

7 Internet Printing Protocol (IPP)/1.0 & 1.1: Exception Attributes for Documents and Pages  
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9 Status of this Memo

10 This document is a PWG-Draft of an IEEE-ISTO PWG Proposed Standard and is in full conformance with  
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12 are working documents of the IEEE-ISTO PWG and its working groups.

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14 Abstract

15 This document specifies an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and  
16 IPP/1.1 [ipp-mod, ipp-pro]. This extension relaxes the restriction that each attribute value is the same for all  
17 ~~pages and~~ pages, all documents and all document copies within a job. For example, with this extension,  
18 page 1 of a job could have a different media from the other pages in the job or document 2 of a job could be  
19 stapled while the other documents of the job are not.

20 As another example, the first ten copies of a document could be printed on letter paper and stapled while  
21 the eleventh copy of the same document could be printed on transparencies with no staple.

22  
23 This extension supports document exceptions and page exceptions by adding two new Job Template  
24 attributes: “document-exceptions” and “page-exceptions” -- both have a syntax type of “1setOf collection”.  
25 Each ‘collection’ value for “document-exceptions” contains an attribute that identifies the exception  
26 documents, namely “input-documents” or “output-documents”. The ‘collection’ value also contains one or  
27 more attributes that are exceptions for the identified documents, e.g. “document-format”, “finishings”, and  
28 “media”. Each ‘collection’ value for “page-exceptions” contains two attributes that identify the exception  
29 pages, namely “input-documents” or “output-documents” plus “pages”. The ‘collection’ value also  
30 contains one or more attributes that are exceptions for the identified pages, e.g. “sides” and ~~“media”~~.  
31 “media”. When the exceptions applies to some but not all document copies, the ‘collection’ value for  
32 “document-exceptions” or “page-exceptions” contains the attribute of “document-copies”.

33  
34 This extension also supports subset finishing by adding a new Job Template attribute “pages-per-subset”,  
35 which specifies the number of pages per subset. The extension allows finishing and other document  
36 attributes to be applied to such subsets of pages.

37  
38 The full set of IPP documents includes:

39 Design Goals for an Internet Printing Protocol [RFC2567]

40 Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]

41 Internet Printing Protocol/1.1: Model and Semantics (this document)

42 Internet Printing Protocol/1.1: Encoding and Transport [IPP-PRO]

43 Internet Printing Protocol/1.1: Implementer's Guide [IPP-IIG]

44 Mapping between LPD and IPP Protocols [RFC2569]

45 The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed printing  
46 functionality, and it enumerates real-life scenarios that help to clarify the features that need to be included  
47 in a printing protocol for the Internet. It identifies requirements for three types of users: end users,  
48 operators, and administrators. It calls out a subset of end user requirements that are satisfied in IPP/1.0. A  
49 few OPTIONAL operator operations have been added to IPP/1.1.

50 The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document  
51 describes IPP from a high level view, defines a roadmap for the various documents that form the suite of  
52 IPP specification documents, and gives background and rationale for the IETF working group's major  
53 decisions.

54 The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the abstract  
55 operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines the  
56 encoding rules for a new Internet MIME media type called "application/ipp". This document also defines  
57 the rules for transporting over HTTP a message body whose Content-Type is "application/ipp". This  
58 document defines a new scheme named 'ipp' for identifying IPP printers and jobs.

59 The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to  
60 implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some of the  
61 considerations that may assist them in the design of their client and/or IPP object implementations. For  
62 example, a typical order of processing requests is given, including error checking. Motivation for some of  
63 the specification decisions is also included.

64 The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of gateways  
65 between IPP and LPD (Line Printer Daemon) implementations.

66

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## 1. Introduction

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The Internet Printing Protocol (IPP) is an application level protocol for distributed printing using Internet tools and technologies. IPP version 1.1 (IPP/1.1) requires that each attribute value be the same for all all pages, all documents and all pages in document copies within a job. This document defines OPTIONAL extensions to the IPP/1.1 model which relax this restriction and allow pages, documents and pages document copies to have attributes that are exceptions. For example, with this extension, page 1 of a job could have a different media or different value of “sides” from the other pages in the job, or document 2 of a job could be stapled while the other documents of the job are not. As another example, the first ten copies of a document could be printed on letter paper and stapled while the eleventh copy of the same document could be printed on transparencies with no staple. This document is a proposal for an extension to IPP/1.0 and IPP/1.1.

This extension supports document exceptions and page exceptions by adding two new Job Template attributes: “document-exceptions” and “page-exceptions” -- both have a syntax type of “1setOf collection”. Each ‘collection’ value for “document-exceptions” contains

- a) an attribute that identifies the exception documents, namely “input-documents” or “output-documents”.
- b) The ‘collection’ value also contains an OPTIONAL attribute that identifies the document copies of the specified exception documents, i.e. “document-copies”. If this attribute is absent, the exceptions apply to all document copies.
- c) one or more attributes that are exceptions for the identified documents, e.g. “document-format”, “finishings”, and “media”.

Each ‘collection’ value for “page-exceptions” contains

- a) two attributes that identify an attribute that identifies the documents containing the exception pages, namely “input-documents” or “output-documents”.
- b) an attribute that identifies the exception pages, namely “pages”.
- c) an OPTIONAL attribute that identifies the document copies of the specified documents, i.e. “document-copies”. If this attribute is absent, the exceptions apply to all document copies.
- d) documents” or “output-documents” plus “pages”. The ‘collection’ value also contains one or more attributes that are exceptions for the identified pages, e.g. “sides” and “media”.

This extension also supports subset finishing with a new Job Template attribute “pages-per-subset”, which specifies the number of pages per subset. The extension allows finishing and other document attributes to be applied to such subsets of pages.

194

## 2. Terminology

195

This section defines the following additional terms that are used throughout this document:

## 196 2.1 REQUIRED

197 If an implementation supports the extensions described in this document, it MUST support a  
198 REQUIRED feature.

## 199 2.2 OPTIONAL

200 If an implementation supports the extensions described in this document, it MAY support an  
201 OPTIONAL feature.

## 202 2.3 Exception-Extension

203 The Exception-Extension is the extension proposed in this document that adds attribute exceptions  
204 for documents and pages. This extension supports Document-Exceptions, Page-Exceptions and  
205 Subset-Finishing, which are all defined later in this section.

