



A Project of the PWG-IPP Working Group

# Printer Working Group (PWG): Semantic Model

IEEE-ISTO Printer Working Group  
Standard XXXX.X-200X

September ~~169~~, 2002

Version 0.~~1009~~

## 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.

## PWG Semantic Model

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24

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268

269 **1 Introduction**

270

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

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

279 **ISSUE-01: Need a real Terminology section badly, right here. Explain Processing Attributes**  
 280 **(supplied only in a request), Production Instructions (represented by Processing Attributes and PDL**  
 281 **content), Data Classes, Job Ticket, operation (or action?), object, etc.— Is must, should, and may to**  
 282 **be used?**

283 **2 Terminology**

<u>Action</u>	<u>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.</u>
<u>Data Class</u>	<u>A template for data describing an object and representing its state. Each attribute in the data class represents a semantic element of the associated object.</u>
<u>Document</u>	<u>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.</u>
<u>Document Processing Attributes</u>	<u>Document Attributes supplied by the Print Client to direct the printing of a Document that the Printer copies to the Document. Examples: Copies, Finishings, Media, NumberUp.</u>
End User	A print client that has no special rights on the printer. The End User typically <del>submit</del> <u>submits</u> jobs. The End User is allowed to query the printer, jobs and documents and control jobs based on policy.
<u>Impression</u>	<u>Everything printed on a single side of a media</u>
<u>Job</u>	<u>An object that represents the submission of work for the printer. It contains descriptive and state information as well as default Document Processing Attributes. Jobs contain one or more Documents</u>
<u>Job Description Attributes</u>	<u>Job Attributes supplied by the Print Client to describe the Job. Examples: JobName, RequestingUserName, JobRecipient</u>
<u>Job Processing Attributes</u>	<u>Job Attributes 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.</u>
<u>Object</u>	<u>A entity that instantiates a data class and implements the appropriate actions.</u>
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.

## PWG Semantic Model

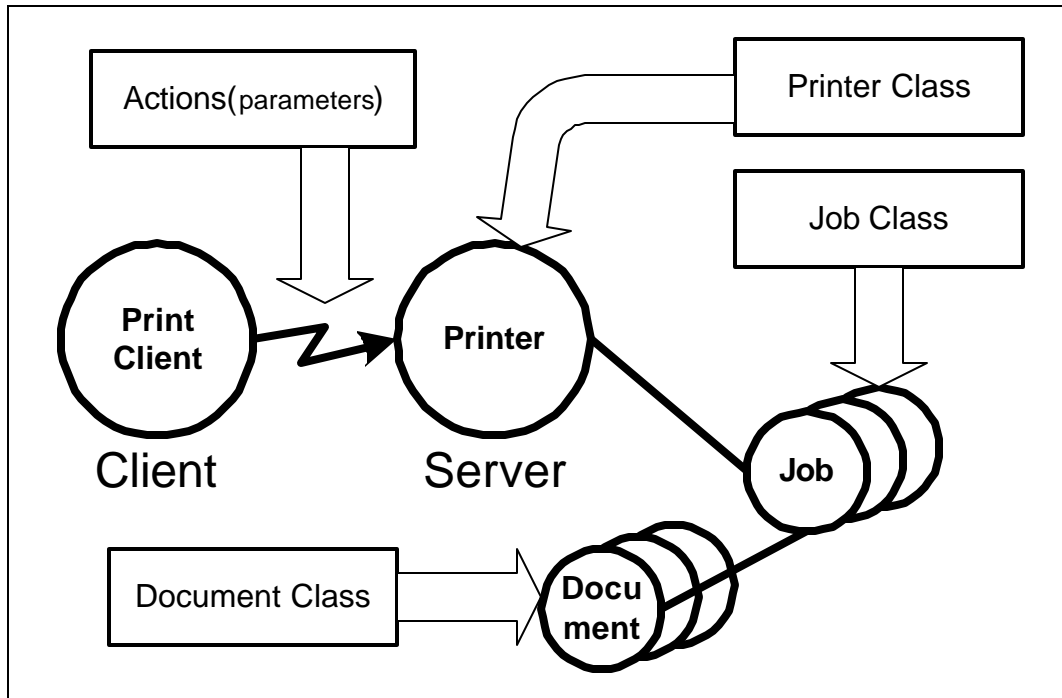
<u>MediaSheet</u>	A sheet of paper, or other material, used for printing
<u>Page</u>	<u>A logical entity that represents the information contained on a single side of a sheet of media. Note that this is the electronic form and that multiple pages can be rendered into a single impression through N-Up printing</u>
<u>PDL</u>	<u>(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®).</u>
<u>Print Client</u>	<u>An application or network entity that performs actions</u>
<u>Printer</u>	<u>An object that represents a printing device, set of printing devices, or a printing service and contains zero or more Jobs</u>
<u>Type 1 keyword</u>	<u>All the values are defined in the specification. Additional values require a new specification.</u>
<u>Type 2 keyword</u>	<u>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.</u>
<u>Type 3 keyword</u>	<u>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.</u>

284

### 285 **3 Model Overview**

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

## PWG Semantic Model



293

294

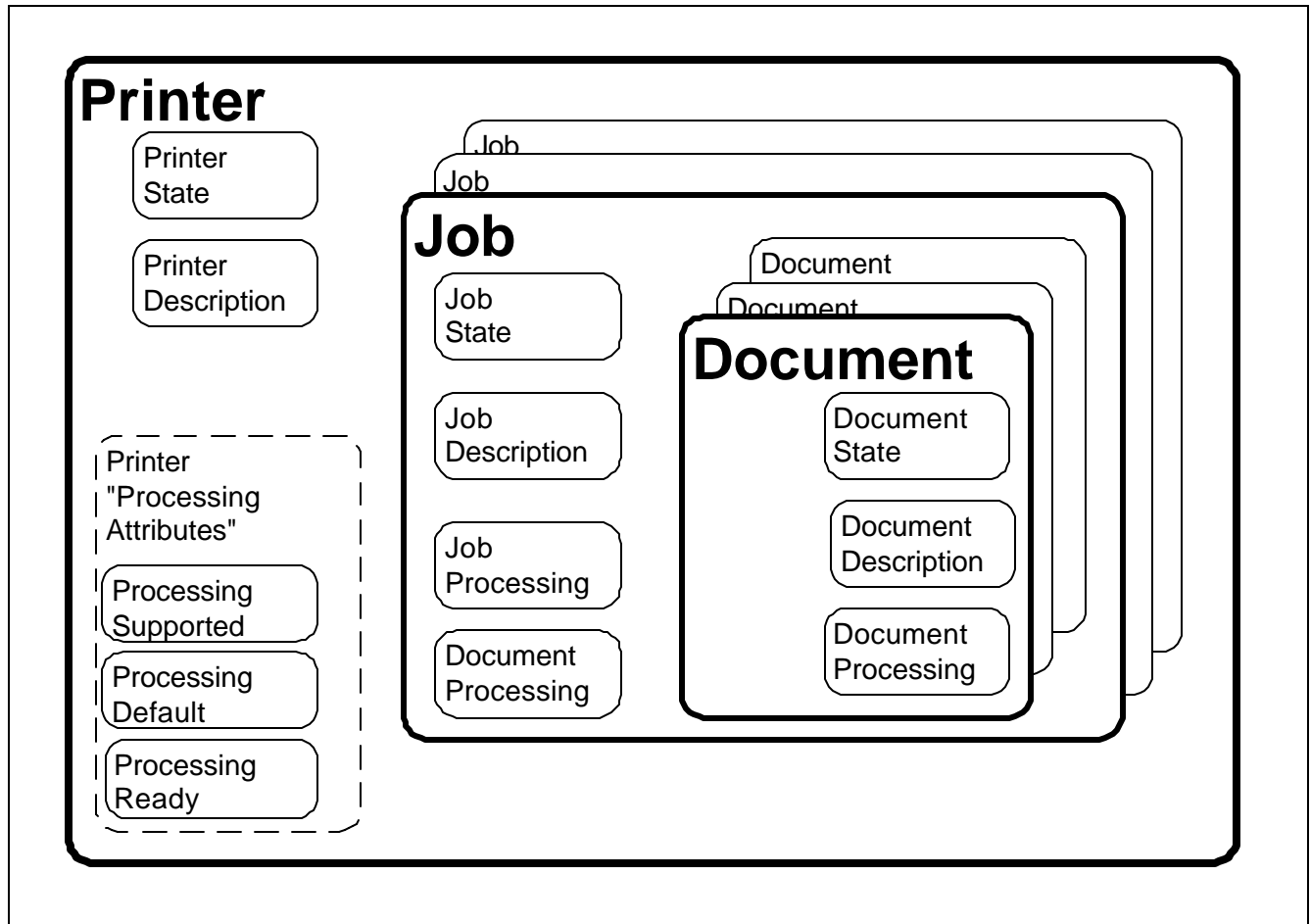
**Figure 1 Model Overview**

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

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

## 301 **4 Data Classes**

302 This section describes the data classes in the PWG semantic model. Some of the classes are taken  
303 from the model and semantics of IPP [rfc2911]. ~~Figure 2~~ **Figure-2** Shows the data classes, their  
304 attribute groups and the containment relationship between the classes



305  
306

307

Figure 2 Data Classes

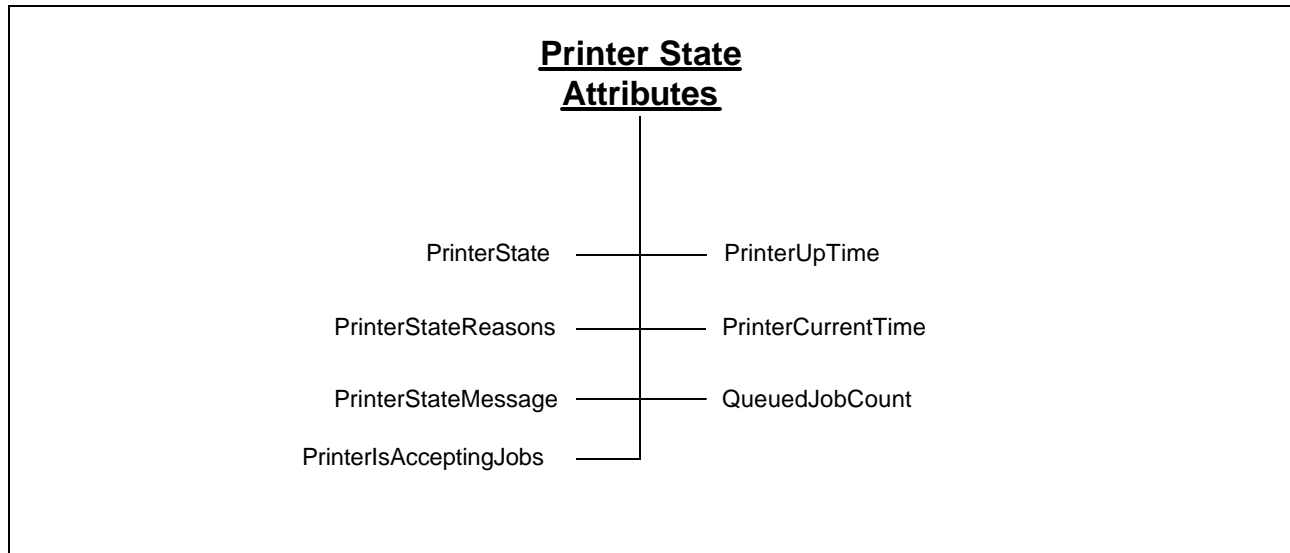
308 **4.1 Printer Object Class**

309 The Printer class is represented by a collection of attributes as shown in [Figure 2](#)~~Figure-2~~. The  
 310 Printer Attributes are presented in detail in [Table 6](#)~~Table-6~~. The printer object also contains  
 311 attributes that describe the valid processing attribute values. (See section 4.3.2 for processing  
 312 attributes) The Printer class is the container for Jobs.

313 **4.1.1 Printer State Attributes**

314 [Figure 3](#)~~Figure-3~~ below shows the Printer State Attributes. These attributes represent the state of  
 315 the printer such as the number of jobs or existing error conditions. ~~Automata primarily control~~  
 316 ~~The~~ values of th attributes in this group are changed by automata. End Users cannot directly  
 317 modify their values. The End User can affect the values of these attributes through actions (e.g.  
 318 PausePrinter can change the value of PrinterIsAcceptingJobs”). The semantics of the attributes are  
 319 summarized in [Table 6](#)~~Table-6~~.

320



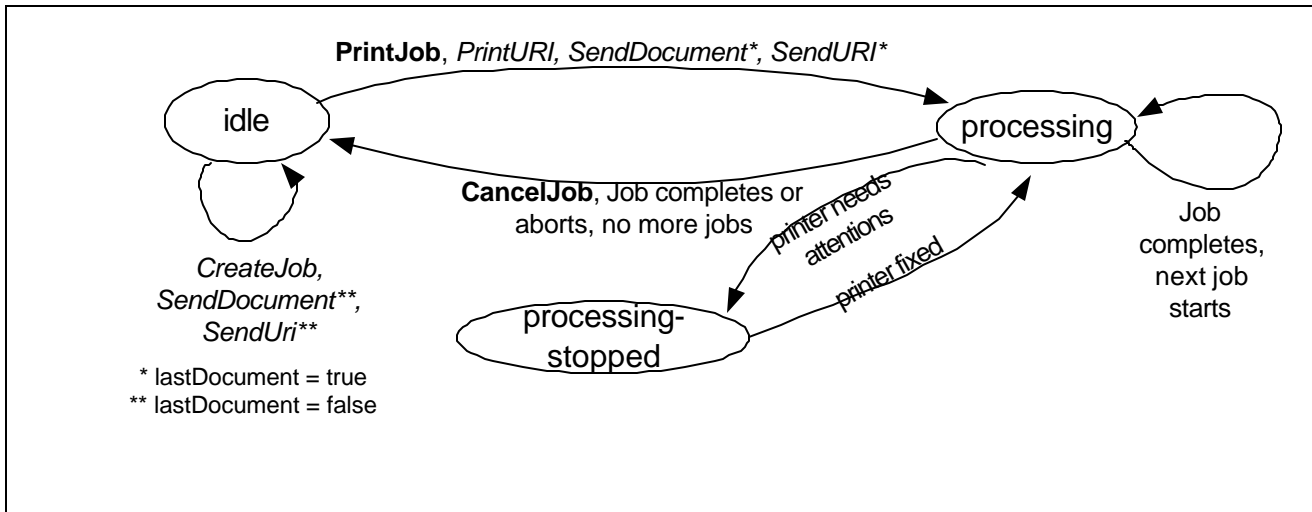
321  
322

323

**Figure 3 Printer State Attributes**

324 **4.1.1.1 The Printer Life Cycle**

325 The “PrinterState” attribute is one of the most important Printer Description attributes. **Error!**  
 326 **Reference source not found.** [Figure 4](#) shows the values of the “PrinterState” attribute and the  
 327 Printer life cycle as affected by actions on the Printer and job processing.



