processing and Description elements that are allowed in a Document Creation operation (e.g. SendDocument, SendUri)					
DocumentDigitalSignatureDefault		String	Type2 keyword	S	[PWG5100.7] §7.3
The default type of digital signature, if any, used in the Document Content. (Keywords: dss, none, pgp, smime, xmldsig)					
DocumentDigitalSignatureSupported		String	Type2 keyword	S	[PWG5100.7] §7.4
The allowed types of digital signature, if any, for the Document Content. (Keywords: dss, none, pgp, smime, xmldsig)					
DocumentFormatDefault		String	MimeMediaType [rfc2046], [rfc2048]	D	[rfc2911] §4.4.21
The document format (i.e. PDL) that this Printer has been configured to assume if the client does not specify a document format in any of the actions that supply document content for a Job. The value "application/octet-stream" has a special meaning. This value is used to indicate that a Printer is capable of auto-sensing the format of the document. (examples: application/octet-stream, application/postscript, application/vnd.hp-PCL, "text/plain; charset=utf-8")					

Deleted: 13.1

Deleted: [jobx]

Deleted: [jobx]

Deleted: doc-obj

Deleted: [jobx]

Deleted: [jobx]

Deleted: 10

Deleted: 24

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
DocumentFormatDetailsDefault		Complex	Complex	D	[PWG5100.7] §7.5
The default distinct contained document formats when Document contains multiple files, i.e., the Document is a container DocumentFormat, such as 'multipart/related' or 'application/zip'. (Includes DocumentSourceApplicationName, DocumentSourceApplicationVersion, DocumentSourceOsName, DocumentSourceOsVersion, DocumentFormat, DocumentFormatDeviceId, DocumentFormatVersion, DocumentNaturalLanguage).					
DocumentFormatDetailsSupported	YES	String	Type2 keyword	D	[PWG5100.7] §7.6
Lists the type2 keyword names of the member attributes of DocumentFormatDetails that the Printer supports. (Examples: DocumentCreatorApplicationName, DocumentCreatorApplicationVersion, DocumentCreatorOsName, DocumentCreatorOsVersion, DocumentFormat, DocumentFormatDeviceId, DocumentFormatVersion, DocumentNaturalLanguage).					
DocumentFormatSupported	YES	String	MimeMediaType [rfc2046], [rfc2048]	D	[rfc2911] §4.4.22
Identifies both the Document and Image formats supported by this Printer. Specifies the set of Document formats that the Printer supports. (examples: application/octet-stream, application/postscript, application/vnd.hp-PCL, "text/plain; charset=utf-8"). Also specifies the set of Image formats that the Printer supports. (examples: 'image/jpeg' which is a registered MIME Media Type with IANA).					
DocumentFormatVersionDefault		String	Maxlength=127	D	[jobx] §7.7
The default level or version of the DocumentFormats that the Printer will use if not supplied by the Client in DocumentFormatDetails. (examples: "3" for DocumentFormat=application/postscript "5e" for DocumentFormat=application/vnd.hp-pcl; "ISO 12639-1:1996" for TIFF/IT Profile 1)					
DocumentFormatVersionSupported	YES	String	Maxlength=127	D	[jobx] §7.8
The level or version of the DocumentFormats that the Printer will accept if supplied by the Client in DocumentFormatDetails. (examples: "3" for DocumentFormat=application/postscript "5e" for DocumentFormat=application/vnd.hp-pcl; "ISO 12639-1:1996" for TIFF/IT Profile 1)					
GeneratedNaturalLanguageSupported	YES	String	Natural Language	D	[rfc2911] §4.4.20
Identifies the natural language(s) that the Printer supports in returned values of messages generated by the Printer, that is, the JobStateMessage, DocumentStateMessage, and PrinterStateMessage elements.					
ImpressionsSupported		RangeOfInteger	0:MAX	D	[rfc2911] §4.4.34
Specifies the upper and lower bounds for the number of impressions allowed per job. (job-impressions-supported in IPP)					

Deleted: [jobx]

Deleted: [jobx]