## 206 2.4 Sheet

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

## 209 2.5 Output-Page

210 An Output-Page is the set of all markings that the author intended to be placed on one side of a  
211 Sheet, including, but not limited to, text, drawings, images, footers and headers.

## 212 2.6 Impression:

213 An impression is the set of all markings that the Job submitter intended to be placed on one side of a  
214 Sheet. Each impression contains one or more Output-Pages. Generally a Job submitter prints each  
215 Output-Page as the author intended, namely one Output-Page per Impression. Sometimes, a Job  
216 submitter prints several Output-Pages per Impression, perhaps to save paper or money. The IPP  
217 attribute “number-up” specifies the number of Output-Pages per impression. When “number-up” is  
218 greater than 1, an impression contains multiple Output-Pages.

## 219 2.7 Input-Page

220 An Input-Page is a sequence of bytes that describe how to mark a single Output-Page. IPP 1.1 [ipp-  
221 mod] uses the term “print-stream-pages” to refer to both Input-Pages and Output-Pages. There is a  
222 one to one relationship between Input-Pages and Output-Pages and they are in the same order. Both  
223 Input-Pages and Output-Pages are numbered sequentially (see section 4.1) starting from 1 at the  
224 beginning of each Input-Document or Output-Document, respectively. When the first Input-Page of  
225 an Input-Document coincides with the first Output-Page of an Output-Document, the numbering of  
226 Input-Pages and Output-Pages coincides; otherwise it doesn't.

## 227 2.8 Input-Document

228 An Input-Document is the entire sequence of bytes transmitted as the Document Content in the  
 229 Print-Job and Send-Document operations or referenced by the "document-uri" operation attribute in  
 230 the Print-URI and Send-URI operations. This sequence of bytes consists of one or more Input-  
 231 Pages.

## 232 2.9 Output-Document

233 An Output-Document is a set of one or more Sheets which either are permanently bound into a  
 234 single unit, e.g. with a staple, or are intended to be treated by an end-user as a single unit, e.g. for a  
 235 loose leaf binder. If an Output-Document is bound, it is uniformly bound; if it is not bound, no  
 236 subset of sheets within it are bound. The Output-Pages that comprise an Output-Document may  
 237 come from

- 238 a) all the Input-Pages of an Input-Document or
- 239 b) a proper subset of the Input-Pages of the Input-Document or
- 240 c) all the Input-Pages of several Input-Documents.

241  
 242  
 243 An Output-Document is *not* a set of sheets that are bound temporarily for shipping, e.g. with  
 244 banding.

## 245 2.10 Output-Document-Copy

246 When a Printer produces more than one or more copies of an Output-Document, each copy is called  
 247 an Output-Document-Copy. Sometimes this specification uses the phrase "copy of Output-  
 248 Document" to emphasize "copy", but the phrase is equivalent to "Output-Document-Copy".

## 249 2.11 Relationship between Input-Document and Output-Documents

250 Each relationship is named and defined below. The cases are derived from an analysis of possible  
 251 tree structures (see section 4.2). A client selects the desired case with the number of submitted  
 252 Input-Documents and the specific values of three attributes: the existing Job Template "multiple-  
 253 document-handling" and two new attributes "pages-per-subset" and "documents-per-subset". The  
 254 latter two attributes describe how the stream of Input-Pages or Input-Documents and are partitioned  
 255 into Output-Documents, respectively.

256  
 257 In this section, the number of copies produced for each Output-Document does not affect the  
 258 discussion, so it is easiest to assume that the number is 1.

259  
 260 The table below summarizes the relationship of Input-Documents to Output-Document in the five  
 261 cases:

262

Case	Number of	
	Input-Documents	Output-Documents



Case	Number of	
	Input-Documents	Output-Documents
Degenerate	1	1
Separate-Documents	n	n
Single-Document	n	1
Page-Subset Documents	n	m (m >n)
Document-Subset Documents	n	m (m < n)

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When n = 1 for the “Separate-Documents” and “Single-Document” become the “Degenerate” case.

The table below summarizes the attribute values that control the cases.

The “separate” value means that “multiple-document-handling” is 'separate-documents-collated-copies' or 'separate-documents-uncollated-copies'.

The “single” value means that “multiple-document-handling” is 'single-document' or 'single-document-new-sheet'.

The “ignored” value means that the attribute need not be present and is ignored if it is present,

The “present” value means that the attribute must be present. A different case is implied if it is not present.

The “not present” value means that the attribute must not be present. A different case is implied if it is present.

Case	“multiple-document-handling”	“pages-per-subset”	“documents-per-subset”
Separate-Documents	separate	not present	not present
Single-Document	single	ignored	ignored
Page-Subset Documents	separate	present	not present
Document-Subset Documents	separate	not present	present

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The Degenerate row is omitted because it follows the rules for the “Separate-Documents” and “Single-Documents” rules when the number of Input-Documents is 1.

There is an error if both “page-per-subset” and “document-per-subset” are present in the “separate” case.

283 **2.11.1 Degenerate Case:**

284 In the Degenerate Case, the Job consists of exactly one Output-Document and exactly one  
285 Input-Document. The single Input-Document produces the single Output-Document. This  
286 case represents the most common case of printing. For example, if a user is Printing a single  
287 MS Word file, the MS Word file is the Input-Document and the printed pages are the  
288 Output-Document. This case is the degenerate case of Separate-Documents and Single-  
289 Document. It occurs when the number of Input-Documents is 1 and either  
290

- 291 a) “multiple-document-handling” is 'separate-documents-collated-copies' or 'separate-  
292 documents-uncollated-copies' and neither “pages-per-subset” nor “documents-per-  
293 subset” are present or.  
294 b) “multiple-document-handling” is 'single-document' or 'single-document-new-sheet', and  
295 both “pages-per-subset” and “documents-per-subset” are ignored if present

### 296 **2.11.2 Separate Documents Case**

297 In the Separate Documents Case, the Job consists of one or more Output-Documents where  
298 each Input-Documents produces one Output-Documents. For example, if a user prints 10 Java  
299 files in one Job and wants 10 separately stapled Output-Documents, each of the 10 Java files  
300 is an Input-Documents, and the printed Output-Pages from each of the 10 Java files is a  
301 separate Output-Documents that is stapled separately. This case occurs when “multiple-  
302 document-handling” is 'separate-documents-collated-copies' or 'separate-documents-  
303 uncollated-copies' and the new attributes “pages-per-subset” and “documents-per-subset” are  
304 not present.