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330

**Figure 4 - The "PrinterState" attribute and the Printer Life Cycle**

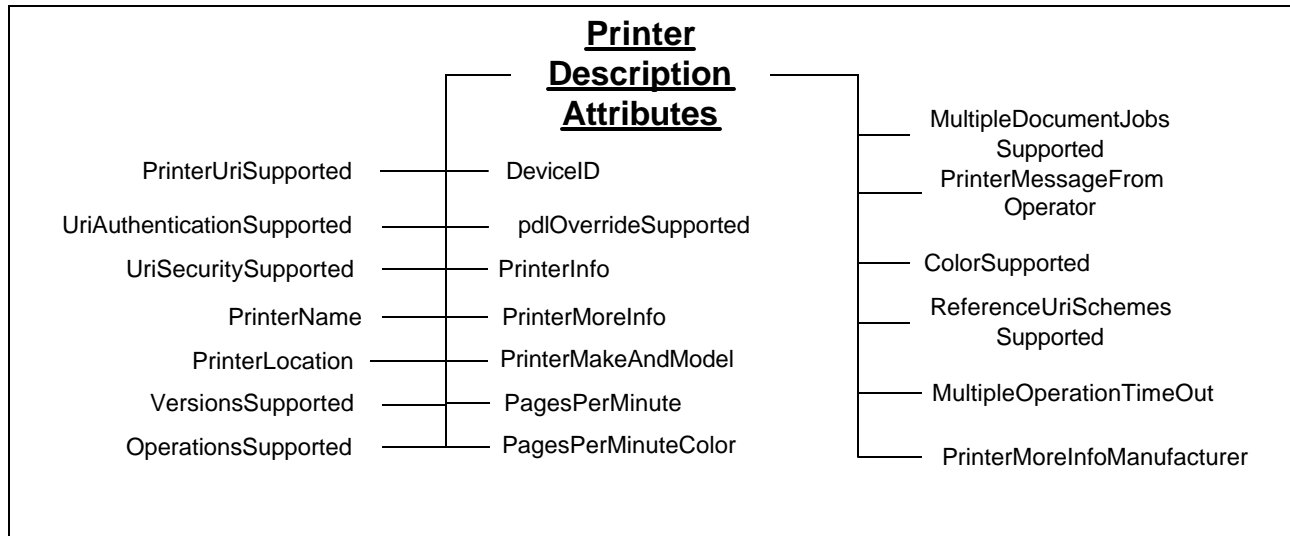
331 **4.1.2 Printer Description Attributes**

332 [Figure 5](#) below shows the Printer Description Attributes. These attributes contain  
 333 information that describes the printer such as its make, where it's located and its speed. An  
 334 automaton controls some of the attributes in this group (e.g. “PagesPerMinute”). Others attributes

## PWG Semantic Model

335 in this group can be modified by Operators or Administrators (e.g. “PrinterName”). The semantics  
 336 of the attributes are summarized in [Table 6](#)~~Table-6~~.

337



338  
339

**Figure 5 Printer Description Attributes**

340

### 4.1.3 Printer Defaults, Supported and Ready Processing Attributes

341

342 See section 4.3.2 below for the attributes that may comprise these groups. Processing Attributes  
 343 are the union of Job Processing Attributes and Document Processing Attributes. If a Processing  
 344 attribute (e.g. Media) is supported, the Printer must have an associated Processing Supported  
 345 Attribute (e.g. MediaSupported) and Processing Default Attribute (e.g. MediaDefault) Printer  
 346 attribute. There may be an associated Processing Ready Attribute (e.g. MediaReady) Printer  
 347 attribute. By retrieving the Printer Processing attributes, a Client can determine all the Job and  
 348 Document Processing attributes and values that may be used in creating Jobs and Documents.

#### 4.1.3.1 Processing Supported Attributes

349

350 These attributes list all the currently configured valid values for each Job Processing Attribute and  
 351 Document Processing Attribute. Though the Printer is configured to support the feature, human  
 352 intervention may be required to process the job (e.g. selected paper may have to be loaded into a  
 353 tray). The syntax for Processing Attributes Supported is multi-valued when the associated  
 354 processing attribute is a string. When syntax of the processing attribute is an integer, the syntax of  
 355 the corresponding Processing Supported Attribute is usually RangeOfInteger which indicates the  
 356 minimum and maximum values supported by the Printer. However, there are some exceptions as  
 357 indicated in [Table 1](#)~~Table-1~~.

**Table 1-Integer syntaxes whose ProcessingAttributeSupported syntax isn't RangeOfInteger**

358

“xxx” attribute name	“xxx” syntax	“xxxSupported” syntax
----------------------	--------------	-----------------------

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JobPriority	Integer	Integer (Max value)
Copies	Integer	Integer (Max value)
PageRanges	RangeOfInteger (multivalued)	Boolean (are PageRanges supported)

359

### 360 **4.1.3.2 Processing Default Attributes**

361 These attributes give the default value for the associated processing instruction if the Processing  
362 Attribute of the job and document are not supplied and the instructions is not embedded in the  
363 PDL. The syntax for the Processing Default Attributes is the same as the corresponding Processing  
364 Attribute. The only exception is that the PageRanges attribute does not have a PageRangesDefault  
365 attribute.

### 366 **4.1.3.3 Processing Ready Attributes**

367 These attributes give the features available without human intervention. The syntax for a  
368 Processing Ready Attribute is the same as the corresponding Processing Attribute.

## 369 **4.2 Job Object Class**

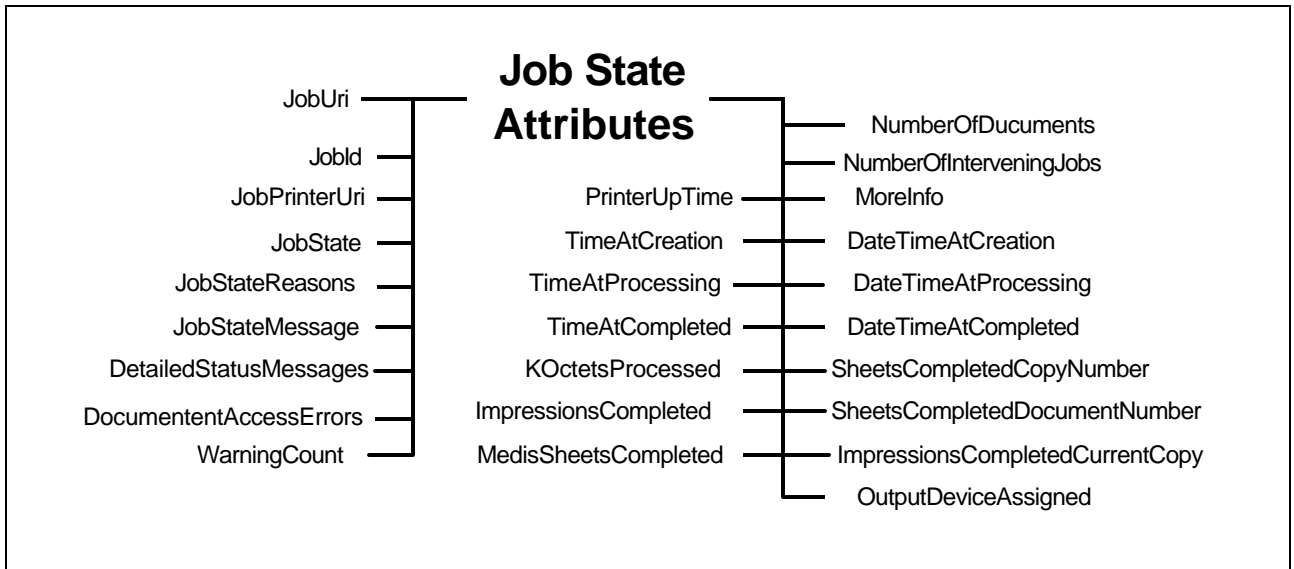
370 The Job object class is represented by a collection of attributes divided into four groups as shown  
371 in [Figure 2](#)~~Figure-2~~. The Job class also contains the document class

- 372 Job State Attributes – See Section 4.2.1
- 373 Job Description Attributes – See section 4.2.2.
- 374 Job Processing Attributes – See section 4.4.1
- 375 Document Processing Attributes – See section 4.4.2

### 376 **4.2.1 Job State Attributes**

377 [Figure 6](#)~~Figure-6~~ below shows the Job State Attributes. Automata primarily control the attributes in  
378 this group. End Users cannot directly modify their values. The End User can affect the values of  
379 these attributes through actions (e.g. CancelJob can change the value of JobStateReasons”). The  
380 semantics of the attributes are summarized in [Table 4](#)~~Table-4~~.





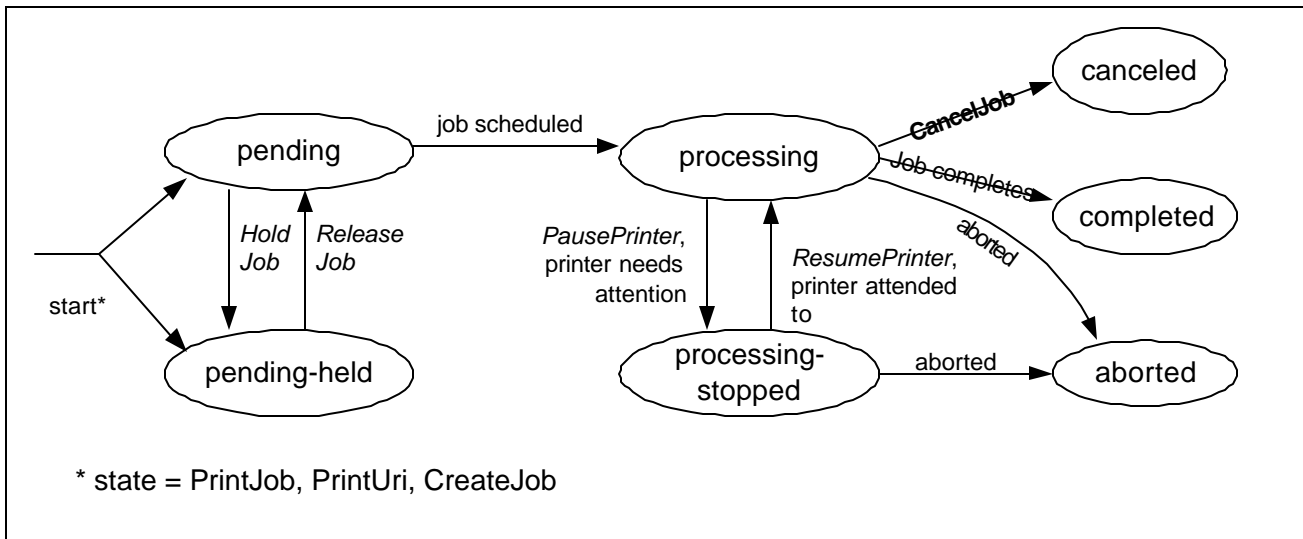
381  
382

383

Figure 6 Job State Attributes

384 **4.2.1.1 The Job Life Cycle**

385 The “JobState” attribute is one of the most important Job State attributes. ~~Figure 7~~Figure-7 shows  
386 the values of the “JobState” attribute and the Job life cycle as affected by actions on the Job,  
387 Printer, and job processing.



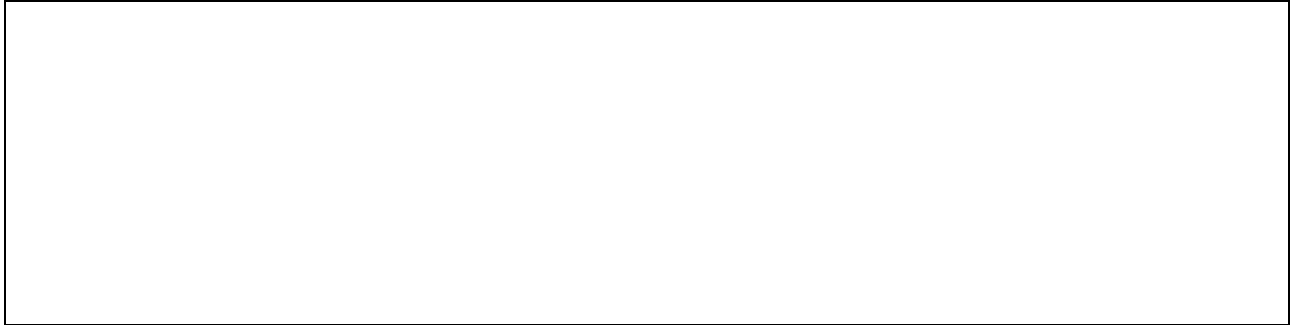
388

389

Figure 7 The "JobState" Job Attribute and the Job object life Cycle

390 **4.2.2 Job Description Attributes**

391 ~~Figure 8~~Figure-8 below shows the Job Attributes. These attributes contain information from the  
392 End User at Job creation that describes the Job such as its name. Automaton may modify the value  
393 of some of the attributes in this group (e.g. “KOctets”) if more reliable data is obtained. The  
394 semantics of the attributes are summarized in ~~Table 4~~Table-4.



395

396

Figure 8 Job Description Attributes

397 **4.3 Document Object Class**

398 The Document object class is represented by a collection of attributes divided into Three groups as  
 399 shown in [Figure 2](#)~~Figure-2~~. The Document class contains the document class

400 Document State Attributes – See Section 4.3.1.

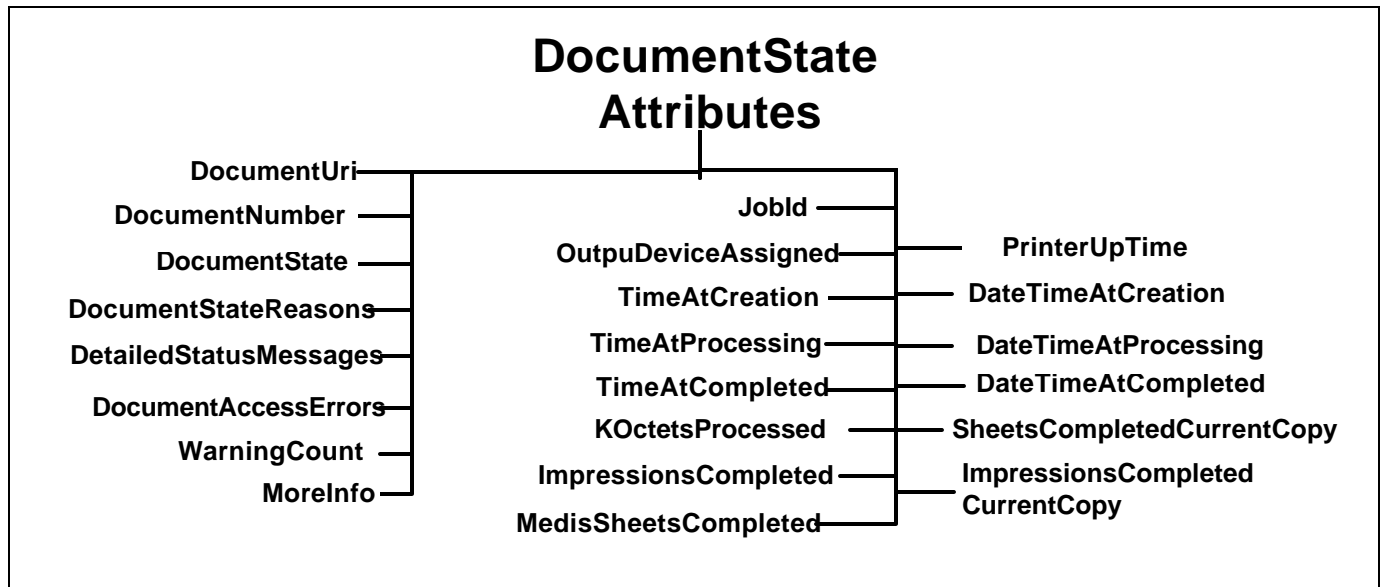
401 Document Description Attributes – See section [4.3.2](#).