Deleted: Was

Deleted: J

Deleted: I

Deleted: S

Deleted: 10

Deleted: 14

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
JobCreationElementsSupported	YES	String	Type2 keyword	D	[prod-print1] §7.1
Identifies the set of Job Processing and Job Description elements (but not member elements) that this Printer will accept in a JobCreation action (job-creation-attributes-supported in IPP)					
JobPasswordEncryptionSupported	Yes	String	type3 keyword	D	[prod-print1] §7.3
Identifies which encryption methods this Printer supports as values of the JobPasswordEncryption Job Description element for Secure Print. (Keywords: None, Md2, Md4, Md5, Sha)					
JobPasswordSupported		Integer	0:MAX	D	[prod-print1] §7.2
Indicates the maximum length that this Printer will accept for the unencrypted password which the client will encrypt as the value of the JobPassword Description Element.					
JobSpoolingSupported		String	type2 keyword	D	[prod-print1] §7.4
Indicates whether or not the Printer spools Jobs before interpreting the document data (RIPing). (Keywords: Spool, Stream, Automatic)					
KOctetsSupported		RangeOfInteger	0:MAX	D	[rfc2911] §4.4.33
Specifies the allowable upper and lower bounds of the total size per Job in integral units of 1024 octets that this Printer will accept. (job-k-octets-supported in IPP)					
MaxSaveInfoSupported		Integer	1:MAX	D	[prod-print1] §7.5
Identifies the maximum number of SaveInfo member element collections that this Printer can accept in a job request.					
MediaColDatabase	Yes	Complex		D	[prod-print1] §7.6
Identifies all of the Media supported by this Printer using a collection value for each which identifies the media characteristics. This element is not returned when 'all' is requested. (Includes any of the MediaCol member elements)					
MediaSheetsSupported		RangeOfInteger	0:MAX	D	[rfc2911] §4.4.35
Specifies the upper and lower bounds for the number of media sheets allowed per job by this Printer. (job-media-sheets-supported in IPP)					
MultipleDocumentJobsSupported		boolean		D	[rfc2911] §4.4.16
Indicates whether this Printer supports more than one Document per job, i.e., more than one SendDocument and/or SendUri request per job. A multi-Documnt per job Printer must implement this element and have a value of 'true'. A single Document per job Printer may either not support this element or support it with a value of 'false'.					

Deleted: Was

Deleted: J

Deleted: C

Deleted: A

Deleted: S

Deleted: Was

Deleted: J

Deleted: KO

Deleted: S

Deleted: Was

Deleted: J

Deleted: M

Deleted: S

Deleted: S

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
MultipleOperationTimeOut		Integer	1:MAX	D	[rfc2911] §4.4.31
Identifies the minimum time (in seconds) that this multi-Document per job Printer will wait between actions on an open job before timing out. The actions can add Document to the open Job or close the Job. Timeouts are handled in an implementation specific manner. Multi-Document per job Printers must implement this element. The recommended value is greater than 60 and less than 240.					
NaturalLanguageConfigured		String	Natural language	D	[rfc2911] §4.4.19
Indicates the natural language of the elements with string syntax that were set by the Administrator or Manufacturer.					
OperationsSupported	Yes	String	type2 keyword	D	[rfc2911] §4.4.15
The set of supported actions for the Printer and Job. (Keywords: PrintJob, PrintUri, CreateJob, SendDocument, SendURI, ValidateJob, ValidateDocument, CancelJob, HoldJob, ReleaseJob, RestartJob, SetJobElements, SetDocumentElements, CancelDocument, DeleteDocument, GetJobs, GetPrinterElements, GetJobElements, GetDocuments, GetDocumentElements, GetPrinterSupportedValues, PausePrinter, ResumePrinter, PurgeJobs, DisablePrinter, EnablePrinter, SetPrinterElements).					
PagesPerMinute		Integer	0:MAX	D	[rfc2911] §4.4.36
Specifies the nominal number of pages per minute which may be generated by this Printer.					
PagesPerMinuteColor		Integer	0:MAX	D	[rfc2911] §4.4.37
Specifies the nominal number of pages per minute which may be generated by this Printer when printing color.					
ParentPrintersSupported	Yes	String	Uri	D	[admin-ops] §7.2
Contains the URI of the non-leaf Printer for which this Printer is the immediate subordinate.					
PdlOverrideSupported		String	type2 keyword	D	[rfc2911] §4.4.28
Expresses the ability of this Printer to (1) guaranteed, (2) attempt to, or (3) not attempt to override a Document's processing instructions with Job Processing Elements. (Keywords: Attempted, Guaranteed, NotAttempted)					
PrinterCurrentTime		String	DateTime [rfc1123]	S	[rfc2911] §4.4.30
Indicates the current date and time. (example: Fri, 03 May 2002 08:49:37 GMT)					
PrinterDetailedStatusMessages	Yes	String	Maxlength=1023	S	[prod-print2] §7.7
Specifies additional detailed and technical information about this Printer for the technical staff.					