### 305 **2.11.3 Single Document Case**

306 In the Single Document Case, the job consists of a single Output-Documents produced from  
307 one or more Input-Documents. For example, if a user prints 10 Java files in one Job and  
308 wants all Output-Pages of the 10 Java files to be produced as 1 stapled Output-Documents,  
309 then each of the 10 Java files is an Input-Documents, and all printed Output-Pages from all of  
310 the 10 Java files is a single Output-Documents that is stapled. This case occurs when  
311 “multiple-document-handling” is 'single-document' or 'single-document-new-sheet'; the  
312 value of “pages-per-subset” and “documents-per-subset” are both ignored if present.

### 313 **2.11.4 Page-Subset Document Case:**

314 In the Page-Subset Case, the Job consists of one or more Output-Documents and one or  
315 more Input-Documents. The new attribute “pages-per-subset” contains a sequence of  
316 integers which specifies how to partition the stream of Input-Pages into subsets, each of  
317 which produces an Output Document. For example, if a user prints 1 PostScript file with  
318 1000 pages, where each 4 Output-Pages represents an insurance policy, then the PostScript  
319 file is the Input-Documents and each group of 4 Output-Pages is an Output-Documents. The  
320 resulting Output-Documents would be the same if the same 1000 Input-Pages were spread  
321 across 2 or more PostScript files. This case occurs when “multiple-document-handling” is  
322 'separate-documents-collated-copies' or 'separate-documents-uncollated-copies' and the new  
323 attribute “pages-per-subset” contains 1 or more integer values. The new attribute  
324 “documents-per-subset” is not present.

### 325 **2.11.5 Document-Subset Document Case:**

326 This case is defined here for completeness, but it is not supported by this extension.  
327

328 In the Document-Subset Document Case, the Job consists of one or more Output-Documents  
329 and one or more Input-Documents. The new attribute “documents-per-subset” contains a  
330 sequence of integers which specifies how to partition Job’s Input-Documents into subsets,

331 each of which produces an Output Document. For example, if a user prints 25 Java files in  
332 one Job and wants 2 separately stapled Output-Documents, one with 15 Java files and one  
333 with 10 Java files, then each of the Java files is an Input-Document, and the printed Output-  
334 Pages from the first 15 Java files and next 10 Java files are two separate Output-Documents  
335 that are stapled separately. This case occurs when “multiple-document-handling” is  
336 'separate-documents-collated-copies' or 'separate-documents-uncollated-copies' and  
337 “documents-per-subset” contains 1 or more integer values. The new attribute “pages-per-  
338 subset” is not present.  
339

## 340 **2.12 Document-Exceptions**

341 In IPP/1.1 each attribute value is the same for the entire Job. When an attribute is a “Document-  
342 Exceptions” attributes, it is different for identified Input-Documents or Output-Documents.

## 343 **2.13 Page-Exceptions**

344 In IPP/1.1 each attribute value is the same for the entire Job. When an attribute is a “Page-  
345 Exceptions” attributes, it is different for identified Input-Pages or Output-Pages.

## 346 **2.14 Subset-Finishing**

347 Subset-Finishing is the ability to subdivide the stream of Input-Pages from one or more Input-  
348 Documents into multiple Output-Documents and to apply the same or different finishing to each  
349 individual Output-Document.

## 350 **2.15 Affects**

351 Each attribute is said to ‘affect’ some part of a job. For example, “media” affects a sheet,  
352 “finishings” affects an Output-Document, “page-ranges” affects an Input-Document and “job-  
353 priority” affects a job. This nuance must be explicit in the Exceptions-Extension because the parts  
354 of a job that an attribute affects limit the parts of a job that an attribute can be associated with (see  
355 the next section for a definition of “associates”). For example, “job-priority” affects a job; so it can  
356 be associated with a Job, but not an Input-Document or Input-Page. Likewise, “finishings” affects  
357 and Output-Document; so it can be associated with a Job or an Output-Document, but not with an  
358 Output-Page.

## 359 **2.16 Associates**

360 The word “associates” combines the meaning of the two terms in subsections of this section, namely  
361 “directly associates” and “effectively associates”. When an attribute is either directly associated or  
362 effectively associated with some part of a job, it is said to be “associated” with that part of a job.

### 363 2.16.1 Directly Associates

364 When an attribute is said to be ‘directly associated’ with some part of a job, it affects that  
365 part or some other part. The part that it affects depends on the attribute and what the attribute  
366 is directly associated with. For example if “media” is directly associated with a job, it affects  
367 all sheets in the job. If “media” is directly associated with an Output-Document, it affects all  
368 sheets in that Output-Document. If “media” is directly associated with an Output-Page, it  
369 affects the sheet containing that Output-Page.

### 370 2.16.2 Effectively Associates

371 When an attribute is said to be directly associated with some part of a job ‘A’ that is  
372 semantically connected with another part ‘B’, the attribute is said to be “effectively  
373 associated” with ‘B’. For example, in the Separate-Documents Case, when an attribute is  
374 directly associated with an Input-Document, it is effectively associated with the  
375 corresponding Output-Document.

## 376 2.17 Job-Submission Operations:

377 The Job-Submission Operations are the IPP operations that create jobs and send document content,  
378 namely Print-Job, Print-URI, Create-Job, Send-Document and Send-URI.