402 Document Processing Attributes – See section 4.4.2

403 **4.3.1 Document State Attributes**

404 [Figure 9](#)~~Figure-9~~ shows the Document State Attributes. Automata primarily control the attributes  
 405 in this group. End Users cannot directly modify their values. The End User can affect the values  
 406 of these attributes through actions (e.g. CancelDocument can change the value of  
 407 DocumentsState”). The semantics of the attributes are summarized [Table 5](#)~~Table-5~~

408



409

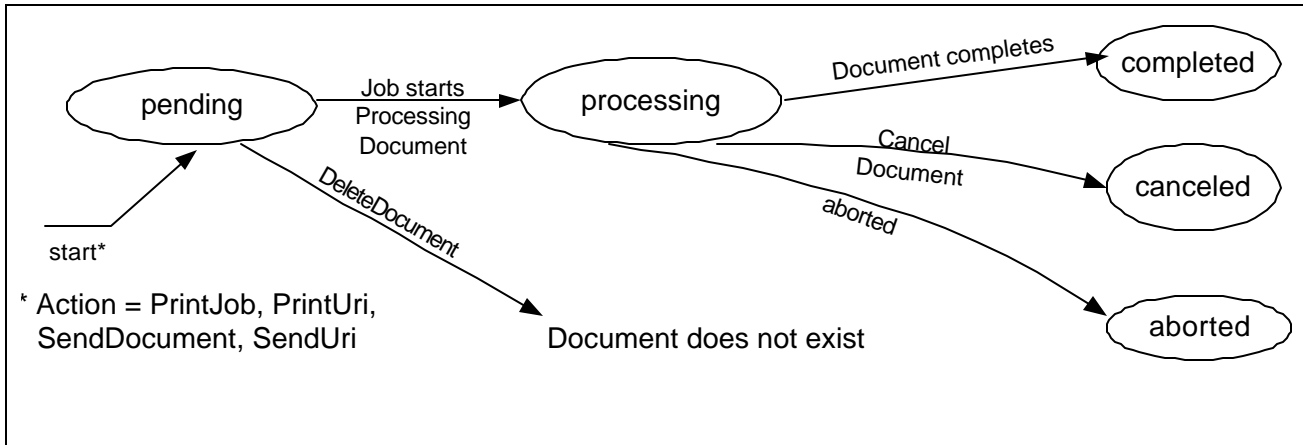
410

Figure 9 Document State Attributes

411

412 **4.3.1.1 The Document Life Cycle**

413 The “DocumentState” attribute is one of the most important Document State Attributes. [Figure](#)  
 414 [10Figure-10](#) shows the values of the “DocumentState” attribute and the Document life cycle as  
 415 affected by Actions and job processing. Documents are not active objects and their life cycle is  
 416 closely tied to the lifecycle of a Job. Documents basically have three states. The first is waiting to  
 417 be processed by a Job (i.e. pending). The second state is from the time the Job first starts  
 418 processing the Document(i.e processing) and until it reaches its terminating state. The last state for  
 419 a Document is its terminal state (i.e. completed, canceled, aborted)



420  
421

422 **Figure 10 "DocumentState" Attribute and Document object life Cycle**

423 **4.3.2 Document Description Attributes**

424 [Figure 9Figure-9](#) shows the Document Description Attributes. These attributes contain information  
 425 from the End User at Document creation that describes the document such as its size. Automaton  
 426 may modify the value of some of the attributes in this group (e.g. “KOctets”) if more reliable data  
 427 is obtained. The semantics of the attributes are summarized in [Table 5Table-5](#)



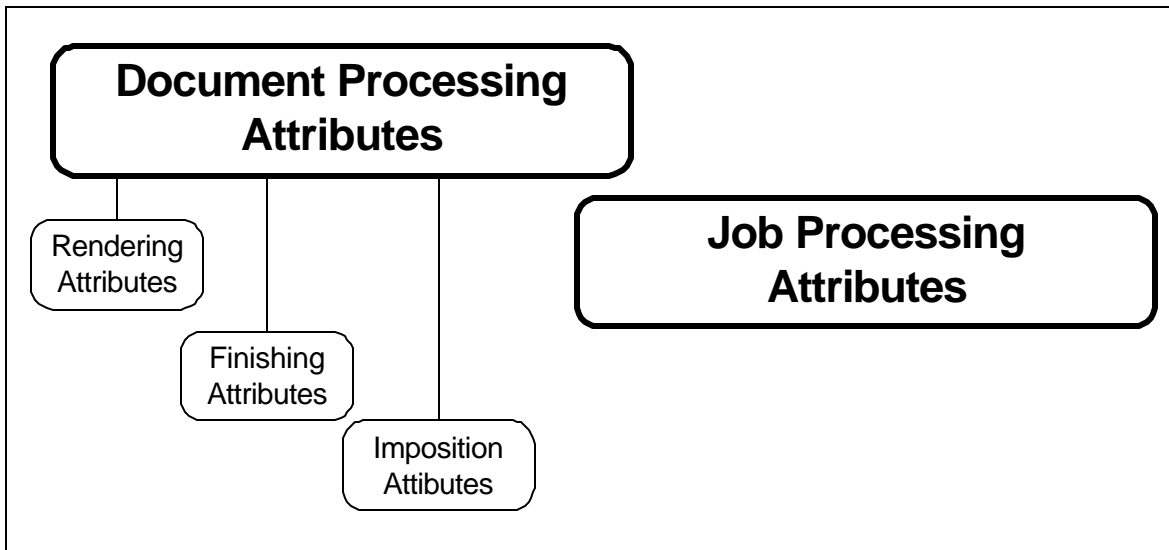
428  
429

**Figure 11 Document DescriptionAttributes**

430 **4.4 Processing Attributes**

431 Processing attributes are instructions to be applied to jobs and documents. They indicate such  
 432 things as the priority for scheduling a job or the number of copies for a document. A Printer should  
 433 support each Processing Attribute that represents a feature of the Printer. The Processing attributes  
 434 are split into two groups. One groups applies to Jobs and the other to Documents. The Document  
 435 Processing group contains three sub-groups. (See ~~Figure 12~~Figure 12)

- 436 1) Job Processing Attributes are processing instructions applied the Job level. See section  
 437 4.4.1.  
 438 2) Document Processing Attributes are specific to documents. See section 4.4.2.



439

440

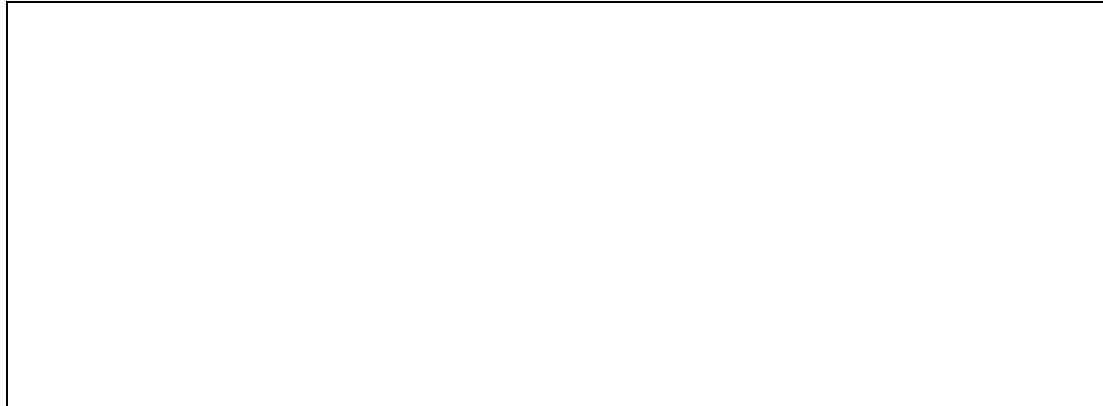
**Figure 12 - Processing Attribute Groups**

441 **4.4.1 Job Processing Attributes**

442 ~~Figure 13~~Figure 13 shows the Job Processing Attributes. These attributes apply to the job as a  
 443 whole as opposed to each document in the job. The semantics of the attributes are summarized in  
 444 ~~Table 3~~Table 3 along with a brief description of each attribute.

445

446



447

448

**Figure 13 Job Processing Attributes**

449 **4.4.2 Document Processing Attributes**

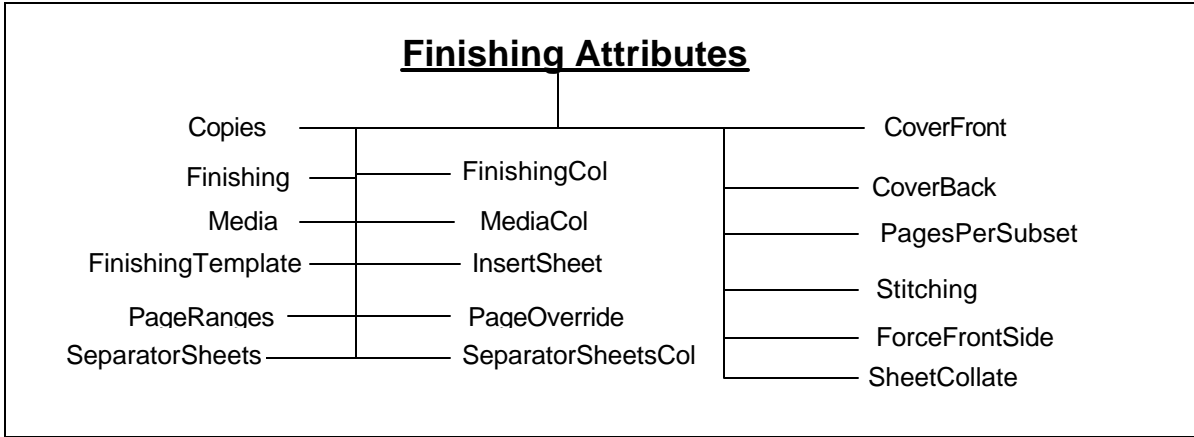
450 Document Processing Attributes are attributes that are applied to documents (e.g. “copies”). The  
 451 Document Processing Attributes can be applied at the Job or Document level. If the attributes are  
 452 applied at the Job level they are the default values for all the Documents in the Job. If the attributes  
 453 are applied at the Document level they apply only to that Document. The semantics of the  
 454 Processing attributes are summarized in [Table 3](#)~~Table-3~~. The Document Processing attributes are  
 455 split into three groups as shown in [Figure 12](#)~~Figure-12~~:

- 456 1) Finishing Attributes define how multiple physical sheets are manipulated to create final  
 457 output products. See section 4.4.2.1.
- 458 2) Imposition Attributes identify how the logical pages look on the output media. See section  
 459 4.4.2.2.
- 460 3) Rendering Attributes determine the quality and resolution of how marks are made on the  
 461 page. See section 4.4.2.3.

462 **4.4.2.1 Finishing Attributes**

463 [Figure 14](#)~~Figure-14~~ shows the Finishing Attributes. Finishing Attributes define how multiple  
 464 physical sheets are manipulated to create final output products. See [Table 3](#)~~Table-3~~ for summary of  
 465 attribute semantics.

466



467  
468

469

**Figure 14 Finishing Attributes**

470 **4.4.2.2 Imposition Attributes**

471 [Figure 15](#) shows the Imposition Attributes. Imposition Attributes identify how the logical  
472 pages look on the output media. See [Table 3](#) for summary of attribute semantics.

473



474

475

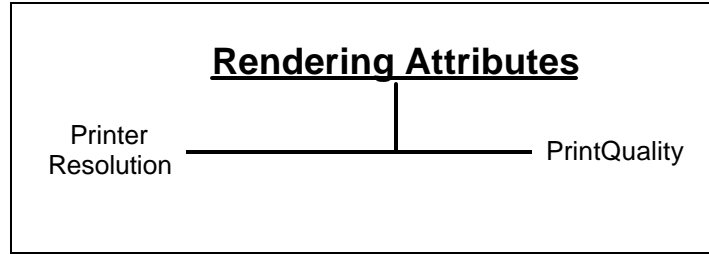
476

**Figure 15 Imposition Attributes**

477 **4.4.2.3 Rendering Attributes**

478 [Figure 16](#) shows the Rendering Attributes. Rendering Attributes determine the quality  
479 and resolution of how marks are made on the page. See [Table 3](#) for summary of attribute  
480 semantics.

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481

482

483

Figure 16 Rendering Attributes

## 5 Actions

485 The PWG has defined a number of operations that affect Printers, Jobs and their document. Below  
 486 is a description of the semantics of these Actions. Naturally different protocol bindings will use  
 487 differing subsets of the Actions or define new ones. Another difference will be the precise  
 488 parameters to the Actions. Below is an abstract definition of the Actions. **ISSUE 2: Need to add**  
 489 **Document actions (GetDocumentAttribute, CancelDocument, CancelCurrentDocument,**  
 490 **DeleteDocument, GetDocuments, SetDocumentAttribute, ValidateDocument from PSI and PWG**  
 491 **Document object work in progress.**

492 Action Summary

493 This table summarizes the actions defined for the Job and Printer. See section 4.4.2 for more  
 494 details.

Job Creation and Document submission	Job <u>and Document</u> Control	Status and Information access	Printer Control
PrintJob	CancelJob	GetJobs	PausePrinter
PrintUri	HoldJob	GetPrinterAttributes	ResumePrinter
CreateJob	ReleaseJob	GetJobAttributes	PurgeJobs
SendDocument	RestartJob	<u>GetDocuments</u>	<u>DisablePrinter</u>
SendURI	<u>SetJobAttributes</u>	<u>GetDocumentAttributes</u>	<u>EnablePrinter</u>
ValidateJob	<u>SetDocumentAttributes</u>	<u>GetPrinterSupportedValues</u>	<u>SetPrinterAttributes</u>
<u>ValidateDocument</u>	<u>CancelDocument</u>		
	<u>DeleteDocument</u>		

495

Table 2 - Summary of Actions

### 496 5-25.1 Job Creation and document submission Actions

497 This section describes the Job Creation actions that create a Job and the ones that create add  
 498 Document to a Job. The Job Creation actions are: PrintJob, PrintUri, and CreateJob. The PrintJob

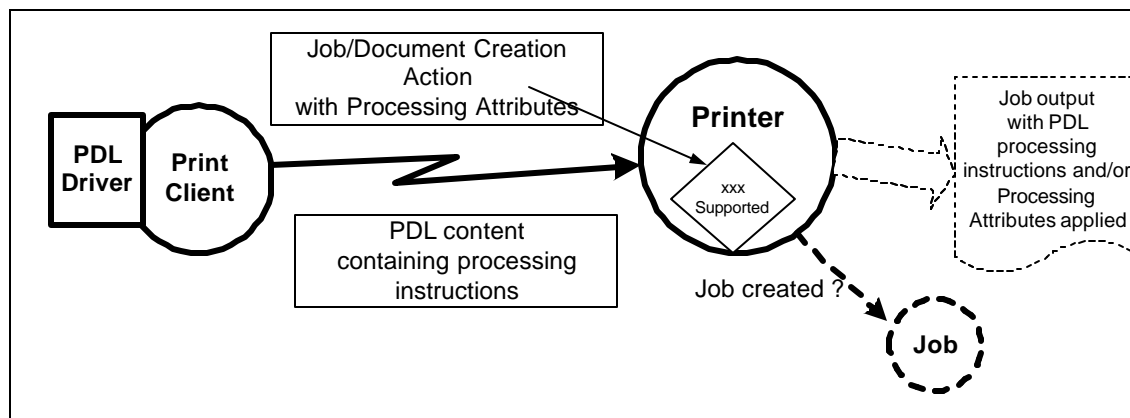
## PWG Semantic Model

499 action also submits the Document. The PrintUri action submits a URI reference to the Document  
500 which the Printer then retrieves when needed at a later time. The CreateJob action only creates the  
501 job and the Client must issue subsequent SendDocument and SendUri actions in order to submit  
502 document content or a URI reference, respectively, for a job.