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
PrinterDriverInstaller		String	Uri	D	[rfc2911] §4.4.8
	Intended for consumption by automata to locate the driver installer for this Printer object. (example: " http://www.company.com/printer/installerProgram ") Note: This element has not been used by any known implementation and is therefore deprecated.				
PrinterInfo		String	Maxlength=127	D	[rfc2911] §4.4.6
	Descriptive information about this Printer object.(example: "Out of courtesy for others, please print only small (1-5 page) jobs at this printer")				
PrinterIsAcceptingJobs		Boolean		S	[rfc2911] §4.4.23
	Indicates whether this Printer is currently able to accept jobs.				
PrinterLocation		String	Maxlength=127	D	[rfc2911] §4.4.5
	Identifies the location of the device that this Printer represents. (Example: <i>Pete's Office</i>)				
PrinterMakeAndModel		String	Maxlength=127	D	[rfc2911] §4.4.9
	Identifies the make and model of the device that this Printer object represents. (Example: "Xerox Phaser 7700", "HP LaserJet 1000", "Lexmark Optra Color 45")				
PrinterMessageFromOperator		String	Maxlength=127	D	[rfc2911] §4.4.25
	End user information for this Printer. (Example: "printer unavailable until 1pm due to preventive maintenance")				
PrinterMoreInfo		String	uri	D	[rfc2911] §4.4.7
	URI used to obtain information intended for end user consumption about this specific Printer. (Example: " http://www.company.com/printer/embeddedwebpage ")				
PrinterMoreInfoManufacturer		String	uri	D	[rfc2911] §4.4.10
	URI used to obtain more information for end user consumption about this type of device that this Printer represents. (Example: " http://www.xerox.com/go/xrx/template/012.jsp?Xcntry=USA&Xlang=en_US&prodID=7700 ", " http://www.lexmark.com/US/products/overview/0,1224,MjQ5fDE=,00.html ")				
PrinterName		String	Maxlength=127	D	[rfc2911] §4.4.4
	The end-user friendly name of this Printer object. (example: "Pete's Printer")				
PrinterState		String	type1 keyword	S	[rfc2911] §4.4.11
	Identifies the current state of the device(s) that this Printer represents (see Figure 4). (See "PrinterStateReasons" below) (Keywords: <i>Idle, Processing, Stopped</i>)				

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
PrinterStateMessage		String	Maxlength=1023	S	[rfc2911] §4.4.13
Information about the "printer-state" and "printer-state-reasons" elements in human readable text localized by the Printer according to the natural language supplied in the client's query request. (Example: "Printer stopped due to paper jam" for an English request)					
PrinterStateReasons	Yes	String	type2 keyword	S	[rfc2911] §4.4.12
Augments the "printer-state" element to give more detailed information about this Printer's state. Each keyword value may have a suffix to indicate its level of severity. The three suffixes (levels) are: "Report" (least severe), "Warning", and "Error" (most severe). Keywords without suffixes are assumed to be "Error" (most severe). See reference for semantics of defined keywords. (Keywords: AttentionRequired, ConnectingToDevice, CoverOpen, Deactivated, DeveloperEmpty, DeveloperLow, DoorOpen, FuserOverTemp, FuserUnderTemp, HoldNewJobs, InputTrayMissing, InterlockOpen, InterpreterResourceUnavailable, MarkerSupplyEmpty, MarkerSupplyLow, MarkerWasteAlmostFull, MarkerWasteFull, MediaEmpty, MediaJam, MediaLow, MediaNeeded, MovingToPaused, None, OpcLifeOver, OpcNearEol, Other, OutputAreaAlmostFull, OutputAreaFull, OutputTrayMissing, Paused, Shutdown, SpoolAreaFull, StoppedPartly, Stopping, TimedOut, TonerEmpty, TonerLow)					
PrinterUpTime		integer	1:MAX	S	[rfc2911] §4.4.29
The amount of time (in seconds) that this Printer has been up and running					
PrinterUriSupported	Yes	String	uri	D	[rfc2911] §4.4.1
Contains at least one URI for this Printer object. The PrinterUriSupported, UriAuthenticationSupported and the UriSecuritySupported are parallel elements. Each of these elements must have the same cardinality. The "i"th value of each of these elements describes the URI for the printer, the authentication mechanism used and the security method used. (Example: <i>ipp://www.company.com/printer</i>)					
QueuedJobCount		integer	0:MAX	S	[rfc2911] §4.4.24
The number of jobs that this Printer has accepted but has not yet completed.					
ReferenceUriSchemesSupported	Yes	String	UriScheme	D	[rfc2911] §4.4.27
Which URI schemes are supported by this Printer to retrieve Document This element must be supported if the Printer is capable of print by reference. (Example: <i>ftp, http</i>)					
RepertoiresSupported	Yes	String	Repertoire	D	[Repertoire] §3.1
Indicates the subsets of characters that are actually present in the Printer. (Example: IANA: <i>iso-8859-1, Unicode: Latin 1, Vendor: Oak Floral</i>)					
SubordinatePrintersSupported	Yes	String	Uri	D	[admin-ops] §7.1
Contains the URI of the immediate subordinate Printers associated with this Printer.					

Deleted: Other, None,

Printer Element Name	Multivalued	Syntax	Constraint	Group*	reference
Description (values)					
UriAuthenticationSupported	Yes	String	type2 keyword	D	[rfc2911] §4.4.2
The Client authentication mechanism that this Printer object uses to identify the user. (See PrinterUriSupported for additional information) (<i>Keywords: None, Requesting-UserName, Basic, Digest, Certificate</i>)					
UriSecuritySupported	Yes	String	type2 keyword	D	[rfc2911] §4.4.3
Identifies the security mechanisms used for accessing this Printer object. (See PrinterUriSupported for additional information) (<i>Keywords: None, Ssl3, Tls</i>)					
VersionsSupported	Yes	String	type2 keyword	D	[rfc2911] §4.4.14
The versions of the semantics that this Printer supports. (<i>Keywords: 1.0, 1.1, etc.</i>).					
WhichJobsSupported	Yes	String	type2 keyword	D	[prod-print2] §7.8
Contains the set of values that this Printer supports for the WhichJobs operation element that the client may supply in the Get-Jobs operation as a job filter. (<i>Keywords: Aborted, All, Canceled, Completed, NotCompleted, Pending, PendingHeld, Processing, ProcessingStopped</i>)					

8 Status Strings

This Appendix lists the status strings that the Printer returns in each action response.