## 379 3. Requirements

380 The following is a list of requirements for the Exceptions-Extension.

- 381
- 382 1. The Exception-Extension MUST contain a mechanism for specifying Job attributes that are  
383 exceptions for particular Input-Documents or Output-Documents. A Printer and a client  
384 OPTIONALLY support this mechanism.
- 385 2. There MUST be a mechanism for specifying Job attributes that are exceptions for particular Input-  
386 Pages or Output-Pages. A Printer and a client OPTIONALLY support this mechanism.
- 387 3. There MUST be a mechanism for specifying Job attributes that are exceptions for particular  
388 document copies of Output-Documents. A Printer and a client OPTIONALLY support this  
389 mechanism.
- 390 4. The mechanism for exceptions MUST be supported by all Job-Submission operations and Validate-  
391 Job.
- 392 5. The extension MUST support the four relationships of Input-Documents and Output-Documents:  
393 Degenerate Case, Separate-Documents Case, Single-Document Case and Page-Subset Document  
394 Case.
- 395 6. The extension MUST support Subset-Finishing.

## 396 4. Overview

397 In IPP 1.1 all attributes that a client includes with job creation operations affect the entire Job in a uniform  
398 way. That is, there is no way for one Output-Document in a given Job to be stapled and another drilled.

399 Also, there is no way for the first sheet of each Output-Document to be on a different media or to have a  
400 different value of “sides” from the other Sheets in the Output-Document. In addition, there is no way for  
401 one document copy to be printed on paper and another on transparencies. An IPP/1.1 client can specify  
402 features, such as finishing, media and sides only at the job level.

403  
404 The Exception Extension defined in this document allows some Output-Pages, some Output-Documents  
405 and some Input-Documents to be affected by attribute values that are exceptions to those specified for the  
406 Job as a whole. For example, the first Output-Page of an Output-Document has a different media from the  
407 rest, or the second Output-Document is stapled and the rest are not, or the page-ranges of the first Input-  
408 Document selects a few Input-Pages and the rest of the Input-Documents are printed in full, or one copy of  
409 an Output-Document has a different media from the rest.

## 410 **4.1 Numbering of Components**

411 The Exception Extension defines a system for numbering of components.

412  
413 Each Input-Document has a number. The single Input-Document that a client sends with Print-Job or  
414 Print-URI and the first Input-Document that a client sends with Send-Documents or Send-URI has a  
415 number of 1. Each subsequent Input-Document that a clients sends has a number that is one higher  
416 than the previous.

417 Each Input-Page in an Input-Document is numbered sequentially, starting at 1 for the first Input-Page. If  
418 a Job has several Input-Documents, the first Input-Page of each Input-Document has the number of  
419 1, which is relative to that Input-Document.

420 Each Output-Document has a number. The first Output-Document has a number of ‘1’, and each  
421 subsequent Output-Document has a number that is one higher than the previous Output-Document.  
422 The Output-Documents are numbered as if the value of “copies” were 1, i.e. if an Input-Document  
423 produces multiple copies, each copy of a particular Output-Document has the same number.

424 Each Output-Page in an Output-Document is numbered sequentially, starting at 1 for the first Output-  
425 Page. If a Job has several Output-Documents, the first Output-Page of each has the number of 1,  
426 which is relative to that Output-Document

427 Each copy of an Output-Document has a number. The first copy of each Output-Document has a  
428 number of ‘1’, and each subsequent copy has a number that is one higher than the previous copy. If  
429 a job has multiple Output-Documents, the first copy of each has a number of ‘1’.

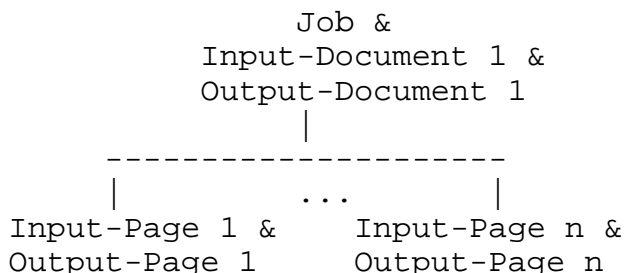
## 430 **4.2 Relationship of Numbered Components**

431 The previous section described how to number Input-Documents, Output-Documents, Input-Pages and  
432 Output-Pages. This section describes the relationship between the number on each of these four  
433 components. The relationship differs for each of the five cases defined in section 2.10. The following  
434 diagrams of tree structure show each of the five cases and the relationship of the numbers in those cases.

435

436 These diagrams assume that the number of copies of Output-Documents is 1. When the number of copies  
 437 exceeds 1, some parts of these diagrams would have further replication, but the numeric relationships of the  
 438 four displayed components would not change.

440 Degenerate Case:



452 Conditions that define this case:

454 Job contains exactly 1 Input-Document

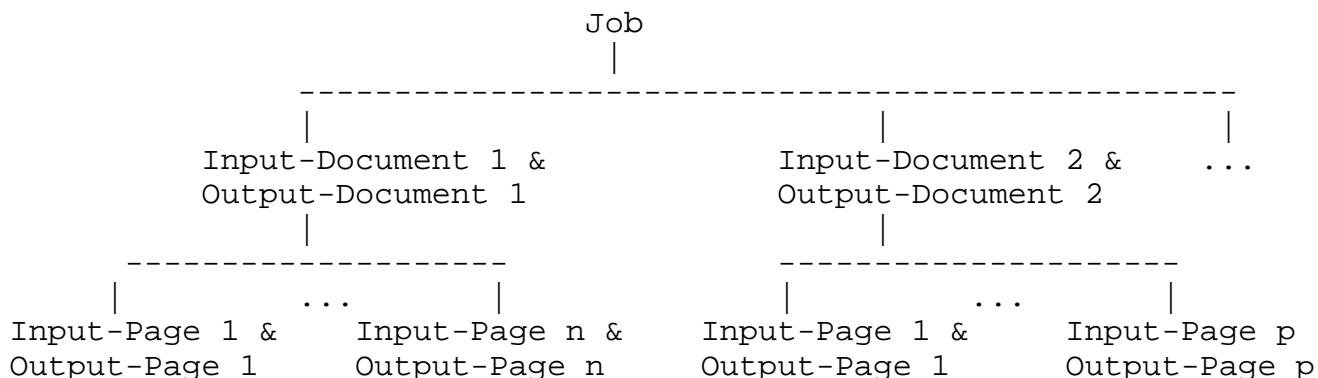
455 Either conditions for “Separate-Documents” or “Single-Documents” are met.