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

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

510 A concept that is important in the PWG model is a set of instructions that can be applied to a print  
511 job. Examples of these instructions include the number of copies and the media to use. These  
512 instructions are referred to as Processing Attributes. The Processing Attributes are made up of the  
513 Job Processing Attributes (see section 4.4.1) and the Document Processing Attributes (see section  
514 4.4.2) sent in a Job or Document Creation Action.



515

516

**Figure 17 Processing Instruction Processing**

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

524 There is a wide variety of capabilities in Printers. An instance of a Printer is to subject to changes  
525 in its configured capabilities. An example would be an administrative change in the media the  
526 Printer supports or disabling two-sided printing. Clients need not check the capabilities of a Printer  
527 before creating their Job Processing Attributes and submitting a job. Since this is a client/server  
528 paradigm, it is always possible that the capabilities could change after checking a Printer's  
529 capabilities and before a Job is submitted. On the other hand, a client may use the Printer's  
530 configured capabilities to create their Job Processing Attributes and submit a job.



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

### 540 **5.2.15.1.1 PrintJob**

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

### 545 **5.2.25.1.2 PrintUri**

546 ([rfc2911] §3.2.2) Identical to the PrintJob operation (see section ~~5.1.15.2.4~~) except that a client  
547 supplies a URI reference to the document data.

### 548 **5.2.35.1.3 CreateJob**

549 ([rfc2911] §3.2.4) Similar to the PrintJob operation (see section ~~5.1.15.2.4~~), except that in the  
550 CreateJob request the Client does not supply Document Data. The client supplies a single set of  
551 Job Processing attributes that the Printer applies to the Output Document(s) of the job. The  
552 "MultipleDocumentHandling" Job Processing attribute controls whether the Printer produces  
553 separate Output Documents or combines the Input Documents into a single Output Document (see  
554 section ~~2122~~).

### 555 **5.2.3.15.1.3.1 The "MultipleDocumentHandling" Job Processing attribute**

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

568 **5.2.45.1.4 SendDocument**

569 ([rfc2911] §3.3.1) Submits the entire Document Content for the next Input Document of a job  
570 created by a previous CreateJob action (see section 5.1.35.2.3).

571 **5.2.55.1.5 SendUri**

572 ([rfc2911] §3.3.2) Identical to the SendDocument operation (see section 5.1.45.2.4) except that a  
573 client supplies a URI reference to the Document Content data, instead of supplying the document  
574 content.

575 **5.2.65.1.6 ValidateJob**

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

579 **5.35.2 Job Control Actions**

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

582 **5.3.15.2.1 CancelJob**

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

585 **5.3.25.2.2 HoldJob**

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

588 **5.3.35.2.3 ReleaseJob**

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

590 **5.3.45.2.4 RestartJob**

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

592 **5.45.3 Status and information Actions**

593 This section describes the actions that allow a client to obtain status and attributes of Jobs and  
594 Printers: GetJobs, GetPrinterAttributes, ~~and~~ GetJobAttributes and GetPrinterSupportedValues.

595 **5.4.15.3.1 GetJobs**

596 ([rfc2911] §3.3.4) Retrieve the list of Jobs belonging to the Printer. The Client may supply some  
597 simple filters (e.g. "MyJobs, "Limit) to control which jobs will be returned. The Client may supply  
598 a list of Job attribute and/or attribute group names to be returned in the response (See 5.3.35.4.3). A  
599 group of Job attributes will be returned for each returned Job.

600 **5.4.25.3.2 GetPrinterAttributes**

601 ([rfc2911] §3.2.5) Returns the values of the requested printer attributes and/or attribute groups of a  
602 Printer (i.e. Printer State, Printer Description, Processing Supported, Processing Default,  
603 Processing Ready).

604 **5.4.35.3.3 GetJobAttributes**

605 ([rfc2911] §3.3.4) Returns the values of the requested job attributes and/or attribute groups of a  
606 Job (i.e Job Description, Job State, Job Processing and Document Processing).

607 **5.3.4 SetJobAttributes**

608 ([set-ops] §4.2) Set the values of the supplied Job Processing and Job Description attributes of the  
609 indicated Job.

610 **5.3.5 GetPrinterSupportedValues**

611 ([set-ops] §4.3) Returns the possible values of the Printer Processing and Printer Description  
612 attributes that may be set with the SetPrinterAttributes action.

613 **5.3.6 GetDocuments**

614 ([doc-obj] §3) Returns the requested Document attributes or attribute groups in all Documents in  
615 the indicated Job.

616 **5.3.7 GetDocumentAttributes**

617 ([doc-obj] §3) Returns the requested Document attributes or attribute groups in the indicated  
618 Document in the indicated Job.

619 **5.3.8 SetDocumentAttributes**

620 ([doc-obj] §3) Set the values of the supplied Document Processing and Document Description  
621 attributes in the indicated Document in the indicated Job.

622 **5.55.4 Printer Control Actions**

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

626 **5.5.15.4.1 PausePrinter**

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

628 **5.5.25.4.2 ResumePrinter**

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

630 **5.5.35.4.3 PurgeJobs**

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

632 **5.4.4 DisablePrinter**

633 ([adm-ops] §3.1.1) Prevents the Printer from accepting any more Job Creation operations. The  
634 Printer sets the PrinterIsAcceptingJobs Printer State attribute to ‘false’.

635 **5.4.5 EnablePrinter**

636 ([adm-ops] §3.1.2) Allows the Printer to start accepting Job Creation operations. The Printer sets  
637 the PrinterIsAcceptingJobs Printer State attribute to ‘true’.

638 **5.4.6 SetPrinterAttributes**

639 ([set-ops] §4.1) Set the values of the supplied Printer Processing and Printer Description attributes.

640 **6 Summary of attributes**

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

650 **6.1 Processing Attributes (Job and Document)**

651 \* Group key: J=Job Processing Attributes, D=Document Processing Attributes

652 Table 3 - Processing Attributes (Job and Document)

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
<u>AttributeFidelity</u>		<u>Boolean</u>		<u>J</u>	<u>[rfc2911] §15.1</u>
<u>Allows a user to control the Printer’s acceptance of the job submission based on whether or not the Printer supports all the supplied job Processing attributes and values. Default = ‘false’</u> <u>NOTE: Deprecated in favor of “JobMandatoryAttributes”.</u>					
<u>Compression</u>		<u>String</u>	<u>Type2 keyword</u>	<u>D</u>	<u>[rfc2911] §4.4.32</u>
<u>Compression algorithm used on the Document Data, if any. (keywords: none, deflate, gzip, compress)</u>					
Copies		Integer	1:MAX	<u>D</u>	<u>[rfc2911] §4.2.5</u>

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Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
					The number of copies of the Output Document(s) to be printed.
CoverBack		<i>complex</i>		<u>D</u>	[PWG5100.3] §3.1
					The back cover to apply to document or job. ( <i>Includes Media/MediaCol, CoverType</i> )
CoverFront		<i>complex</i>		<u>D</u>	[PWG5100.3] §3.1
					The front cover to apply to document or job. ( <i>Includes Media/MediaCol, CoverType</i> )
CoverType		String	Type2 keyword	<u>D</u>	[PWG5100.3] §3.1.2
					Indicates if covers are requested and which sides will contain print stream pages. (Keywords: no-cover, print-none, print-front, print-back, print-both)
DocumentCopies	Yes	RangeOfInteger		<u>J</u>	[PWG5100.4] §5.1.3
					Specifies the output document copies for override processing. <b>NOTE: Deprecated in favor of "Copies"</b>
<u>DocumentFormat</u>		<u>String</u>	<u>MimeMediaType</u> <u>[rfc2046], [rfc2048]</u>	<u>D</u>	<u>[rfc2911] §3.2.1.1</u>
					<b>The Document format (i.e. PDL) for the 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. (examples: application/octet-stream, application/postscript, application/vnd.hp-PCL, "text/plain; charset=utf-8")</b>
DocumentOverride		<i>complex</i>		<u>J</u>	[PWG5100.4] §5.1
					Provides for the overriding of processing instructions on a document basis. <del>←may also be applied only to a portion of a document.</del> Applied to job, see PageOverride for overrides <u>supplied</u> at the document level. ( <i>Includes InputDocuments/OutputDocuments, DocumentCopies, DocumentFormat, DocumentName, Compression, DocumentNaturalLanguage, PageRanges, and any other processing attribute that affects documents</i> ) <b>NOTE: Deprecated in favor of <u>supporting and using the Document Object</u></b>
<u>Finishings</u>	Yes	String	Type2 keyword	<u>D</u>	[rfc2911] §4.2.6 <u>[PWG5100.1] §2</u>
					Identifies the <u>finishings</u> that the Printer uses for each copy of each printed Output Document <del>in the Job</del> (Keywords: none, staple, punch, cover, bind, saddle-stitch, edge-stitch, staple-top-left, staple-bottom-left, staple-top-right, staple-bottom-right, edge-stitch-left, edge-stitch-top, edge-stitch-right, edge-stitch-bottom, staple-dual-left, staple-dual-top, staple-dual-right, staple-dual-bottom)
FinishingCol		<i>complex</i>		<u>D</u>	[PWG5100.3] §3.2
					Enables an end user to specify detailed finishing options not possible with the " <u>Finishings</u> " attribute ( <i>Includes FinishingTemplate, Stitching</i> )

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
FinishingTemplate		String	Maxlength=1023	<u>D</u>	[PWG5100.3] §3.1
A string specifying some particular finishing operation.					
ForceFrontSide	yes	Integer		<u>D</u>	[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	<u>D</u>	[PWG5100.3] §3.4
Specifies imposition method for laying out finished page images onto the surface of output media. (Keywords: none, signature)					
InputDocuments	Yes	RangeOfInteger		<u>D</u>	[PWG5100.4] §5.1.1
Specifies the input documents for override processing. <u>NOTE: Deprecated since PageOverrides are applied explicitly to documents and DocumentOverrides are themselves deprecated.</u>					
InsertAfterPageNumber		Integer		<u>D</u>	[PWG5100.3] §3.5.1
Specifies the input page after which the Insert Sheet will be placed.					
InsertAfterPageNumber		Integer		<u>D</u>	[PWG5100.3] §3.5.2
Specifies the number of Insert Sheet to insert.					
InsertSheet	Yes	complex		<u>D</u>	[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 <del>in a job</del> . (Includes InsertAfterPageNumber, InsertCount, Media/MediaCol)					
JobAccountingOutputBin		String	Type3 keyword	<u>J</u>	[PWG5100.3] §3.8.3
Specifies the output bin where the accounting sheet is to be placed. (keywords: top, middle, bottom, side, left, right, center, rear, face-up, face-down large-capacity, my-mailbox, stacker-N, mailbox-N, tray-N *Note:N is replaced by a cardinal number, *Note: See [PWG5100.2] §2.1 for description of keywords)					
JobAccountingSheet		complex		<u>J</u>	[PWG5100.3] §3.8
Specifies the accounting sheet for a job. (Includes JobAccountingSheetType, Media/ MediaCol, JobAccountingOutputBin).					
JobAccountingSheetType		String	Type3 keyword	<u>J</u>	[PWG5100.3] §3.8.1
Specifies the accounting sheet format for a job. (keywords: none, standard)					
JobCopies		Integer	1:MAX	<u>J</u>	[rfc2911] §4.2.5

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
	The number of copies of the Job to be printed. <b>NOTE: New attribute to differentiate job and document level copies.</b>				
JobErrorSheet		complex		<u>J</u>	[PWG5100.3] §3.9
Specifies the error sheet for a job. ( <i>Includes JobErrorSheetType, JobErrorSheetWhen, Media/MediaCo</i> ).					
JobErrorSheetType		String	Type3 keyword	<u>J</u>	[PWG5100.3] §3.9.1
Specifies the error sheet format for a job. (keywords: none, standard)					
JobErrorSheetWhen		String	Type2 keyword	<u>J</u>	[PWG5100.3] §3.9.2
Specifies the accounting sheet format for a job. (keywords: on-error, always)					
JobFinishings	Yes	String	Type2 keyword	<u>J</u>	[rfc2911] §4.2.6
Identifies the finishing that the Printer uses for each job copy of the Job (Keywords: none, staple, punch, cover, bind, saddle-stitch, edge-stitch, staple-top-left, staple-bottom-left, staple-top-right, staple-bottom-right, edge-stitch-left, edge-stitch-top, edge-stitch-right, edge-stitch-bottom, staple-dual-left, staple-dual-top, staple-dual-right, staple-dual-bottom) <b>NOTE: New attribute to differentiate job and document level finishing.</b>					
JobFinishingCol		complex		<u>J</u>	[PWG5100.3] §3.2
<u>Enables an end user to specify detailed finishing options not possible with the “JobFinishings” attribute (<i>Includes FinishingTemplate, Stitching</i>)</u> <b>NOTE: New attribute to differentiate job and document level finishing.</b>					
JobHoldUntil		String	Type3 keyword	<u>J</u>	[rfc2911] §4.2.2
Specifies the named time period during which the Job must become a candidate for printing. (keywords: no-hold, indefinite, day-time, evening, night, weekend, second-shift, third-shift)					
JobMandatoryAttributes	Yes	String	Type3 keyword	<u>J</u>	<b>Need reference</b>
<u>Lists the attributes for fidelity processing. (See [rfc2911] §15.1 ) (keywords: Any Processing attribute name)</u> <b>NOTE: New attribute to align fidelity with FSG work.</b>					
JobPriority		Integer	1:100	<u>J</u>	[rfc2911] §4.2.1
Priority for scheduling the Job. A higher value specifies a higher priority.					
JobSheets		String	type3 keyword	<u>J</u>	[rfc2911] §4.2.3
Specifies which job start/end sheet(s), will be printed with a job.. (Keywords: none, standard)					
JobSheetsCol		complex		<u>J</u>	[PWG5100.3] §3.11
Augments the “JobSheets” attribute. ( <i>Includes JobSheets, Media/MediaCol</i> )					
JobSheetMessage		String	Maxlength=1023	<u>J</u>	[PWG5100.3] §3.12



## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
Conveys a message that is delivered with the job.					
Media		String	type3 keyword	<u>D</u>	[rfc2911] §4.2.11
The medium that the Printer uses for all impressions of the Job. (Keywords: na_letter_8.5x11in. See [pwg5101.1])					
MediaCol		complex		<u>D</u>	[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.. ( <i>Includes MediaKey, MediaType, MediaInfo, MediaColor, MediaPreprinted, MediaHoleCount, MediaOrderCount, MediaSize, MediaWeightMetric, MediaBackCoating, MediaFrontCoating, MediaRecycled.</i> )					
MediaBackCoating		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.10
Indicates the pre-process coating applied to the back of the media. (Keywords: none, glossy, high-gloss, semi-gloss, satin, matte)					
MediaColor		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.4
Indicates the desired color of the media being specified. . (Keywords: no-color, white, pink, yellow, blue, green, buff, goldenrod, red, gray, ivory, orange)					
MediaFrontCoating		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.10
Indicates the pre-process coating applied to the front of the media. (Keywords: none, glossy, high-gloss, semi-gloss, satin, matte)					
MediaHoleCount		Integer		<u>D</u>	[PWG5100.3] §3.13.6
Indicates the number of pre-drilled holes in the desired media.					
MediaInfo		String	Maxlength=255	<u>D</u>	[PWG5100.3] §3.13.3
Specifies information that helps describe the media instance. Intended for human consumption.					
MediaInputTrayCheck		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.14
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" attribute. (keywords: top, middle, bottom, side, large-capacity, envelope, main, manual. See [RFC2911] Appendix C)					
MediaKey		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.1
The name of the media represented as a keyword.					
MediaOrderCount		Integer		<u>D</u>	[PWG5100.3] §3.13.7
Indicates the number of sheets, within an ordered sequence of sheets; after which the sequence begins to repeat..					
MediaPrePrinted		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.11
Indicates the pre-printed characteristics of the desired media. (Keywords: blank, pre-printed, letter-head)					



## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
MediaRecycled		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.10
Indicates the recycled characteristics of the media. (Keywords: none, standard)					
MediaSize		Complex		<u>D</u>	[PWG5100.3] §3.13.8
Explicitly specifies the numerical media width and height dimensions. ( <i>Includes XDimension, YDimension</i> )					
XDimension		Integer		<u>D</u>	[PWG5100.3] §3.13.8.1
Size of the media in hundredths of a millimeter along the bottom edge.					
YDimension		Integer		<u>D</u>	[PWG5100.3] §3.13.8.2
Size of the media in hundredths of a millimeter along the left edge.					
MediaSize		String	Type3 keyword	<u>D</u>	Need UPnP ref
The medium size that the Printer uses for all impressions of the Job. (Keywords: na_letter_8.5x11in. See [pwg5101.1] §5) <b>ISSUE3: Resolve definition of media size (string(UpnP) vs. xy(PWG) vs. xy&amp;unit(?))</b>					
MediaType		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.13.2
The medium type that the Printer uses for all impressions of the Job. (Keywords: stationery, transparency envelope, envelope-plain, 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)					
MediaWeightMetric		Integer		<u>D</u>	[PWG5100.3] §3.13.9
Indicates the weight of the desired media rounded to the nearest whole number of grams per square meter.					
MultipleDocumentHandling		String	type2 keyword	<u>J</u>	[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 Jobs. (keywords: single-Documents, separate-Documents-uncollated-Copies, separate-Documents-collated-Copies, single-Documents-new-sheet)					
NumberUp		Integer	1:MAX	<u>D</u>	[rfc2911] §4.2.9
Indicates the number of pages in an impression.					
OrientationRequested		String	type2 keyword	<u>D</u>	[rfc2911] §4.2.10
The desired orientation for printed pages. (keywords: portrait, landscape, reverse-landscape, reverse-portrait)					
OutputBin		String	Type2 keyword	<u>J</u>	[PWG5100.2] §2.1

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
	Specifies the output bin where the job is to be delivered. (keywords: top, middle, bottom, side, left, right, center, rear, face-up, face-down large-capacity, my-mailbox, stacker-N*, mailbox-N*, tray-N*. *Note: N is replaced by a cardinal number)				
OutputDocuments	Yes	RangeOfInteger		<u>D</u>	[PWG5100.4] §5.1.2
	Specifies the output documents for override processing. <b>NOTE: Deprecated since PageOverrides are applied explicitly to documents and DocumentOverrides are themselves deprecated.</b>				
PageDelivery		String	Type2 keyword	<u>D</u>	[PWG5100.3] §3.15
	Indicates if 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, if the pages are delivered face up or face down. (keywords: same-order-face-up, same-order-face-down, reverse-order-face-up, reverse-order-face-down, system-specified)				
PageOverride	Yes	complex		<u>D</u>	[PWG5100.4] §5.2
	Provides for the overriding of processing instructions on a page basis. (Includes InputDocuments/OutputDocuments, DocumentCopies, Page, Sides, media and any other processing attribute that affects pages) <b>ISSUE4: Check FSG definition of PageOverride</b>				
Pages	yes	RangeOfInteger		<u>D</u>	[PWG5100.4] §5.2.4
	Specifies a range of pages in the document data. <b>NOTE: Deprecated in favor of "PageRanges"</b>				
PagesPerSubset	yes	RangeOfInteger		<u>D</u>	[PWG5100.4] §5.3
	Partitions one or more Input-Documents into contiguous subsets of Input-Pages. Each subset is defined to be an Output-Document.				
PageRanges	yes	RangeOfInteger		<u>D</u>	[RFC2911] §4.2.7
	Specifies a range of pages in the document data.				
PresentationDirectionNumberUp		String	Type2 keyword	<u>D</u>	[PWG5100.3] §3.17
	Specifies the placement order of the page images on a Finished-Page Image with the "number-up" attribute. (keywords: toright-tobottom, tobottom-toright, toleft-tobottom, tobottom-toleft, toright-totop, totop-toright, toleft-totop)				
PrintQuality		String	type2 keyword	<u>D</u>	
	The print quality that the Printer uses for the Job. (keyword: draft, normal, high)				
PrinterResolution		resolution		<u>D</u>	RFC2911] §4.2.12
	The resolution that Printer uses for the Job in cross-feed and feed direction in units of dpi or dpcm.				
Sides		String	type2 keyword	<u>D</u>	[rfc2911] §4.2.8
	Indicates how an impression is to be placed upon the side(s) of the media (keyword: one-sided, two-sided-long-edge, two-sided-short-edge, two-sided-long-edge, tumble)				

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
SeparatorSheets		complex		<u>D</u>	[PWG5100.3] §3.18
	Specifies the separator sheets to be printed with the <a href="#">jobDocument</a> . (Includes <i>SeparatorSheetType</i> , <i>Media/MediaCol</i> )				
SeparatorSheetsType		String	Type3 keyword	<u>D</u>	[PWG5100.3] §3.18.1
	Specifies the separator sheets type. (keywords: none, slip-sheets, start-sheet, end-sheet, both-sheets)				
SheetCollate		String	Type2 keyword	<u>D</u>	[job-prog] §3.1
	Specifies if the media sheets of each copy of each printed document in a job are to be in sequence. (keywords: uncollated, collated)				
Stitching		complex		<u>D</u>	[PWG5100.3] §3.2.2
	Provides detailed stitching parameters. (Includes <i>StitchingReferenceEdge</i> , <i>StitchingOffset</i> , <i>StitchingLocations</i> )				
StitchingLocations	yes	Integer		<u>D</u>	[PWG5100.3] §3.2.2.3
	The distance along the stitching axis where a stitch will be placed in hundredths of a millimeter.				
StitchingOffset		Integer		<u>D</u>	[PWG5100.3] §3.2.2.2
	The perpendicular distance from the reference edge to the stitching axis in hundredths of a millimeter.				
StitchingReferenceEdge		String	type2 keyword	<u>D</u>	[PWG5100.3] §3.2.2.1
	Specifies the stitching reference edge of the output media. (keyword: bottom, top, left, right)				
XImagePosition		String	type2 keyword	<u>D</u>	[PWG5100.3] §3.19.2
	Causes the specified point of the Finished-Page Image to be positioned at a specified location. (keyword: none, center, left, right)				
XImageShift		Integer		<u>D</u>	[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 attribute is hundredths of a millimeter. The sign of the value indicates the direction of the shift.				
Xside1ImageShift		Integer		<u>D</u>	[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 attribute is hundredths of a millimeter. The sign of the value indicates the direction of the shift.				
Xside2ImageShift		Integer		<u>D</u>	[PWG5100.3] §3.19.5

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
					Causes each Finished-Page Image that would be placed on the back side of a sheet to be shifted in position with respect to the x-axis of the media. The unit of measure for this attribute is hundredths of a millimeter. The sign of the value indicates the direction of the shift.
YImagePosition		String	type2 keyword	<u>D</u>	[PWG5100.3] §3.19.6
					Causes the specified point of the Finished-Page Image to be positioned at a specified location. (keyword: none, center, top, bottom)
YImageShift		Integer		<u>D</u>	[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 attribute is hundredths of a millimeter. The sign of the value indicates the direction of the shift.
Yside1ImageShift		Integer		<u>D</u>	[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 attribute is hundredths of a millimeter. The sign of the value indicates the direction of the shift.
Yside2ImageShift		Integer		<u>D</u>	[PWG5100.3] §3.19.9
					Causes each Finished-Page Image that would be placed on the back side of a sheet to be shifted in position with respect to the y-axis of the media. The unit of measure for this attribute is hundredths of a millimeter. The sign of the value indicates the direction of the shift.

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### 654 **6.2 Job Attributes (State and Description)**

655 \* Group Key: S=State, D=Description

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**Table 4- Job Attributes (State and Description)**

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
DateTimeAtCreation		String	DateTime [rfc1123]	<u>S</u>	[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)
DateTimeAtProcessing		String	DateTime [rfc1123]	<u>S</u>	[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)
DateTimeAtCompleted		String	DateTime [rfc1123]	<u>S</u>	[rfc2911] §4.3.14.7

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
	Indicates the date and time at which the Job completed. (example: Fri, 03 May 2002 08:49:37 GMT)				
DetailedStatusMessage	Yes	String	Maxlength=1023	<u>S</u>	[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. (example: "PostScript error: stack overflow") (Was JobDetailedStatusMessage)				
DocumentAccessErrors	Yes	String	Maxlength=1023	<u>S</u>	[rfc2911] §4.3.11
	Information about each Document access error for this job encountered by the Printer. (example: "(404) <a href="http://www.company.com/pub/fileToPrint.pdf">http://www.company.com/pub/fileToPrint.pdf</a> ") (Was JobDocumentAccessErrors)				
DocumentState		String	Type1 keyword	<u>S</u>	TBD
	The current state of the job (see section 4.2.1.1). See also DocumentStateReasons attribute below. (keywords: pending, processing, canceled, aborted, completed)				
DocumentStateMessage		String	Maxlength=127	<u>S</u>	TBD
	Specifies information about the "DocumentState" and "DocumentStateReasons" attributes in human readable text. (example: "Document completed successfully with warnings")				
DocumentStateReasons	Yes	String	type2 keyword	<u>S</u>	TBD
	Provides additional information about the Document's current state. (keywords: none, incoming, data-insufficient, document-access-error, submission-interrupted, outgoing, resources-are-not-ready, interpreting, queued, transforming, queued-for-marker, printing, canceled-by-user, canceled-by-operator, canceled-at-device, aborted-by-system, unsupported-compression, compression-error, unsupported-Document-format, Document-format-error, completed-successfully, completed-with-warnings, completed-with-errors, restartable, queued-in-device))				
Impressions		Integer	0:MAX	<u>D</u>	[rfc2911] §4.3.17.2
	The total size in number of impressions in all the Job's Document(s). (Was JobImpressions)				
ImpressionsCompleted		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.18.2
	The number of impressions completed for the job so far. (Was JobImpressionsCompleted)				
ImpressionsCompletedCurrentCopy		Integer	0:MAX	<u>S</u>	[job-prog] §4.4
	The number of impressions completed for the current iteration of the job so far.				
JobAccountId		String	Maxlength=1023	<u>D</u>	[PWG5100.3] §3.6
	Account associated with the job.				
JobAccountingUserID		String	Maxlength=1023	<u>D</u>	[PWG5100.3] §3.7
	Specifies the User ID associated with the "JobAccountId".				
JobId		Integer	1:MAX	<u>S</u>	[rfc2911] §4.3.2

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
					The Printer sets this to the ID of the job that is unique for the Printer.
JobMessageFromOperator		String	Maxlength=127	<u>D</u>	[rfc2911] §4.3.16
					Message to the end user indicating the reasons for any management action taken on a job. (example: "Job canceled due to length", "Pick job up in mailbox")
JobMessageToOperator		String	Maxlength=127	<u>D</u>	[PWG5100.3] §3.10
					Message from the end user to indicate something about the processing of the job. (example: "Call 555-1234 before running this job")
JobName		String	Maxlength=127	<u>D</u>	[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=1023	<u>D</u>	[rfc2911] §4.3.6
					The Printer sets this attribute to the most authenticated printable name that it can obtain (example: "John Doe", \authDomain\John Doe")
JobPrinterUri		String	uri	<u>S</u>	[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	<u>S</u>	[rfc2911] §4.3.7
					The current state of the job (see section 4.2.1.1). See also JobStateReasons attribute below. (keywords: pending, pending-held, processing, processing-stopped, canceled, aborted, completed)
JobStateMessage		String	Maxlength=127	<u>S</u>	[rfc2911] §4.3.6
					Specifies information about the "JobState" and "jobStateReasons" attributes in human readable text. (example: "Job completed successfully with warnings")
JobStateReasons	Yes	String	type2 keyword	<u>S</u>	[rfc2911] §4.3.8
					Provides additional information about the job's current state. (keywords: none, incoming, data-insufficient, Document-access-error, submission-interrupted, outgoing, job-hold-until-specified, resources-are-not-ready, printer-stopped-partly, printer-stopped, interpreting, queued, transforming, queued-for-marker, printing, canceled-by-user, canceled-by-operator, canceled-at-device, aborted-by-system, unsupported-compression, compression-error, unsupported-Document-format, Document-format-error, processing-to-stop-point, service-off-line, completed-successfully, completed-with-warnings, completed-with-errors, restartable, queued-in-device))
JobUri		String	uri	<u>S</u>	[rfc2911] §4.3.1
					The Printer sets this to the URI for the job. (example: ipp://www.company.com/printer/jobs/22) <u>The URI is globally unique.</u>
KOctets		Integer	0:MAX	<u>D</u>	[rfc2911] §4.3.17.1