Table 7 Status strings indicating some degree of success

Status String	Actions where status may occur
Reference	Description of status
SuccessfulOk	Any
Rfc2911	Action succeeded and no requested element were substituted or ignored.
SuccessfulOkConflictingElements	CreateJob, PrintJob, PrintUri, SendDocument, SendUri, ValidateDocument, ValidateJob
	Action succeeded but some elements were conflicting and have been substituted or ignored.
SuccessfulOkIgnoredOrSubstitutedElements	CreateJob, PrintJob, PrintUri, SendDocument, SendUri, ValidateDocument, ValidateJob
	Action succeeded but some unsupported elements were ignored or substituted.

Table 8 Status strings indicating error on the part of the Client

Status String	Actions where status may occur
	Description of status
ClientErrorBadRequest	Any
	Malformed syntax or constraint exceeded.

Status String	Actions where status may occur
Description of status	
ClientErrorCharsetNotSupported	Any
The charset is not supported.	
ClientErrorCompressionError	PrintJob, PrintUri, SendDocument, SendUri
An error occurred when uncompressing the Document Content.	
ClientErrorCompressionNotSupported	PrintJob, PrintUri, SendDocument, SendUri
The compression of the Document Content is not supported.	
ClientErrorConflictingElements	CreateJob, PrintJob, PrintUri, SendDocument, SendUri, SetDocumentElements, SetJobElements, SetPrinterElements, ValidateDocument, ValidateJob
Some supplied elements are conflicting. The Printer must return them in the Unsupported Elements group.	
ClientErrorDocumentAccessError	PrintUri, SendUri
An error occurred when the Printer attempted to access the Document Content through the URI supplied.	
ClientErrorDocumentFormatError	PrintJob, PrintUri, SendDocument, SendUri
An error occurred when interpreting the Document Content.	
ClientErrorDocumentFormatNotSupported	CreateJob, PrintJob, SendDocument, SendUri, ValidateDocument, ValidateJob
The document format is not supported.	
ClientErrorElementsNotSettable	SetDocumentElements, SetJobElements, SetPrinterElements
The supplied element(s) are not settable	
ClientErrorElementsOrValuesNotSupported	CreateJob, PrintJob, PrintUri, SendDocument, SendUri, SetDocumentElements, SetJobElements, SetPrinterElements, ValidateDocument, ValidateJob
The supplied element(s) or Values are not supported	
ClientErrorForbidden	Any
The Printer understood the request, but is refusing to fulfill it for authentication and/or authorization reasons. The client should not try again even with credentials.	
ClientErrorGone	Any
The target object is no longer available.	
ClientErrorJobNotAcceptingAdditionalDocuments	SendDocument, SendUri
Client attempted to add a Document to a Job after indicating the last document was sent	
ClientErrorNotAuthenticated	Any
The request requires user authentication. The client may try again with suitable authentication.	
ClientErrorNotAuthorized	Any

Status String	Actions where status may occur
Description of status	
The requester is not authorized to perform the request. The Client should not try again.	
ClientErrorNotFound	ActivatePrinter, CancelDocument, CancelJob, DeactivatePrinter, DeleteDocument, DisablePrinter, EnablePrinter, GetDocumentElements, GetDocuments, GetJobElements, GetJobs, GetPrinterElements, GetPrinterSettableElementValues, HoldJob, PromoteJob, ReleaseJob, ReprocessJob, RestartJob, ResumeJob, SendDocument, SendUri, SetDocumentElements, SetJobElements
The target object was not found.	
ClientErrorNotPossible	
The action cannot be performed, because of the state of the target object.	
ClientErrorRequestEntityTooLarge	Any
The request and/or the Document Content is too large.	
ClientErrorRequestValueTooLong	Any
An element value in the request is longer than the Printer supports.	
ClientErrorTimeout	SendDocument, SendUri
The client did not produce a subsequent request within the time that the Printer was prepared to wait.	
ClientErrorUnsupportedInterface	
PSI specific error indicating a request for information for a non-existent interface	
ClientErrorUriNotResolvable	
PSI specific error indicating inability of PSI Server to communicate with a Target Device	
ClientErrorUriSchemeNotSupported	PrintUri, SendUri
The URI scheme is not supported.	
ClientInvalidUri	
PSI specific error indicating the URI provided is not well formed	

Table 9 Status strings indicating error on the part of the Printer

Status String	Actions where status may occur
Description of status	
ServerErrorBusy	Any
A temporary error indicating that the Printer is too busy processing jobs and/or other requests. A Client should try again later.	
ServerErrorDeviceError	CreateJob, PrintJob, PrintUri, SendDocument, SendUri