456 Observations about this case:

458 Job coincides with Output-Document 1 and Input-Document 1

459 Output-Page i coincides with Input-Page i

460 Separate-Documents Case:



474 Conditions that define this case:

476 Job contains more than one or more Input-Documents, though one Input-Document is technically the  
 477 Degenerate Case.

478 “multiple-document-handling” is 'separate-documents-collated-copies' or 'separate-documents-  
 479 uncollated-copies'

480 “pages-per-subset” is not present

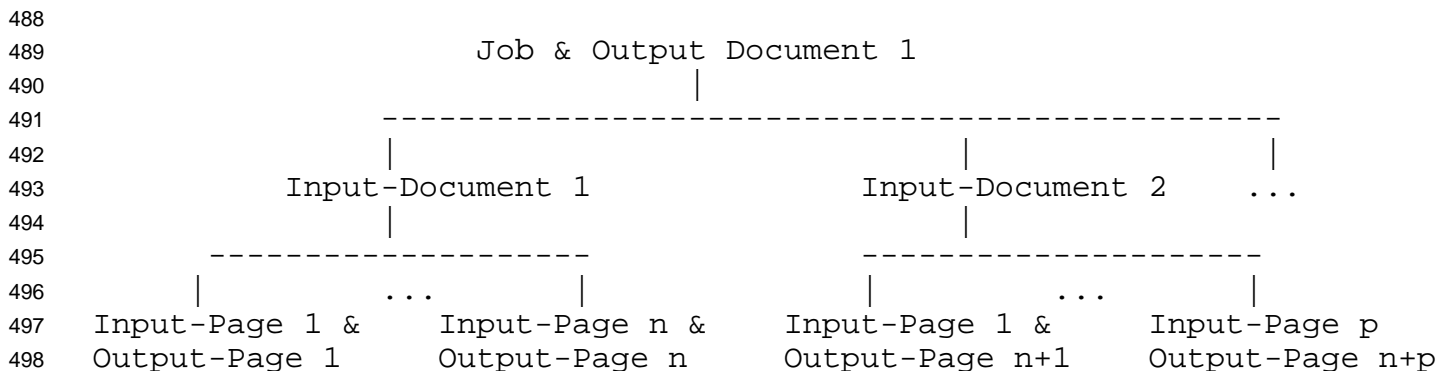
481 “documents-per-subset” is not present

482 Observations about this case:

483  
 484 Output-Document i coincides with Input-Document i

485 Output-Page i coincides with Input-Page i

486  
 487 Single-Document Case:



499  
 500 Conditions that define this case:

501  
 502 Job contains more than one or more Input-Documents, though one Input-Document is technically the  
 503 Degenerate Case.

504 “multiple-document-handling” is 'single-document' or 'single-document-new-sheet';

505 Observations about this case:

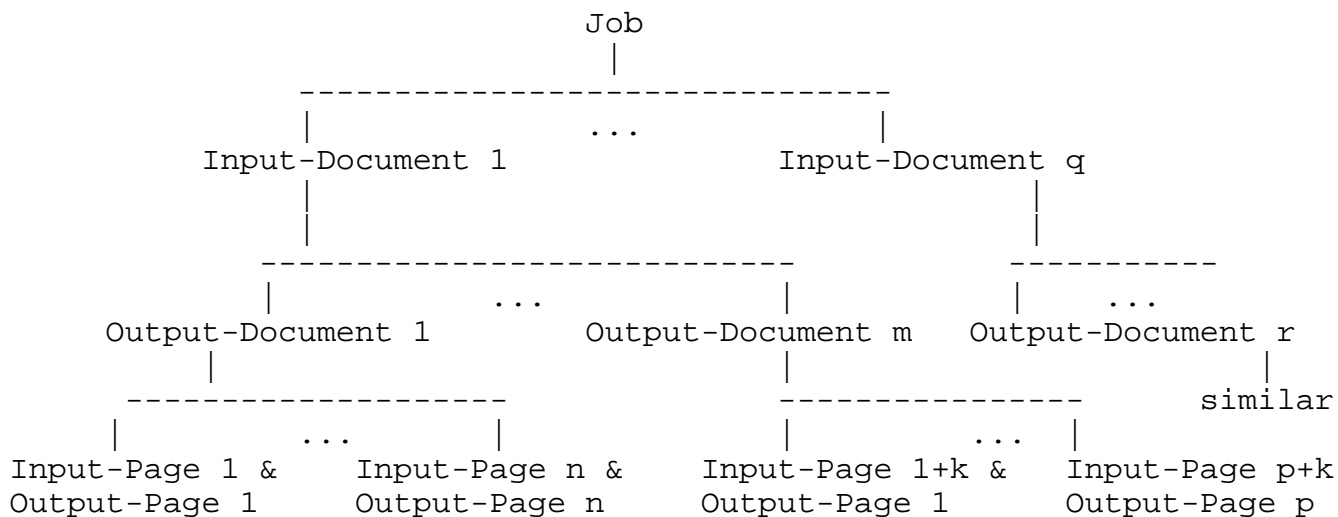
506  
 507 Output-Document 1 coincides with the Job

508 The numbering of Output-Pages is continuous through all Input-Documents, but the numbering of  
 509 Input-Pages starts at 1 in each Input-Document. That is, Input-Page i in Input-Document m  
 510 coincides with Output-Page i + k, where k is the number of Input-Pages in all previous Input-  
 511 Documents, i.e. Input-Documents 1 through m-1.

512 “pages-per-subset” is ignored if present

513 “documents-per-subset” is ignored if present

514  
515 Page-Subset Document Case:



533 Conditions that define this case:

534 Job contains one or more Input-Documents

536 “multiple-document-handling” is 'separate-documents-collated-copies' or 'separate-documents-  
537 uncollated-copies'

538 “pages-per-subset” is present.

539 “documents-per-subset” is not present

540 Observations about this case:

541  
542 The diagram shows that Output-Documents 1 through m are contained in Input-Documents 1, and  
543 Output-Documents m+1 through t are contained in Input-Documents 2 and so on. However, this  
544 diagram is not completely accurate. The Input-Pages from all Input-Documents are more accurately  
545 viewed as a continuous stream of Input-Pages that are partitioned into Output-Documents as  
546 specified by the attribute “pages-per-subset”. For example, an Output-Document could come from  
547 the last 3 Input-Pages of an Input-Documents and the first 4 Input-Pages of the next Input-Documents.