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
	The total size of the Job's Document(s) in integral units of 1024 octets. (Was JobKOctets)				
KOctetsProcessed		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.18.1
	the total number of octets processed in integral units of 1024 octets so far. (Was JobKOctetsProcessed)				
MediaSheets		Integer	0:MAX	<u>D</u>	[rfc2911] §4.3.17.3
	The total number of media sheets to be produced for this job. . (Was JobMediaSheets)				
MediaSheetsCompleted		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.18.3
	The media-sheets completed marking and stacking for the entire job so far. (Was JobMediaSheetsCompleted)				
MoreInfo		String	uri	<u>S</u>	[rfc2911] §4.3.4
	URI used to obtain information intended for end user consumption about this specific Job. (example: " <a href="http://www.company.com/printer/embeddedjobpage">http://www.company.com/printer/embeddedjobpage</a> ") . (Was JobMoreInfo)				
NumberOfDocuments		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.12
	The number of Documents in the job.				
NumberOfInterveningJobs		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.15
	The number of jobs that are "ahead" of this job assuming the current scheduled order.				
OutputDeviceAssigned		String	Maxlength=127	<u>S</u>	[rfc2911] §4.3.13
	Identifies the output device to which the Printer has assigned this job (example: "Pete's Printer")				
PrinterUpTime		Integer	1:MAX	<u>S</u>	[rfc2911] §4.3.14.4
	The amount of time (in seconds) that the Printer has been up and running. See Printer attribute "PrinterUpTime" (Was JobPrinterUpTime)				
SheetsCompletedCopyNumber		Integer	0:MAX	<u>S</u>	[job-prog] §4.2
	Number of the copy being stacked for the current document.				
SheetsCompletedDocumentNumber		Integer	0:MAX	<u>S</u>	[job-prog] §4.3
	Number of the document in the job currently being stacked.				
TimeAtCreation		Integer	MIN:MAX	<u>S</u>	[rfc2911] §4.3.14.1
	The time at which the Job was created in "PrinterUpTime" seconds.				
TimeAtProcessing		Integer	MIN:MAX	<u>S</u>	[rfc2911] §4.3.14.2
	The time at which the Job first began processing.				
TimeAtCompleted		Integer	MIN:MAX	<u>S</u>	[rfc2911] §4.3.14.3



## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
The time at which the Job completed.					
WarningCount		Integer	MIN:MAX	<u>S</u>	[PWG5100.4 §6.1
total number of warnings that a Printer has generated while processing and printing the Job.. (Was JobWarningCount)					

657

### 658 **6.3 Document Attributes (State and Description)**

659 \* Group Key: S=State, D=Description

660 **Table 5 – Document Attributes (State and Description)**

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
<u>Compression</u>		<u>String</u>	<u>Type2 keyword</u>	<u>D</u>	<u>[rfc2911] §4.4.32</u>
<u>Compression algorithm used on the Document Data, if any. (keywords: none, deflate, gzip, compress)</u>					
<u>CurrentPageOrder</u>		<u>String</u>	<u>Type2 keyword</u>	<u>S</u>	<u>[PWG5100.3] §4.1</u>
<u>Specifies the page order of the pages in the document data. Initially set to PageOrderReceived and updated if data is transformed. (keywords: 1-to-n-order, n-to-1-order)</u>					
DateTimeAtCreation		String	DateTime [rfc1123]	<u>S</u>	[rfc2911] §4.3.14.5
Indicates the date and time at which the Document was created . (example: Fri, 03 May 2002 08:49:37 GMT)					
DateTimeAtProcessing		String	DateTime [rfc1123]	<u>S</u>	[rfc2911] §4.3.14.6
Indicates the date and time at which the Document first began processing. (example: Fri, 03 May 2002 08:49:37 GMT)					
DateTimeAtCompleted		String	DateTime [rfc1123]	<u>S</u>	[rfc2911] §4.3.14.7
Indicates the date and time at which the Document completed. (example: Fri, 03 May 2002 08:49:37 GMT)					
DetailedStatusMessage	Yes	String	Maxlength=1023	<u>S</u>	[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. (example: “PostScript error: stack overflow”) (Was JobDetailedStatusMessage)					
DocumentAccessErrors	Yes	String	Maxlength=1023	<u>S</u>	[rfc2911] §4.3.11
Information about each Document access error for this job encountered by the Printer. (example: “(404) <a href="http://www.company.com/pub/fileToPrint.pdf">http://www.company.com/pub/fileToPrint.pdf</a> ”) (Was JobDocumentAccessErrors)					



## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
DocumentName		String	Maxlength=127	<u>D</u>	[rfc2911] §3.2.1.1
Name for the Document to be used in an implementation specific manner.					
DocumentNaturalLanguage		String	Maxlength=127	<u>D</u>	[rfc2911] §3.2.1.1
Identifies the Natural Language of the Document					
<u>DocumentNumber</u>		<u>integer</u>		<u>S</u>	<u>[PWG5100.4] §9.2</u>
<u>The order of the document within a job starting at a base of 1.</u>					
DocumentState		String	Type1 keyword	<u>S</u>	<b>ISSUE5: New</b>
The current state of the document. See also DocumentStateReasons attribute below. (keywords: pending, processing, canceled, aborted, completed)					
DocumentStateMessage		String	Maxlength=127	<u>S</u>	<b>ISSUE6: New</b>
Specifies information about the "DocumentState" and "DocumentStateReasons" attributes in human readable text. (example: "Documentcompleted successfully with warnings")					
DocumentStateReasons	Yes	String	type2 keyword	<u>S</u>	<b>ISSUE7: New</b>
Provides additional information about the document state. (keywords: none, incoming, document-access-error, submission-interrupted, outgoing, resources-are-not-ready, interpreting, transforming, warnings-detected, queued-for-marker, printing, canceled-by-user, canceled-by-operator, canceled-at-device, aborted-by-system, unsupported-compression, compression-error, unsupported-Document-format, Document-format-error, completed-successfully, completed-with-warnings, completed-with-errors, queued-in-device)					
DocumentUri		String	Maxlength=1023	<u>S</u>	[rfc2911] §3.2.2
Reference to document to be printed (Print by reference)					
Impressions		Integer	0:MAX	<u>D</u>	[rfc2911] §4.3.17.2
The total size in number of impressions in the Document. (Was JobImpressions)					
ImpressionsCompleted		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.18.2
The number of impressions completed for the document so far. (Was JobImpressionsCompleted)					
ImpressionsCompletedCurrentCopy		Integer	0:MAX	<u>S</u>	[job-prog] §4.4
The number of impressions completed for the current iteration of the document so far.					
<u>JobId</u>		<u>Integer</u>	<u>1:MAX</u>	<u>S</u>	<u>[rfc2911] §4.3.2</u>
<u>The Printer sets this to the ID of the job containing this document. The ID is unique for the Printer.</u>					
<u>JobUri</u>		<u>String</u>	<u>uri</u>	<u>S</u>	<u>[rfc2911] §4.3.1</u>

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
					<u>The Printer sets this to the URI for the job. (example: <a href="ipp://www.company.com/printer/jobs/22">ipp://www.company.com/printer/jobs/22</a>) The URI is globally unique.</u>
KOctets		Integer	0:MAX	<u>D</u>	[rfc2911] §4.3.17.1
	The total size of the Document in integral units of 1024 octets. (Was JobKOctets)				
KOctetsProcessed		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.18.1
	the total number of octets processed in integral units of 1024 octets so far. (Was JobKOctetsProcessed)				
LastDocument		Boolean		<u>D</u>	[rfc2911] §4.?.?
	'true' if this is the last Input Document for the job. Default = 'false'.				
MediaSheets		Integer	0:MAX	<u>D</u>	[rfc2911] §4.3.17.3
	The total number of media sheets to be produced for this document. (ISSUE3q: was JobMediaSheets)				
MediaSheetsCompleted		Integer	0:MAX	<u>S</u>	[rfc2911] §4.3.18.3
	The media-sheets completed marking and stacking for the document so far. (Was JobMediaSheetsCompleted)				
MoreInfo		String	uri	<u>S</u>	[rfc2911] §4.3.4
	URI used to obtain information intended for end user consumption about this specific Job. (example: " <a href="http://www.company.com/printer/embeddedjobpage">http://www.company.com/printer/embeddedjobpage</a> "). (Was JobMoreInfo)				
<u>PageOrderReceived</u>		<u>String</u>	<u>Type2 keyword</u>	<u>D</u>	<u>[PWG5100.3] §3.16</u>
	<u>Represents the order of pages in the document data as supplied with the job. (keywords: 1-to-n-order, n-to-1-order)</u>				
<u>PrinterUpTime</u>		<u>Integer</u>	<u>1:MAX</u>	<u>S</u>	<u>[rfc2911] §4.3.14.4</u>
	<u>The amount of time (in seconds) that the Printer has been up and running. See Printer attribute "PrinterUpTime" (Was JobPrinterUpTime)</u>				
SheetsCompletedCopyNumber		Integer	0:MAX	<u>S</u>	[job-prog] §4.2
	Number of the copy being stacked for the current document.				
TimeAtCreation		Integer	MIN:MAX	<u>S</u>	[rfc2911] §4.3.14.1
	The time at which the Document was created in "PrinterUpTime" seconds.				
TimeAtProcessing		Integer	MIN:MAX	<u>S</u>	[rfc2911] §4.3.14.2
	The time at which the Document first began processing.				
TimeAtCompleted		Integer	MIN:MAX	<u>S</u>	[rfc2911] §4.3.14.3
	The time at which the Document completed.				

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	Group*	Reference
<b>Description (values)</b>					
WarningCount		Integer	MIN:MAX	<u>S</u>	[PWG5100.4 §6.1
total number of warnings that a Printer has generated while processing and printing the Document. (Was Job WarningCount)					

661

### 662 **6.4 Printer Attributes (State and Description)**

663

**Table 6 - Printer Attributes (State and Description)**

Attribute Name	Multivalued	Syntax	Constraint	Group*	reference
<b>Description (values)</b>					
ColorSupported		boolean		<u>D</u>	[rfc2911] §4.4.26
Indicates if the device is capable of any type of color printing at all, including highlight color.					
CompressionSupported	Yes	String	Type3 keyword	<u>D</u>	[rfc2911] §4.4.32
Identifies the set of supported Compression algorithms for Document content. (keywords: none, deflate, gzip, compress)					
DeviceId		String		<u>D</u>	See Appendix 10.1
An identifier based on IEEE1284 to identify the device. 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;”)					
DocumentFormatDefault		String	MimeMediaType [rfc2046], [rfc2048]	<u>D</u>	[rfc2911] §4.4.21
The document format (i.e. PDL) that the 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”)					
DocumentFormatSupported	YES	String	MimeMediaType	<u>D</u>	
Identifies both the Document and Image formats supported by the 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.					
JobImpressionsSupported		RangOfInteger	0:MAX	<u>D</u>	[rfc2911] §4.4.34
Specifies the upper and lower bounds for the number of impressions allowed per job.					

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	<u>Group*</u>	reference
<b>Description (values)</b>					
JobKOctetsSupported		RangOfInteger	0:MAX	<u>D</u>	[rfc2911] §4.4.33
	Specifies the allowable upper and lower bounds of the total size per job in integral units of 1024 octets.				
JobMediaSheetsSupported		RangOfInteger	0:MAX	<u>D</u>	[rfc2911] §4.4.35
	Specifies the upper and lower bounds for the number of media sheets allowed per job.				
MultipleDocumentJobsSupported		boolean		<u>D</u>	[rfc2911] §4.4.16
	Indicates whether the Printer supports more than one Document per job, i.e., more than one SendDocument and/or SendUri request per job. A multi-Document per job Printer must implement this attribute and have a value of 'true'. A single Document per job Printer may either not support this attribute or support it with a value of 'false'.				
MultipleOperationTimeOut		Integer	1:MAX	<u>D</u>	[rfc2911] §4.4.31
	Identifies the minimum time (in seconds) that a multi-Document per job Printer must wait between actions on an open job. 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 attribute. The recommended value is greater than 60 and less than 240.				
OperationsSupported	Yes	String	type2 keyword	<u>D</u>	[rfc2911] §4.4.15
	The set of supported actions for the Printer and Job. (keywords: PrintJob, PrintUri, ValidateJob, CreateJob, SendDocument, SendUri, CancelJob, GetJobAttributes, GetJobs, GetPrinterAttributes, HoldJob, ReleaseJob, RestartJob, PausePrinter, ResumePrinter, PurgeJobs).				
PagesPerMinute		Integer	0:MAX	<u>D</u>	[rfc2911] §4.4.36
	Specifies the nominal number of pages per minute which may be generated by this printer.				
PagesPerMinuteColor		Integer	0:MAX	<u>D</u>	[rfc2911] §4.4.37
	Specifies the nominal number of pages per minute which may be generated by this printer when printing color.				
PdIOverrideSupported		String	type2 keyword	<u>D</u>	[rfc2911] §4.4.28
	Expresses the ability of a Printer to either attempt to override a Document's processing instructions with Job Processing Attributes or not. (keywords: attempted, not-attempted)				
PrinterCurrentTime		String	DateTime [rfc1123]	<u>S</u>	[rfc2911] §4.4.30
	Indicates the current date and time. (example: Fri, 03 May 2002 08:49:37 GMT)				
PrinterDriverInstaller		String	Uri	<u>D</u>	[rfc2911] §4.4.8
	Intended for consumption by automata to locate the driver installer for this Printer object. <u>(example: "http://www.company.com/printer/installerProgram")</u> Note: This attribute has not been used by any known implementation <u>and is therefore deprecated.</u> <u>-(example: "http://www.company.com/printer/installerProgram")</u>				

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	<u>Group*</u>	reference
<b>Description (values)</b>					
PrinterInfo		String	Maxlength=127	<u>D</u>	[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		<u>S</u>	[rfc2911] §4.4.23
	Indicates whether the printer is currently able to accept jobs.				
PrinterLocation		String	Maxlength=127	<u>D</u>	[rfc2911] §4.4.5
	Identifies the location of the device. (example: Pete’s Office)				
PrinterMakeAndModel		String	Maxlength=127	<u>D</u>	[rfc2911] §4.4.9
	Identifies the make and model of the device. (example: “Xerox Phaser 7700”, “HP LaserJet 1000”, “Lexmark Optra Color 45”)				
PrinterMessageFromOperator		String	Maxlength=127	<u>D</u>	[rfc2911] §4.4.25
	End user information for the printer. (example: “printer unavailable until 1pm due to preventive mainanance”)				
PrinterMoreInfo		String	uri	<u>D</u>	[rfc2911] §4.4.7
	URI used to obtain information intended for end user consumption about this specific Printer. (example: “ <a href="http://www.company.com/printer/embeddedwebpage">http://www.company.com/printer/embeddedwebpage</a> ”)				
PrinterMoreInfoManufacturer		String	uri	<u>D</u>	[rfc2911] §4.4.10
	URI used to obtain more information for end user consumption about this type of device. (example: “ <a href="http://www.xerox.com/go/xrx/template/012.jsp?Xcntry=USA&amp;Xlang=en_US&amp;prodID=7700">http://www.xerox.com/go/xrx/template/012.jsp?Xcntry=USA&amp;Xlang=en_US&amp;prodID=7700</a> ”, “ <a href="http://www.lexmark.com/US/products/overview/0,1224,MjQ5fDE=,00.html">http://www.lexmark.com/US/products/overview/0,1224,MjQ5fDE=,00.html</a> ”)				
PrinterName		String	Maxlength=127	<u>D</u>	[rfc2911] §4.4.4
	The end-user friendly name of the Printer object. (example: “Pete’s Printer”)				
PrinterState		String	type1 keyword	<u>S</u>	[rfc2911] §4.4.11
	Identifies the current state of the device (see section4.1.1.1). See “PrinterStateReasons” below. (keywords: idle, processing, stopped)				
PrinterStateMessage		String	Maxlength=1023	<u>S</u>	[rfc2911] §4.4.13
	Information about the "printer- state" and "printer-state-reasons" attributes in human readable text. (example: “Printer stopped due to paper jam”)				
PrinterStateReasons	Yes	String	type2 keyword	<u>S</u>	[rfc2911] §4.4.12