Status String	Actions where status may occur
Reference	Description of status
	The Printer encountered a device error that causes it to be unable to accept a new request. For example, a paper jam for a Printer that doesn't spool and so cannot accept a new job submission until the jam is fixed.
ServerErrorInternalError	Any An unexpected internal error occurred.
ServerErrorJobCanceled	CancelDocument, CancelJob, DeleteDocument, SendDocument, SendUri, SetDocumentElements, SetJobElements The job has been canceled by an operator or aborted by the system. For example, while the Client is transmitting the Document Content to the Printer.
ServerErrorMultipleDocumentJobsNotSupported	SendDocument, SendUri The Printer doesn't support multiple document jobs and the client attempted to supply a second SendDocument or SendUri request. The Printer's "MultipleDocumentJobsSupported" Printer Description element is 'false'.
ServerErrorNotAcceptingJobs	CreateJob, PrintJob, PrintUri The Printer is not currently accepting jobs. Its "PrinterIsAcceptingJobs" Printer Description element is 'false'.
ServerErrorNotCancelableAtTargetDevice	CancelJob, CancelJob PSI specific error indicating the Print Service is unable to direct the Target Device to cancel the Job.
ServerErrorOperationNotSupported	Any unsupported action The Printer does not support the requested action.
ServerErrorPrinterIsDeactivated	Any except Activate-Printer The Printer has been deactivated using the Deactivate-Printer operation and is only accepting the Activate-Printer
ServerErrorServiceUnavailable	Any The Printer is unable to service the request at this time due to overloading or maintenance. The client should try again later as per the "message" Operation element.
ServerErrorTargetDeviceNotReachable	CreateJob PSI specific error indicating the Print Service is unable to communicate with the specified Target Device.
ServerErrorTargetDeviceUrlNotSupported	CreateJob PSI specific error indicating the Print Service does not support the specified Target Device.
ServerErrorTemporaryError	Any A temporary error such as a buffer full write error, a memory overflow, or a disk full condition.
ServerErrorTooManyDocuments	SendDocument, SendUri An attempt to create a Document in a Job failed because it exceeded the Printer's capacity for this Job at this time..
ServerErrorTooManyJobs	PrintJob, PrintUri, CreateJob An attempt to create a Job in a Job failed because it exceeded the Printer's

Status String	Actions where status may occur
Reference	Description of status
	capacity at this time..
ServerErrorVersionNotSupported	Any
	The Printer doesn't support the requested major version of the protocol and returns the closest version that it does support.

9 Change Log

12/1/03 PJZ Removed "Semantic Elements to be added" section, changed mapping references in tables from "(Was xxx)" to "(xx-xx in IPP)" and added clarification of PWG Semantic Model's relationship to the IPP model, Updated references

11/5/03 PJZ Aligned JobStateReasons and DocumentStateReasons values with PWG specifications, CIP4 and PWG Schema

10/31/03 PJZ Clarified MediaKey

10/24/03 PJZ Clarified MediaSize units, added PrinterStateReason. Updated boiler plate

8/20/03 PJZ cross checked tables and figures

8/15/03 PJZ Synched specification with [PWG5100.7], [override] and [PWG5100.5],

6/30/03 PJZ Added Overrides

4/21/03 PJZ Removed Tumble value from Sides

3/31/03 PJZ Cleaned up Naming of Classes, Elements and Values (§ 4.1) and IPP Mapping (§ 14). Fixed case of element values in tables

3/26/03 PJZ Updated with changes from Document Object Specification

3/21/03 PJZ Added Character Repertoire

3/17/03 PJZ Removed PSI specific actions, corrected list of excluded elements in appendix B

3/16/03 TNH/PJZ Updated with the Document Object specifications. Added CloseJob that PSI is using. Renamed SendData to SendDocumentData to indicate what data. Prefixed JobId, JobPrinterUri, and JobUri Document Description elements with Document, so no Document attributes have a Job prefix. Added the following Document Description elements: DocumentContainerSummary, DocumentCreatorApplicationName, DocumentCreatorApplicationVersion, DocumentCreatorOsName,

Deleted: <#>Semantic Elements to be added¶
<#>Color and Imaging (awaiting reference from CIP4/PWG)¶

Formatted: Bullets and Numbering

Deleted: [jobx]

Deleted: doc-obj

749 DocumentCreatorOsVersion, DocumentFormatDetected, DocumentFormatDeviceId,
750 DocumentFormatVersion, DocumentIdUri, DocumentMessage, ElementNaturalLanguage.

751 1/29/03 PJZ Incorporated comments from Face to Face preparing document for Last Call.
752 Updated abstract, introduction and terminology sections. Added section to capture known
753 semantic elements “waiting in the wings”. Sorted status strings alphabetically. Added PSI
754 specific actions and status strings. Corrected Job & Doc state transition diagrams.