548 The Input-Pages in each Input-Documents are numbered sequentially starting from 1 and the Output-  
549 Pages in each Output-Documents are numbered sequentially starting from 1. For the first Output-  
550 Document, the numbers of the Input-Pages and Output-Pages coincide. For subsequent Output-  
551 Documents, the numbers differ. For example, the first Output-Page of the second Output-Documents

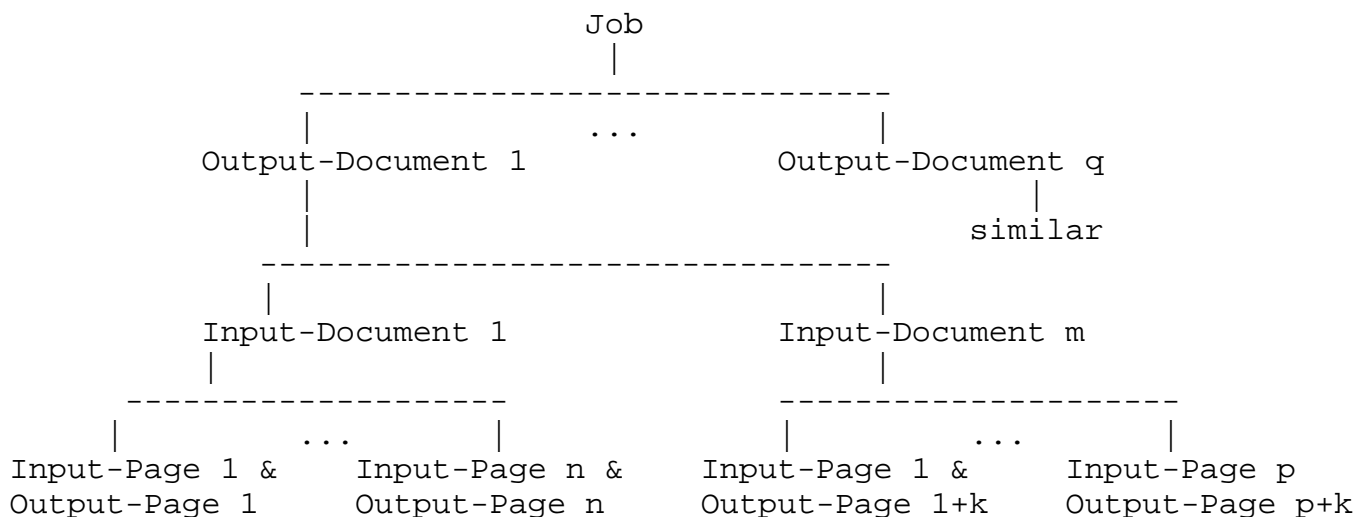


552 coincides with Input-Page w, where w is the number of Output-Pages in the first Output-Document.  
 553 To be specific, Output-Page i in Output-Document m coincides with Input-Page i + k of the Job,  
 554 where k is the number of Output-Pages in all previous Output-Documents of the job, e.g. Output-  
 555 Documents 1 through m-1.

556 “pages-per-subset” specifies the number of pages in each Output-Document.

557  
 558 Document-Subset Document Case:

559  
 560 NOTE: this case is here for completeness and is not supported by the Exceptions-Extension.



578 Conditions that define this case:

579  
 580 Job contains one or more Input-Documents

581 “multiple-document-handling” is 'separate-documents-collated-copies' or 'separate-documents-  
 582 uncollated-copies'

583 “pages-per-subset” is not present.

584 “documents-per-subset” is present

585 Observations about this case:

586  
 587 Input-Documents 1-m are contained in Output-Document 1, and Input-Documents m+1 through t are  
 588 contained in Output-Document 2 and so on.

589 Input-Page i in Input-Document m coincides with Output-Page i + k of Output-Document j, where k is  
 590 the number of Input-Pages in all previous Input-Documents of Output-Document j, e.g. Input-  
 591 Documents 1 through m-1.

592 “documents-per-subset” has the number of Input-Documents in each Output-Document.

### 593 4.3 Association of Attributes

594 The Exception Extension allows attribute associations with Input-Pages, Output-Pages, Input-Documents  
595 and Output-Documents, and it continues to allow associations with Jobs. The Exception Extension specifies  
596 rules for associations, and it categorizes attributes according to what they affect. The categories of attributes  
597 and the members in the Exceptions-Extension are:

598  
599 Input Documents: “page-ranges”, “document-format”, “document-name”, “compression” and  
600 “document-natural-language”.

601 Output-Documents: “finishings”

602 Sheets: “media” and “sides”

603 The table below shows what each of the three categories of attributes can be associated with:

604

Associates with:	Category of attribute		
	Input-Document	Output-Document	Sheets
Input-Document	yes	yes	yes
Output-Document	no	yes	yes
Input-Page	no	no	yes
Output-Page	no	no	yes

605

606 The meaning of these associations and their limitation is specified in section 16.

607

608 The Exception-Extension mechanism seems to be general enough to add new Document-Exceptions and  
609 Page-Exceptions attributes without changing or extending the general mechanism. That is, an existing or  
610 new Job attribute becomes a Document-Exceptions or Page-Exceptions attribute when a description of that  
611 attributes says so, but no changes need be made to the ways exceptions work. If the new attribute belongs  
612 to one of the three above categories, it follows the rules of that category. If it belongs to a new categories,  
613 the rules of association must be defined.

### 614 4.4 Effect of the “document-copies” attribute

615 The “document-copies” attribute causes some copies of a document to be printed differently from others.  
616 For example, 10 copies are duplex printed on letter paper with a staple. One copy is simplex printed on  
617 transparencies without a staple. As another example, the first page of 100 copies of a 3 page document are  
618 printed on letterhead paper and the first page of the 101<sup>st</sup> copy of the document is printed on regular letter  
619 paper.

620

621 If an attribute can affect an Output-Document, it can affect particular Output-Document-Copies. If an  
622 attribute can affect Sheets, it can affect Sheets of particular Output-Document-Copies.