## PWG Semantic Model

Attribute Name	Multivalued	Syntax	Constraint	<u>Group*</u>	reference
<b>Description (values)</b>					
	<p>Augments the "printer-state" attribute to give more detailed information about the Printer 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: other, none, media-needed, media-jam, moving-to-paused, paused, shutdown, connecting-to-device, timed-out, stopping, stopped-partly, toner-low, toner-empty, spool-area-full, cover-open, interlock-open, door-open, input-tray-missing, media-low, media-empty, output-tray-missing, output-area-almost-full, output-area-full, marker-supply-low, marker-supply-empty, marker-waste-almost-full, marker-waste-full, fuser-over-temp, fuser-under-temp, opc-near-eol, opc-life-over, developer-low, developer-empty, interpreter-resource-unavailable)</p>				
PrinterUpTime		integer	1:MAX	<u>S</u>	[rfc2911] §4.4.29
	The amount of time (in seconds) that a Printer has been up and running				
PrinterUriSupported	Yes	String	uri	<u>D</u>	[rfc2911] §4.4.1
	<p>Contains at least one URI for the Printer object. The PrinterUriSupported, UriAuthenticationSupported and the UriSecuritySupported are parallel attributes. Each of these attributes must have the same cardinality. The "i"th value of each of these attributes describes the URI for the printer, the authentication mechanism used and the security method used. (example: ipp://www.company.com/printer)</p>				
QueuedJobCount		integer	0:MAX	<u>S</u>	[rfc2911] §4.4.24
	The number of jobs that the Printer has accepted but has not yet completed.				
ReferenceUriSchemesSupported	Yes	String	UriScheme	<u>D</u>	[rfc2911] §4.4.27
	<p>Which URI schemes are supported by the printer to retrieve Document This attribute must be supported if the Printer is capable of print by reference. (example: ftp, http)</p>				
UriAuthenticationSupported	Yes	String	type2 keyword	<u>D</u>	[rfc2911] §4.4.2
	<p>The Client authentication mechanism that the Printer object uses to identify the user. See PrinterUriSupported for additional information. (keywords: none, requesting-user-name, basic, digest and certificate)</p>				
UriSecuritySupported	Yes	String	type2 keyword	<u>D</u>	[rfc2911] §4.4.3
	<p>Identifies the security mechanisms used for accessing the Printer object. See PrinterUriSupported for additional information. (keywords: none, ssl3, tls)</p>				

664

## 665 **7 Status Strings**

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

667 The following status strings are returned when the Printer accepts the action request and indicates  
668 some degree of success:

## PWG Semantic Model

669 successful-ok - Action succeeded and no requested attribute were substituted or ignored.  
670 successful-ok-ignored-or-substituted-attributes - Action succeeded but some unsupported attributes  
671 were ignored or substituted.  
672 successful-ok-conflicting-attributes - Action succeeded but some attributes were conflicting and  
673 have been substituted or ignored.  
674

675 The following status strings are returned when the Printer rejects the action indicating some error  
676 on the part of the Client:

677 client-error-bad-request - malformed syntax or constraint exceeded.  
678 client-error-forbidden - The Printer understood the request, but is refusing to fulfill it for  
679 authentication and/or authorization reasons. The client should not try again even with  
680 credentials.  
681 client-error-not-authenticated - The request requires user authentication. The client may try again  
682 with suitable authentication.  
683 client-error-not-authorized - The requester is not authorized to perform the request. The Client  
684 should not try again.  
685 client-error-not-possible - The action cannot be performed, because of the state of the target object.  
686 client-error-timeout - The client did not produce a subsequent request within the time that the  
687 Printer was prepared to wait.  
688 client-error-not-found - The target object was not found.  
689 client-error-gone - The target object is no longer available.  
690 client-error-request-entity-too-large - The request and/or the Document Content is too large.  
691 client-error-request-value-too-long - A attribute value in the request is longer than the Printer  
692 supports.  
693 client-error-document-format-not-supported - The document format is not supported.  
694 client-error-attributes-or-values-not-supported - An attribute and/or value is not supported and must  
695 be in order to carry out the request. The Printer must return the unsupported attributes or  
696 values in the Unsupported Attributes group.  
697 client-error-uri-scheme-not-supported - The URI scheme is not supported.  
698 client-error-charset-not-supported - The charset is not supported.  
699 client-error-conflicting-attributes - Some supplied attributes are conflicting. The Printer must  
700 return them in the Unsupported Attributes group.  
701 client-error-compression-not-supported - The compression of the Document Content is not  
702 supported.  
703 client-error-compression-error - An error occurred when uncompressing the Document Content.  
704 client-error-document-format-error - An error occurred when interpreting the Document Content.  
705 client-error-document-access-error - An error occurred when the Printer attempted to access the  
706 Document Content through the URI supplied.

707 client-error-attributes-not-settable - The supplied attribute(s) are not settable

708  
709 The following status strings are returned when the Printer rejects the action indicating some error  
710 on the part of the Printer:

711 server-error-internal-error - An unexpected internal error occurred.  
712 server-error-operation-not-supported - The Printer does not support the requested action.



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713 server-error-service-unavailable - The Printer is unable to service the request at this time due to  
714 overloading or maintenance. The client should try again later as per the “message”  
715 Operation attribute.  
716 server-error-version-not-supported - The Printer doesn’t support the requested major version of the  
717 protocol and returns the closest version that it does support.  
718 server-error-device-error - The Printer encountered a device error that causes it to be unable to  
719 accept a new request. For example, a paper jam for a Printer that doesn’t spool and so  
720 cannot accept a new job submission until the jam is fixed.  
721 server-error-temporary-error - A temporary error such as a buffer full write error, a memory  
722 overflow, or a disk full condition.  
723 server-error-not-accepting-jobs - The Printer is not currently accepting jobs. Its  
724 “PrinterIsAcceptingJobs” Printer Description attribute is ‘false’.  
725 server-error-busy - A temporary error indicating that the Printer is too busy processing jobs and/or  
726 other requests. A Client should try again later.  
727 server-error-job-canceled - The job has been canceled by an operator or aborted by the system. For  
728 example, while the Client is transmitting the Document Content to the Printer.  
729 server-error-multiple-document-jobs-not-supported - The Printer doesn’t support multiple  
730 document jobs and the client attempted to supply a second SendDocument or SendUri  
731 request. The Printer’s “MultipleDocumentJobsSupported” Printer Description attribute is  
732 ‘false’.  
733

## 734 8 Change Log

735 5/16/02 PJZ original draft  
736 5/23/02 TH re-organize draft with comments from Melinda Grant  
737 5/26/02 TH detailed review of the draft  
738 5/29/02 PJZ Incorporated comments prior to initial release  
739 6/4/02 SAA Modified to split the Job Attributes into 3 categories:  
740 1) Processing Attributes  
741 2) Content Attributes  
742 3) Job Attributes  
743  
744 The Processing Attributes were further split into 3 subcategories:  
745 1) Rendering attributes  
746 2) Imposition Attributes  
747 3) Finishing Attributes  
748 Added attributes from UPnP Print Basic service template: MediaSize, MediaType,  
749 DeviceId attributes.  
750 Removed references to Mandatory vs. Optional since a semantic model should not  
751 dictate what is used or not used by the future solutions targeted at specific markets.



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752 For example, UPnP picked specific attributes for the SOHO market and did not need  
753 all of the Mandatory IPP attributes.

754 Modified Printer Description Attributes with the following:

- 755 1) Added in DeviceId.
- 756 2) Changed Document\* to Content\*.
- 757 3) Removed VersionsSupported and OperationsSupported since these are  
758 dependent on the interface used in specific solutions.

759 6/17/02 PJZ Added high level description of PWG Action semantics and Printer state  
760 transitions. Returned VersionsSupported and OperationsSupported.

761 8/16/02 PJZ Changed Content back to document, Added PWG5100.1, PWG5100.2,  
762 PWG5100.3, PWG5100.4, job-progress to model. Filled out document object, added "Job Level"  
763 subcategory to Processing attributes

764 9/1/02 PJZ Changes from email input and PWG meeting. Printer/Job/Document  
765 Attribute groups broken out into State and Description groups

766 9/9/02 PJZ Final edits to ready document for review. Updated all figures and added  
767 highlighting of sections to review.

768 9/16/02 PJZ Added more definitions and document actions. Incorporated comments from  
769 teleconference and TH mail note. Updated references.

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834 ~~IPP-PWG Semantic Model~~ Web Page: <http://www.pwg.org/sm/>  
835 ~~PWG Semantic Model IPP~~ Mailing List: [sm@pwg.org](mailto:sm@pwg.org)  
836

837 To subscribe to the sm mailing list, send the following email:  
838 1) send it to [majordomo@pwg.org](mailto:majordomo@pwg.org)  
839 2) leave the subject line blank  
840 3) put the following two lines in the message body:  
841 subscribe sm  
842 end  
843

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

847

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849

850 **10 Appendix A – UPnP Definitions**

851 **10.1 DeviceID**

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

855 The IEEE 1284-2000 Device ID is a length field followed by a case-sensitive string of ASCII  
856 characters defining peripheral characteristics and/or capabilities. For the purposes of this

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857 specification, the length bytes MUST NOT be included. The Device ID sequence is composed of a  
858 series of keys and values of the form:

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

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

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

870

871 MANUFACTURER:ACME Manufacturing;

872 COMMAND SET:PCL,PJL,PS,XHTML-Print+xml;

873 MODEL:LaserBeam 9;

874 COMMENT:Anything you like;

875 ACTIVE COMMAND SET:PCL;

876

877 (See IEEE 1284-2000 clause 7.6)

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

## 881 **11 Appendix B – IPP Mapping**

882 This section summarizes the IPP operations using PWG semantics. Parameters inside square  
883 brackets ([ ]) indicate that the IPP Client may omit in a request or the Printer may omit in a  
884 response.

885

### 886 **11.1 Action Parameter Overview**

887 IPP Actions may contain a number of parameters. The first parameter is always the Operation  
888 Attributes for the Action. The Operation Attributes contains common information such as the  
889 target of the action (Job or Printer), a version number, or a sequence id to tie the request and  
890 response together. Other information is Action-specific such as the name of the Job to be created  
891 or a filter that controls the information to be returned in a query. The sections below describe the  
892 Operation Attributes and any other Action specific parameters.

893 **11.2 Job Creation Actions**

894 In the Job Creation actions (PrintJob, PrinURI, and CreateJob), the IPP Operation attributes  
 895 correspond to the PWG Job Description attributes (e.g., JobName, RequestingUserName) and the  
 896 IPP Job Template attributes correspond to a mixture of PWG Job Processing attributes (e.g.,  
 897 JobPriority, JobHoldUntil) and Document Processing attributes (Finishing, Copies, Media,  
 898 NumberUp) supplied at the job level as Document defaults.

899

900 **11.2.1 PrintJob**

901 ([rfc2911] §3.2.1)

902 **PrintJobRequest(**Operation Attributes, **[Job Processing Attributes]**, **[Job Finishing**  
 903 **Attributes]**, **[Document Attributes]**,**Document Data)**

904 **Operation Attributes:**

905 **PrinterUri(uri):** The target printer for the job  
 906 **[Document Attributes]:** **[requestingUserName]**, **[JobName]**,  
 907 **[DocumentFormat]**, **[JobKOctets]**, **[jobImpressions]**, **[JobMediaSheets]:**  
 908 see section 4.2.1.

909 **[Job Processing Attributes]:**

910 Any Job Processing Attribute (see section 4.3.2) or vendor/site specific extension.

911 **[Job Description Attributes]:**

912 Any Job Description Attribute (see section 3.2.2) or vendor/site specific extension.

913

914 **[Job Finishing Attributes]:**

915 Any Job Finishing Attribute (see section 4.3.2) or vendor/site specific extension.

916 **[Document Attributes]:**

917 Any Document Attributes for the single document sent (see section 4.3.2) or  
 918 vendor/site specific extension.

919

920 **Document data:** The document to print.

921

922 **PrintJobResponse(**Operation Attributes, **[Unsupported Attributes]**, **Job Attributes)**

923 **Operation Attributes :**

924 **statusCode:** Results of the action (see Appendix section [11.5.411.6](#)).  
 925 *[statusMessage]:* Localized text description of the status code.  
 926 *[detailedStatusMessage]:* Text for detailed and technical information about the job.

927 **[Unsupported Attributes]:** any unsupported or conflicting attributes and or attribute  
 928 values. May be returned on success or failure.

929 **Job Attributes:**

930 **JobUri, JobId, JobState, JobStateReasons , [JobStateMessage],**  
 931 **[NumberOfInterveningJobs]** See section 4.2.1.

932 **11.2.2 PrintUri**

933 ([rfc2911] §3.2.2) The calling sequence is the same as PrintJob () except that the Operation  
 934 Attributes in the request contains the “documentUri” attribute and the Document Data is omitted.

935 **11.2.3 CreateJob**

936 ([rfc2911] §3.2.4) Similar to the PrintJob operation (see section 11.2), except that in the CreateJob  
 937 request the Client does not supply Document Data. The client supplies a single set of Job  
 938 Processing attributes that the Printer applies to the Output Document(s) of the job.

939 **11.2.4 SendDocument**

940 ([rfc2911] §3.3.1 and [doc-obj] §3) Submits the entire Document Content for the next Input  
 941 Document of a job created by a previous CreateJob action (see section 11.2.3). The IPP  
 942 Operation attributes correspond to the PWG Document Description attributes and the Document  
 943 Template attributes correspond to the PWG Document Processing attributes.

944 **SendDocumentRequest(Operation Attributes, Document Data)**

945 **Operation Attributes:**

946 **JobUri(uri) or (PrinterUri(uri) and jobId(integer)):** The target job.

947 **[requestingUserName]:** see section 4.2.1.

948 **[Document Attributes]:**

949 **Document data:** The document to print.

950

951 **SendDocumentResponse(Operation Attributes, [Unsupported Attributes], Job Attributes)**

952 **Operation Attributes :**

953 **statusCode:** Results of the action (see Appendix section 11.5.411.6).

954 **[statusMessage]:** Localized text description of the status code

955 **[detailedStatusMessage]:** Text for detailed and technical information.

956 **[Unsupported Attributes]:** any unsupported or conflicting attributes and or attribute  
 957 values. May be returned on success or failure.

958 **Job Attributes:**

959 **JobUri, JobId, JobState, JobStateReasons , [JobStateMessage],**

960 **[NumberOfInterveningJobs]** See section .

961 **11.2.5 SendUri**

962 ([rfc2911] §3.3.2) The calling sequence is the same as SendDocument () except that the Document  
 963 Data is omitted and the Operation Attributes in the request contains the “documentUri” attribute  
 964 and the Document Data is omitted.

965 **11.2.6 ValidateJob**

966 ([rfc2911] §3.2.3) The calling sequence is similar to PrintJob (see section 11.2) except the request  
 967 does not contain the Document Data and the response does not contain the Job Attributes.