755 1/13/03 PJZ Expanded on Processing Actual Element, Incorporated comments from
756 teleconference

757 11/1/02 PJZ Fixed up status code tables. The DocumentProcessing subgroups were
758 merged into the DocumentProcessing element. Moved fidelity elements to JobDescription.
759 Finished incorporating Prod-Print2 and rfc3381 elements. Cross checked figures tables and
760 associated schema. Added–Actual extension.

761 10/28/02 PJZ “XML”ified attributes and object & added IPP mapping information
762 describing change. Completed adding [admin-ops], [PWG5100.1]. Rationalized “Pages”
763 and “PageRanges”. Changed “State” groups to “Status” to avoid name collision with
764 “State” elements (e.g. “JobState”)

765 10/14/01 TNH Fixed some Figure caption problems. Instead of deprecating
766 AttributeFidelity, made it work with JobMandatoryAttributes. Added way to specify the
767 member attribute in a collection attribute (Attr.Member). Clarified PagesPerSubset as
768 combining all Input Documents into a single contiguous Input-Pages stream and then
769 subsetting it into Output Documents. Added GeneratedNaturalLanguageSupported from
770 RFC 2911.

771 10/07/02 PJZ Updated references. Added JobCoverFront, JobCoverBack, and natural
772 language elements. Reworked section 5.3.5 GetPrinterSettableAttributeValues. Corrected
773 Action table and section.

774 9/30/02 PJZ Began conversion of status string section to table. Corrected and updated
775 figures. Removed detailed IPP encoding section. Added globalization section

776 9/27/02 TNH Version 0.11: Spell checked, corrected some misspelled attribute names.,
777 Finished moving Compression and DocumentFormat from the Processing to the Document
778 Description tables. Improved the attributes descriptions, especially those that are related to
779 other attributes. Added the attributes and values from [prod-print2]. Added several
780 attributes from IPP documents that were missing for some reason. Corrected a number of
781 Maxlength values. Sorted the values of JobStateReasons, DocumentStateReasons, and
782 PrinterStateReasons, so easier to keep track of. Add References: [adm-ops], [prod-print2].

783 9/16/02 PJZ Added more definitions and document actions. Incorporated the comments
784 from teleconference and TH mail note. Updated references.

785 9/9/02 PJZ Final edits to ready document for review. Updated all figures and added
786 highlighting of sections to review.

787 9/1/02 PJZ Changes from email input and PWG meeting. Printer/Job/Document
788 Attribute groups broken out into State and Description groups

789 8/16/02 PJZ Changed Content back to document, Added PWG5100.1, PWG5100.2,
790 PWG5100.3, PWG5100.4, job-progress to model. Filled out document object, added "Job
791 Level" subcategory to Processing attributes

792 6/17/02 PJZ Added high level description of PWG Action semantics and Printer state
793 transitions. Returned VersionsSupported and OperationsSupported.

794 6/4/02 SAA Modified to split the Job Attributes into 3 categories:
795 1) Processing Attributes
796 2) Content Attributes
797 3) Job Attributes
798

799 The Processing Attributes were further split into 3 subcategories:
800 1) Rendering attributes
801 2) Imposition Attributes
802 3) Finishing Attributes

803 Added attributes from UPnP Print Basic service template: MediaSize, MediaType,
804 DeviceId attributes.

805 Removed references to Mandatory vs. Optional since a semantic model should not
806 dictate what is used or not used by the future solutions targeted at specific markets.
807 For example, UPnP picked specific attributes for the SOHO market and did not need
808 all of the Mandatory IPP attributes.

809 Modified Printer Description Attributes with the following:
810 1) Added in DeviceId.
811 2) Changed Document* to Content*.
812 3) Removed VersionsSupported and OperationsSupported since these are
813 dependent on the interface used in specific solutions.

814 5/29/02 PJZ Incorporated comments prior to initial release
815 5/26/02 TH detailed review of the draft
816 5/23/02 TH re-organize draft with comments from Melinda Grant
817 5/16/02 PJZ original draft
818

10 References

[actual] D. Carney, H. Lewis, "Internet Printing Protocol (IPP): "-actual" attributes", February 12, 2003, ftp://ftp.pwg.org/pub/pwg/ipp/new_ACT/pwg-ipp-actual-attrs-v03-021216.pdf, work in progress.

[prod-print2] T. Hastings, and D. Fullman, "Internet Printing Protocol (IPP): Production Printing Attributes - Set 2", to become a PWG IEEE-ISTO standard, work in progress, August 21, 2002, ftp://ftp.pwg.org/pub/pwg/ipp/new_PPE/pwg-ipp-prod-print-set2-draft-v0_1-020821.pdf

[PSI] D. Hall, A. Berkema, "PrinterWorking Group Print Service Interface 1.0", working draft to become a PWG IEEE-ISTO standard, work in progress, February 10, 2003, <ftp://ftp.pwg.org/pub/pwg/ps/wd/wd-psi10-20030210.pdf>

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

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

[PWG5100.3] IEEE-ISTO 5100.3-2001, "Internet Printing Protocol (IPP): Production Printing Attributes - Set1", February 12, 2001, K. Ocke, T. Hastings, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.3.pdf>

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

[PWG5100.5] D. Carney, T. Hastings, and P. Zehler, "Internet Printing Protocol (IPP): Document Object", October 31, 2003, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.5.pdf>, Candidate Standard.