623

624

625

626

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631

Normally, when an attribute is associated with Input-Documents, Output-Documents, Input-Pages or Output-Pages, that attribute is effectively associated with corresponding Input-Documents, Output-Documents or Sheets. When an association includes the “document-copies” attribute, it has the following meaning for each effective association. If the attribute effectively associates with:

Input-Documents, the Printer ignores the “document-copies” attribute.

Output-Documents, the attribute affects the specified copies of the Output-Documents.

Sheets: the attribute affects the sheets of the specified copies of Output-Documents.

632

## 4.5 Subset Finishing

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637

In IPP/1.1 a Printer applies the “finishings” attribute to all Output-Documents in a given job. This proposal supports “Subset Finishing” which we define as the ability to partition the Input-Pages of an Input-Documents into one or more Output-Documents and to apply different types of finishing to each of the individual Output-Documents contained within a single job.

638

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This model supports subset finishing with the new attribute “pages-per-subset” which specifies the number of Input-Pages per Output-Documents. This model treats Subset-Finishing as a Job level sub-setting of the Input-Documents into Output-Documents and as a Document Exception attribute rather than a Page Exception attribute for two reasons.

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Page-Exceptions, as their name suggests, are exceptions for a few Input-Pages or Output-Pages that differ from the rest of the Input-Pages or Output-Pages in the Job. With Subset-Finishing, all Input-Pages belong to some subset. So, sub-setting is not an exception; it encompasses the entire Job. Only the finishing part of Subset-Finishing can have exceptions and those exceptions apply to a subset, much like they apply to Output-Documents. Because subsets behave like Output-Documents, it is easiest to describe the sub-setting operation as creating Output-Documents.

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If the attributes “media”, “sides” and “finishings” were all treated as Page-Exception attributes, then there would have to one rule for splitting and merging groups when “finishings” is associated with the group and another rule when it is not associated with the group. If a Page-Exception specifies “sides” is duplex for pages 1-10 and “media” is added to pages 5 and 6, there can be three Page-Exception groups, one for pages 1-4 with “sides”, one for pages 5 and 6 with “sides” and “media” and one for pages 7-10 with sides. If “media” is removed, the groups can be merged back to the original single group. If “finishings = staple” had been present in the original group of pages 1-10, such a split would change finishing from one staple in pages 1-10 to 3 staples, one in pages 1-6, one in page 5-6 and one in pages 7-10.

658

659

The remainder of this document describes the changes necessary to support the Exceptions Extension.

660 **5. New Job Template Attributes**

661 The Exception Extension adds three new Job Template attributes: “document-exceptions”, “page-  
 662 exceptions” and “pages-per-subset”. The first two attributes support exception attributes, and the third  
 663 supports subset finishing.

664

665 Job Attribute	665 Printer: Default Value	665 Printer: Supported Values Attribute
666 document-exceptions 667 (1setOf collection)	666 none	666 document-exceptions-supported 667 (1setOf type1 keyword)
672 page-exceptions 673 (1setOf collection)	672 none	672 page-exceptions-supported 673 (1setOf type1 keyword)
676 page-per-subset 677 (1setOf integer)	676 none	676 pages-per-subset-supported 677 (Boolean)

680

681

682 **5.1 document-exceptions (1setOf collection)**

683 This OPTIONAL Job Template attribute contains attributes that are associated with Input-Documents and  
 684 Output-Documents and that are treated as document exceptions. Such attributes are called “Document-  
 685 Exceptions” [attributes](#).  
 686 attributes. The remainder of this section describes features that an implementation MUST support or MAY  
 687 support if an implementation supports this attribute.

688

689 If this attribute is not present in a Job, there are no Document-Exceptions within the Job. If it is present, the  
 690 value consists of one or more ‘collection’ values, where each ‘collection’ value identifies one or more  
 691 Input-Documents or Output-Documents and contains one or more Job Template attributes which act as  
 692 exceptions to the corresponding Job Template attribute values for the specified Input-Documents or Output-  
 693 Documents.

694

695 The first attribute of each ‘collection’ value MUST be either “input-documents” or “output-documents” and  
 696 this attribute identifies Input-Documents or Output-Documents, respectively. The second attribute of each  
 697 ‘collection’ MAY be “document-copies” and this attribute identifies the Output-Documents-Copies. The  
 698 remaining attributes in the ‘collection’ value are the one or more Job Template attributes that are exceptions  
 699 for the specified ~~Input-~~ Input- Documents or Output-Documents. The allowed attributes are listed in section  
 700 5.1.8

701 There may be more than one way for a client to arrange Document-Exceptions attributes in ‘collection’  
 702 values. For example, if a job contains 10 Output-Documents to be printed 1-sided on letter paper with no

703 stapling and Output-Document 1 is to be two sided with stapling and Document 2 is to be two sided with  
 704 no stapling, there are two possible ways to group the exceptions. The client could specify the two  
 705 exceptions for Output-Document 1 in one ‘collection’ value and the single exception for Output-Document  
 706 2 in a second ‘collection’ value, or it could specify “two-sided” for Output-Documents 1 and 2 in one  
 707 ‘collection’ value and “stapled” for Output-Document 1 in another ‘collection’ value.

708 If the ~~“input-documents” or “input-documents”~~, “output-documents” or “document-copies” identify ~~Input-~~  
 709 ~~Documents or Input-Documents~~, Output-Documents or Output-Documents-Copies that don’t exist, the  
 710 Printer silently ignores them and associates the Document-Exceptions with those ~~Input Documents or Input-~~  
 711 ~~Documents~~, Output-Documents or Output-Documents-Copies that do exist. A client MUST NOT allow two  
 712 ‘collection’ values to be associated with the same ~~Input Document or Input-Documents~~, Output-Documents or  
 713 ~~Output-Documents-Copy~~ and to contain the same Document-Exceptions attribute with different values. If  
 714 the client violates the preceding rule, the Printer can use either value, and it MUST issue a warning. It does  
 715 so by adding ‘job-warnings-detected’ to the “job-state-reasons” and by increasing the value of the “job-  
 716 warnings-count” Job Description attribute by 1. If the Printer detects this conflict while it is processing a  
 717 Job-Submission operation, it MUST return the ignored values in the Unsupported attributes.