968 **11.3 Job Control Actions**

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

971 **11.3.1 CancelJob**

972 ([rfc2911] §3.3.3)

973 **CancelJobRequest(Operation Attributes)**

974 **Operation Attributes:**

975 **JobUri(uri)** or (**PrinterUri(uri)** and **JobId(integer)**): The target job.

976 **[requestingUserName]**: see section 4.2.1.

977 **[message(string)]**: *Message from the Client to the Printer Operator. Utilized in an*  
978 *implementation specific manner.*

979

980 **CancelJobResponse(Operation Attributes, [Unsupported Attributes])**

981 **Operation Attributes :**

982 **statusCode**: Results of the action (see Appendix section 11.5.411.6).

983 **[statusMessage]**: *Localized text description of the status code.*

984 **[detailedstatusMessage]**: *Text for detailed and technical information about the job*

985 **[Unsupported Attributes]**: any unsupported or conflicting attributes and or attribute

986 values. May be returned on success or failure.

987 **11.3.2 HoldJob**

988 ([rfc2911] §3.3.5) The request calling sequence is similar to CancelJob (see section 11.3.1) except  
989 that the “jobHoldUntil” attribute may be in the “Operation Attributes”. The response sequence is  
990 the same as CancelJob.

991 **11.3.3 ReleaseJob**

992 ([rfc2911] §3.3.6) The calling sequence is the same as CancelJob (see section 11.3.1).

993 **11.3.4 RestartJob**

994 ([rfc2911] §3.3.7) The request calling sequence is similar to CancelJob except that the  
995 “jobHoldUntil” attribute may be in the “Operation Attributes”. The response sequence is the same  
996 as CancelJob (see section 11.3.1).

997 **11.3.5 SetJobAttributes**

998 **([set-ops] §4.2) SetJobAttributesRequest(Operation Attributes)**



999            **Operation Attributes:**  
1000            **JobUri(uri) or (PrinterUri(uri) and JobId(integer)):** The target job  
1001            **[requestingUserName]:** see section 4.2.1.  
1002            **[AttributesToBeSet]:** set of Job Attribute to be set for each Job.  
1003            **Job Attributes (attributes/values):** The supplied attributes and their values to be set.

1004  
1005            **SetJobAttributesResponse(Operation Attributes, [Unsupported Attributes])**

1006            **Operation Attributes :**  
1007            **statusCode:** Results of the action (see Appendix section 11.5.4).  
1008            **[statusMessage]:** Localized text description of the status code.  
1009            **[detailedstatusMessage]:** Text for detailed and technical information about the job.  
1010            **[Unsupported Attributes]:** any unsupported or conflicting attributes and or attribute  
1011            **values. May be returned on success or failure.**

### 1012    **11.3.6    SetDocumentAttributes**

1013    **([set-ops] §4.2) SetDocumentAttributesRequest(Operation Attributes)**

1014            **Operation Attributes:**  
1015            **JobUri(uri) or (PrinterUri(uri) and JobId(integer)) and DocumentNumber:**  
1016            The target job and document.  
1017            **[RequestingUserName]:** see section 4.2.1.  
1018            **[AttributesToBeSet]:** set of Document Attribute to be set for the Document.  
1019            **Job Attributes (attributes/values):** The supplied attributes and their values to be set.

1020  
1021            **SetDocumentAttributesResponse(Operation Attributes, [Unsupported Attributes])**

1022            **Operation Attributes :**  
1023            **statusCode:** Results of the action (see Appendix section 11.5.4).  
1024            **[statusMessage]:** Localized text description of the status code.  
1025            **[detailedstatusMessage]:** Text for detailed and technical information about the job.  
1026            **[Unsupported Attributes]:** any unsupported or conflicting attributes and or attribute  
1027            **values. May be returned on success or failure.**

## 1028    **11.4 Status and information Actions**

1029    This section describes the actions that allow a client to obtain status and attributes of Jobs and  
1030    PrinterS: GetJobs, GetPrinterAttributes, and GetJobAttributes.

### 1031    **11.4.1    GetJobs**

1032    ([rfc2911] §3.3.4)

1033    **GetJobsRequest(Operation Attributes)**

1034            **Operation Attributes:**  
1035            **PrinterUri(uri):** The target printer containing the jobs  
1036            **[requestingUserName]:** see section 4.2.1.



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1037 **[requestedAttributes (string(multivalued))]**: set of Job Attribute and/or Attribute  
1038 Group names to be returned for each Job. Default = 'JobUri' and 'JobId'.  
1039 **[whichJobs(string)]**: Allows user to restrict jobs returned to completed or  
1040 active/queued states. (keywords: completed, not-completed (Default)).  
1041 **[myJobs(boolean)]**: Allows user to restrict jobs returned to just the user's jobs or  
1042 all jobs. Default = 'false'.  
1043 **[limit(integer)]**: Sets maximum number of jobs to return. Default = no limit.  
1044 **GetJobsResponse(Operation Attributes, [Unsupported Attributes], Job Attributes)**  
1045 **Operation Attributes :**  
1046 **statusCode**: Results of the action (see Appendix section [11.5.411.6](#)).  
1047 *[statusMessage]*: Localized text description of the status code.  
1048 *[detailedstatusMessage]*: Text for detailed and technical information about the job.  
1049 **Unsupported Attributes**: any unsupported or conflicting attributes and or attribute values.  
1050 May be returned on success or failure.  
1051 **Job Attributes(sequence of requested attributes/values ~~(multivalued)~~)**: A list of jobs each  
1052 containing the requested attributes with their values.

### 11.4.2 GetPrinterAttributes

1054 ([rfc2911] §3.2.5)

1055 **GetPrinterAttributesRequest(Operation Attributes)**

1056 **Operation Attributes:**

1057 **PrinterUri(uri)**: The target printer

1058 **[requestingUserName]**: see section 4.2.1.

1059 **[requestedAttributes (string(multivalued))]**: set of Printer Attribute and/or  
1060 Attribute Group names to be returned. Default = 'all'.

1061 **[DocumentFormat(string)]**: Since some capabilities can be PDL specific, this  
1062 optional attributes allows the Printer to return capabilities based on PDL if  
1063 known to the Printer.

1064 **GetPrinterAttributesResponse(Operation Attributes, [Unsupported Attributes], Printer  
1065 Attributes)**

1066 **Operation Attributes :**

1067 **statusCode**: Results of the action (see Appendix section [11.5.411.6](#)).  
1068 *[statusMessage]*: Localized text description of the status code.  
1069 *[detailedstatusMessage]*: Text for detailed and technical information about the  
1070 Printer.

1071 **[Unsupported Attributes]**: any unsupported or conflicting attributes and or attribute  
1072 values. May be returned on success or failure.

1073 **Printer Attributes(requested attributes/values ~~(multivalued)~~)**: The requested attributes  
1074 and their values.

### 11.4.3 GetJobAttributes

1076 ([rfc2911] §3.3.4) .

1077 **GetJobAttributesRequest(Operation Attributes)**

1078 **Operation Attributes:**

1079 **JobUri(uri)** or (**PrinterUri(uri)** and **JobId(integer)**): The target job

1080 **[requestingUserName]**: see section 4.2.1.

1081 **[requested-attributes (string(multivalued))]**: set of Job Attribute and/or Attribute  
1082 Group names to be returned for each Job. Default = 'all'.

1083 **GetJobAttributesResponse(Operation Attributes, [Unsupported Attributes], Job Attributes)**

1084 **Operation Attributes :**

1085 **statusCode**: Results of the action (see Appendix section [11.5.411.6](#)).

1086 *[statusMessage]*: Localized text description of the status code.

1087 *[detailedstatusMessage]*: Text for detailed and technical information about the job.

1088 **[Unsupported Attributes]**: any unsupported or conflicting attributes and or attribute  
1089 values. May be returned on success or failure.

1090 **Job Attributes(requested attribute/values(multivalued))**: The requested attributes and  
1091 their values)

1092 **11.4.4 GetPrinterSupportedValues**

1093 ([set-ops] §4.3) Has the same calling sequence as the GetPrinterAttributes operation, except that  
1094 only XxxSupported Printer Description attributes are returned.

1095 **11.4.5 GetDocuments**

1096 ([doc-obj] §3)

1097 **GetDocumentsRequest(Operation Attributes)**

1098 **Operation Attributes:**

1099 **PrinterUri(uri)**: The target printer containing the jobs

1100 **[requestingUserName]**: see section 4.2.1.

1101 **[requestedAttributes (string(multivalued))]**: set of Job Attribute and/or Attribute  
1102 Group names to be returned for each Job. Default = 'JobUri' and 'JobId'.

1103 **[whichDocuments(string)]**:Allows user to restrict jobs returned to completed or  
1104 active/queued states. (keywords: completed, not-completed, all (Default)).

1105 **[limit(integer)]**: Sets maximum number of Documents to return. Default = no  
1106 limit.

1107 **GetDocumentsResponse(Operation Attributes, [Unsupported Attributes], Document**  
1108 **Attributes)**

1109 **Operation Attributes :**

1110 **statusCode**: Results of the action (see Appendix section [11.5.4](#)).

1111 *[statusMessage]*: Localized text description of the status code.

1112 *[detailedstatusMessage]*: Text for detailed and technical information about the job.

1113 **Unsupported Attributes**: any unsupported or conflicting attributes and or attribute values.  
1114 May be returned on success or failure.

1115 Document Attributes(sequence of requested attributes/values): A list of Documents each  
1116 containing the requested attributes with their values.

#### 1117 **11.4.6 GetDocumentAttributes**

1118 ([doc-obj] §3)

#### 1119 GetDocumentAttributesRequest(Operation Attributes)

##### 1120 Operation Attributes:

1121 JobUri(uri) or (PrinterUri(uri) and JobId(integer)): The target Job

1122 DocumentNumber: The target Document within the Job

1123 [requestingUserName]: see section 4.2.1.

1124 [requested-attributes (string(multivalued))]: set of Document Attribute and/or  
1125 Attribute Group names to be returned for each Document. Default = 'all'.

#### 1126 GetDocumentAttributesResponse(Operation Attributes, [Unsupported Attributes], 1127 Document Attributes)

##### 1128 Operation Attributes :

1129 statusCode: Results of the action (see Appendix section 11.5.4).

1130 [statusMessage]: Localized text description of the status code.

1131 [detailedstatusMessage]: Text for detailed and technical information about the job.

1132 [Unsupported Attributes]: any unsupported or conflicting attributes and or attribute  
1133 values. May be returned on success or failure.

1134 Document Attributes(requested attribute/values): The requested attributes and their  
1135 values).

### 1136 **11.5 Printer Control Actions**

1137 This section describes actions which allow a client to control a Printer and may require operator  
1138 credentials: PausePrinter, ResumePrinter, ~~and~~ PurgeJobs, DisablePrinter, EnablePrinter, and  
1139 SetPrinterAttributes.

#### 1140 **11.5.1 PausePrinter**

1141 ([rfc2911] §3.2.7)

#### 1142 PausePrinterRequest(Operation Attributes)

##### 1143 Operation Attributes:

1144 PrinterUri(uri): The target printer for the job

1145 [requestingUserName]: see section 4.2.1.

#### 1146 PausePrinterResponse(Operation Attributes, [Unsupported Attributes])

1147       **Operational Attributes :**  
1148            **statusCode:** Results of the action (see Appendix section [11.5.411-6](#)).  
1149            *[statusCode]: Localized text description of the status code.*  
1150            *[detailedStatusCode]: Text for detailed and technical information.*  
1151        **[Unsupported Attributes]:** any unsupported or conflicting attributes and or attribute  
1152        values. May be returned on success or failure.

1153    **11.5.2        ResumePrinter**  
1154    ([rfc2911] §3.2.8) The calling sequence is the same as PausePrinter (see section 11.5.1).

1155    **11.5.3        PurgeJobs**  
1156    ([rfc2911] §3.2.9) The calling sequence is the same as PausePrinter (see section 11.5.1).

1157    **11.5.4        DisablePrinter**  
1158    ([\[adm-ops\] §3.1.1](#)) The calling sequence is the same as PausePrinter (see section 11.5.1).

1159    **11.5.5        EnablePrinter**  
1160    ([\[adm-ops\] §3.1.2](#)) The calling sequence is the same as PausePrinter (see section 11.5.1).

1161    **11.5.6        SetPrinterAttributes**  
1162    ([\[set-ops\] §4.1](#))

1163    **SetPrinterAttributesRequest(Operation Attributes, Printer Attributes)**

1164        **Operation Attributes:**  
1165            **PrinterUri(uri):** The target printer  
1166            **[requestingUserName]:** see section 4.2.1.

1167        **Printer Attributes:**  
1168            **Printer Description Attributes and values to be set**

1169    **SetPrinterAttributesResponse(Operation Attributes, [Unsupported Attributes])**

1170        **Operation Attributes :**  
1171            **statusCode:** Results of the action (see Appendix section 11.5.4).  
1172            *[statusCode]: Localized text description of the status code.*  
1173            *[detailedstatusCode]: Text for detailed and technical information about the*  
1174            *Printer.*

1175        **[Unsupported Attributes]:** any unsupported or conflicting attributes and or attribute  
1176        values. May be returned on success or failure.

## 1177    **11.6 Changes to remove some IPP specific aspects**

1178    This section lists some changes to remove some IPP specific aspects from the PWG Semantic  
1179    Model. Any attribute name containing “ipp” has had the “ipp” removed. The IPP operation names  
1180    have the hyphens removed to be the PWG action names and the operations supported are mixed  
1181    keywords, not integer enum values. All attributes names have had the first letter capitalized and

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1182 the ‘-‘ character removed and the character following the ‘-‘ has been capitalized. The keyword  
1183 attribute values defined remain unchanged and are all lower case, except for the ones that specify  
1184 other attributes names (which are changed to be the mixed case without hyphens). **ISSUE8: What**  
1185 **about the case and hyphens in status code names (and removing the integer values)?**—The term  
1186 “object” is sometimes changed to “data class”. **ISSUE8: Why? and Why not done consistently?**  
1187 The term “operation” has been changed to “action” to use the term more frequently used with  
1188 XML.

1189 The aspects of the model that deal with globalization (i.e. character set & language) have been  
1190 removed. **ISSUE9: Should this be described generically in this document** Globalization will be  
1191 addressed in a protocol specific binding of this semantic model. The Printer globalization attributes  
1192 are charsetConfigured, charsetSupported, naturalLanguageConfigured, naturalLanguageSupported  
1193 and generatedNaturalLanguageSupported.

1194 The types of the attributes have been simplified. All keyword, text, name, DateTime, uri,  
1195 UriScheme, enum and mimeType are represented by the simple string type. The term  
1196 “keyword” continues to be used for string values enumerated as part of the PWG Model. The  
1197 integer enums values are replaced by their associated keyword. The “1setOf X” types are  
1198 represented as the base type and the “Multivalued” field in the tables below set to “Yes”. Integers  
1199 and Boolean types remain the same. Any applicable constraints placed on the attribute values has  
1200 been noted in the tables below.

1201 The following IPP attributes are not included: operation-id, attributes-charset, attributes-natural-  
1202 language, page-overrides, request-id, version-number