[PWG5100.6] P. Zehler, K. Ocke and R. Herriot, "Internet Printing Protocol (IPP): Page Overrides", October 31, 2003, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.5.pdf>, Candidate Standard.

[PWG5100.7] T. Hastings, and P. Zehler, "Internet Printing Protocol (IPP): Job Extensions", October 31, 2003, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5100.8.pdf>, Candidate Standard.

[PWG5101.1] IEEE-ISTO 5101.1-2001 Media Standardized Names <work in progress>, <ftp://ftp.pwg.org/pub/pwg/standards/pwg5101.1.pdf>, .doc, .rtf for standardized names

[Repertoire] Working Draft: The Printer Working Group Standard for Character Repertoire Interoperability <work in progress>, March 17, 2003, E. Bradshaw <ftp://ftp.pwg.org/pub/pwg/Character-Repertoires/wd-pcr10-20030317.html>

Deleted: [doc-obj] D. Carney, T. Hastings, and P. Zehler, "Internet Printing Protocol (IPP): Document Object", August 8, 2003, ftp://ftp.pwg.org/pub/pwg/ipp/new_DOC/wd-ippdoc10-20030808.pdf work in progress.¶
[jobx] T. Hastings, and P. Zehler, "Internet Printing Protocol (IPP): Job Extensions", August 8, 2003, ftp://ftp.pwg.org/pub/pwg/ipp/new_JOB/X/wd-ippjobx10-20030808.pdf, work in progress.¶
[override] P. Zehler, K. Ocke and R. Herriot, "Internet Printing Protocol (IPP): Page Overrides", August 8, 2003,, work in progress.¶

Deleted: [prod-print2] T. Hastings, and D. Fullman, "Internet Printing Protocol (IPP): Production Printing Attributes - Set 2", to become a PWG IEEE-ISTO standard, work in progress, August 21, 2002, ¶
[PSI] D. Hall, A. Berkema, "PrinterWorking Group Print Service Interface 1.0", working draft to become a PWG IEEE-ISTO standard, work in progress, February 10, 2003, <ftp://ftp.pwg.org/pub/pwg/ps/wd/wd-psi10-20030210.pdf>¶

Formatted: Space Before: 12 pt

- 855 [rfc1123] RFC 1123 " Requirements for Internet Hosts -- Application and Support ", October 1989,
856 Branden, R. , <ftp://ftp.rfc-editor.org/in-notes/rfc1123.txt>
- 857 [rfc2046] RFC 2046 "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types",
858 November 1996, N. Freed, and N. Borenstein, <ftp://ftp.rfc-editor.org/in-notes/rfc2046.txt>
- 859 [rfc2048] RFC 2048 "Multipurpose Internet Mail Extension (MIME) Part Four: Registration
860 Procedures", November 1996, N. Freed,, J. Klensin and J. Postel, [ftp://ftp.rfc-editor.org/in -
861 notes/rfc2048.txt](ftp://ftp.rfc-editor.org/in-notes/rfc2048.txt)
- 862 [rfc2911] RFC 2566 "Internet Printing Protocol/1.0 Model and Semantics", March 1999 and RFC
863 2911 "Internet Printing Protocol/1.1 Model and Semantics", September 2000, T. Hastings,
864 R. Herriot, R. deBry, S. Isaacson, P. Powell, <ftp://ftp.rfc-editor.org/in-notes/rfc2911.txt>
- 865 [rfc3380] "Internet Printing Protocol (IPP): Job and Printer Set Operations", September 2002, T.
866 Hastings, R. Herriot, C. Kugler, and H. Lewis, <ftp://ftp.rfc-editor.org/in-notes/rfc3380.txt>
- 867 [rfc3381]"Internet Printing Protocol (IPP): Job Progress Attributes", September 2002, T. Hastings,
868 H. Lewis, and R. Bergman, <ftp://ftp.rfc-editor.org/in-notes/rfc3381.txt>

Formatted: Bullets and Numbering

869 **11 Author's Addresses**

Peter Zehler Xerox Corporation 800 Phillips Road MS/128-30E Webster, NY 14580 Phone: 585 265-8755 Fax: 585-422-7691 e-mail: pzehler@crt.xerox.com	Tom Hastings Xerox Corporation 701 S. Aviation Blvd. MS/ESAE-242 El Segundo, CA 90245 Phone: 310 333-6413 e-mail: thastings@cp10.es.xerox.com	Shivaun Albright Hewlett Packard e-mail: shivaun_albright@hp.com
---	--	---

Formatted: Bullets and Numbering

872 **11.1 Other Participants**

Alan Berkema – Hewlett Packard
 Lee Farrell - Canon Information Systems
 Melinda Grant - Hewlett Packard
 Harry Lewis - IBM
 Gail Songer - Netreon
 William Wagner - NetSilicon/DPI

Elliott Bradshaw, Oak Technology
 Don Fullman - Xerox
 David Hall - Hewlett Packard
 Ira McDonald – High North
 Robert Taylor - Hewlett Packard

874 **12 Appendix A – UPnP Definitions**

875 **12.1 DeviceId**

876 The value of this variable MUST exactly match the IEEE 1284-2000 Device ID string, except the
877 length field MUST not be specified.. The value is assigned by the Printer vendor and MUST NOT
878 be localized by the Print Service.

879 The IEEE 1284-2000 Device ID is a length field followed by a case-sensitive string of ASCII
880 characters defining peripheral characteristics and/or capabilities. For the purposes of this
881 specification, the length bytes MUST NOT be included. The Device ID sequence is composed of a
882 series of keys and values of the form:

883 key: value {,value} repeated for each key

884 As indicated, each key will have one value, and MAY have more than one value. The minimum
885 necessary keys (case-sensitive) are MANUFACTURER, COMMAND SET, and MODEL. (These
886 keys MAY be abbreviated as MFG, CMD, and MDL respectively.) Each implementation MUST
887 supply these three keys and possibly additional ones as well. Each key (and each value) is a string
888 of characters. Any characters except colon (:), comma (,), and semi-colon (;) MAY be included as
889 part of the key (or value) string. Any leading or trailing white space (SPACE[x'20'], TAB[x'09'],
890 VTAB[x'0B'], CR[x'0D'], NL[x'0A'], or FF[x'0C']) in the string is ignored by the parsing program
891 (but is still counted as part of the overall length of the sequence).

892 An example ID String, showing optional comment and active command set keys and their
893 associated values (the text is actually all on one line):

```
894
895 MANUFACTURER:ACME Manufacturing;
896 COMMAND SET:PCL,PJL,PS,XHTML-Print+xml;
897 MODEL:LaserBeam 9;
898 COMMENT:Anything you like;
899 ACTIVE COMMAND SET:PCL;
```

900

901 (See IEEE 1284-2000 clause 7.6)

902 Note: One of the purposes of the DeviceId variable is to select a printer driver for those clients that
903 need a printer driver. The values of the COMMAND SET key are interpreted by the printer driver
904 provided by the vendor and so are vendor-defined, rather than being standardized.

Formatted: Bullets and Numbering

905 **13 Appendix B – IPP Mapping**

906 **13.1 Changes to remove some IPP specific aspects**

907 This section lists some changes to remove some IPP specific aspects from the PWG Semantic
908 Model.

1. IPP enumerations use their well-known string name instead of the integer enumeration. This applies not only to IPP attributes but also to IPP Operations.
2. Any IPP attribute name containing “ipp” has had the “ipp” removed.
3. All IPP attribute and operation keywords have the substring “attribute” replaced with “element”.
4. All IPP operation, status codes, attribute, and attribute value keyword names have had the first letter capitalized and the ‘-’ character removed and the character following the ‘-’ has been capitalized. (All mixed case PWG Semantic Model keywords can be interpreted without regard to case.)
5. Certain elements prefixed with “Job” that apply to either Jobs or Documents has had the “Job” prefix removed. (This mapping clarified in the tables in section 7)
6. The IPP attribute value keywords defined in other registries remain unchanged. Note that the PWG defined media keyword values for the Semantic Elements MediaType, MediaColor, MediaSizeName and Media use the values as specified in PWG 5101.1.
7. The types of the attributes have been simplified. All keyword, text, name, DateTime, uri, UriScheme, enum and mimeType types are represented by the simple string type. The “Constraint” column in section 7 clarifies the mapping of the string types in the Semantic Model to their original types (e.g. JobState type:string constraint: Type 1 keyword). Note that IPP Attributes of type Keyword or Name are represented as strings with a Type 2 or 3 keyword constraint
8. The “1setOf X” types are represented as the base type and the “Multivalued” field in the tables set to “Yes”.
9. Integers and Boolean types remain the same.
10. Any applicable constraints placed on the attribute values has been noted in the tables.

Formatted: Bullets and Numbering

The term “keyword” continues to be used for string values enumerated as part of the PWG Model. The term “object” is sometimes changed to “data class”. The term “operation” has been changed to “action” to use the term more frequently used with XML.

The following IPP attributes are not included: operation-id, attributes-charset, request-id.

Formatted: Bullets and Numbering

13.2 Attribute Group Mapping

IPP Actions may contain a number of parameters. The first parameter is always the Operation Attributes for the Action. The IPP Operation Attributes have been mapped to the Printer and Job Description Element Groups.

The IPP Printer Description Attributes map to the PWG Printer Status Elements and Printer Description Elements. The IPP Job Description Attributes map to the PWG Job Status Elements and Job Description Elements.

The IPP Job Template Attributes map to the PWG Job Processing Elements and Document Processing Elements. IPP does not differentiate between the PWG Processing Elements subgroups of Rendering, Imposition and Finishing Elements.