718 When a Client receives this attribute in a Get-Jobs or Get-Job-Attributes, the value MUST contain the same  
 719 ‘collection’ values received in Job-Submission operations, except for those ‘collection’ values the Printer  
 720 returned in the Unsupported Attributes.

721 Each ‘collection’ value of this attribute has either of the two forms as defined below. The ‘collection’  
 722 values NEED NOT all be of the same ~~form-~~form..

723 For the first form, the client MUST supply “input-documents” as the first attribute. If the client supplies the  
 724 “document-copies” attribute, it MUST be the second attribute. The client OPTIONALLY supplies the  
 725 remaining attributes in any ~~order-~~order.

726 order. If the Printer supports the Create-Job operation, then it MUST support the attribute labeled with  
 727 “CMUST” below; otherwise support is OPTIONAL.

<u>Attribute name</u>	<u>syntax</u>	<u>In request</u>	<u>Printer Support</u>
input-documents	rangeOfInteger(MAX)	MUST	MUST
<u>document-copies</u>	<u>rangeOfInteger(MAX)</u>	<u>MAY</u>	<u>MAY</u>
<del>document-format</del>	<del>mimeMediaType</del>	<del>MAY</del>	<del>MUST</del>
<u>document-format</u>	<u>mimeMediaType</u>	<u>MAY</u>	<u>CMUST</u>
<del>document-name</del>	<del>name (MAX)</del>	<del>MAY</del>	<del>MUST</del>
<u>document-name</u>	<u>name (MAX)</u>	<u>MAY</u>	<u>CMUST</u>
<del>compression</del>	<del>type3 keyword</del>	<del>MAY</del>	<del>MUST</del>
<u>compression</u>	<u>type3 keyword</u>	<u>MAY</u>	<u>CMUST</u>
document-natural-language	naturalLanguage	MAY	MAY
page-ranges	1setOf rangeOfInteger (1:MAX)	MAY	MAY
finishings	1setOf type2 enum	MAY	MAY
sides	type2 keyword	MAY	MAY
media	type3 keyword   name(MAX)	MAY	MAY

728 For the second form, the client MUST supply “output-documents” as the first attribute. If the client supplies  
 729 the “document-copies” attribute, it MUST be the second attribute. The client OPTIONALLY supplies the  
 730 remaining attributes in any order.

<u>Attribute name</u>	<u>syntax</u>	<u>In request</u>	<u>Printer Support</u>
output-documents	rangeOfInteger(MAX)	MUST	MUST
<u>document-copies</u>	<u>rangeOfInteger(MAX)</u>	<u>MAY</u>	<u>MAY</u>
finishings	1 setOf type2 enum	MAY	MAY
sides	type2 keyword	MAY	MAY
media	type3 keyword   name(MAX)	MAY	MAY

731 The following sections describe each attribute in the above table.

732 **5.1.1 input-documents (rangeOfInteger (1:MAX))**

733 This attribute identifies one or more Input-Documents by specifying a range of numbers (see section  
 734 4.1 for the rules on associating a number with each Input-Document ). The Document-Exceptions  
 735 apply to the identified Input-Documents.

736  
 737 A Printer MUST support this attribute. A client MUST supply this attribute in each ‘collection’  
 738 value and it MUST be the first attribute of each ‘collection’ value. If this attribute is present, then  
 739 the client MUST NOT supply “output-documents”. ~~If this attribute is not the first attribute in a~~  
 740 ~~‘collection’ value, a Printer,~~  
 741 ~~depending on implementation, MUST either~~

- 742
- 743 ~~a) ignore the “input-documents” attribute or~~
- 744 ~~b) reject all attributes in the ‘collection’ value and treat the ‘collection’ values, but not other~~
- 745 ~~sibling ‘collection’ values, as unsupported.~~
- 746

747 When a client supplies this attribute in a “document-exceptions” attribute of a Send-Document or  
 748 Send-URI request, this attribute MUST NOT identify Input-Documents which were sent in an  
 749 earlier operation. If a Printer receives such a value in a ‘collection’ value, it MUST treat all  
 750 attribute values in such a ‘collection’ value, but not other sibling ‘collection’ values, as unsupported  
 751 values and return the entire collection value in the Unsupported Attributes group.

752  
 753 See section 5 for details of usage of this attribute.

754  
 755 **5.1.2 output-documents (rangeOfInteger (1:MAX))**

756 This attribute identifies one or more Output-Documents by specifying a range of numbers (see  
 757 section 4.1 for the rules on associating a number with each Output-Documents). The Document-  
 758 Exceptions apply to the identified Output-Documents.

759 A Printer MUST support this attribute. A client MUST supply this attribute in each ‘collection’  
760 value and it MUST be the first attribute of each ‘collection’ value. If this attribute is present, then  
761 the client MUST NOT supply “input-documents”. ~~If this attribute is not the first attribute in a~~  
762 ~~‘collection’ value, a Printer,~~

763 ~~depending on implementation, MUST either~~

764 ~~a) ignore the “output-documents” attribute or~~  
765 ~~b) reject all attributes in the ‘collection’ value and treat the ‘collection’ values, but not other~~  
766 ~~sibling ‘collection’ values, as unsupported.~~

768  
769 When a client supplies this attribute in a “document-exceptions” attribute of a Send-Document or  
770 Send-URI request, this attribute MUST NOT identify Output-Documents whose first Input-Page  
771 was sent in an earlier operation. If a Printer receives such a value in a ‘collection’ value, it MUST  
772 treat all attribute values in such a ‘collection’ value, but not other sibling ‘collection’ values, as  
773 unsupported values and return the entire collection value in the Unsupported Attributes group.

### 774 **5.1.3 document-copies (rangeOfInteger (1:MAX))**

775 This attribute identifies one or more Output-Document-Copies by specifying a range of numbers.  
776 The Document-Exceptions apply to the identified Output-Document-Copies within Output-  
777 Documents specified either directly by “output-documents” or indirectly by “input-documents” (see  
778 section 16 for further details).

779 A Printer MAY support this attribute. A client MAY supply this attribute in each ‘collection’ value.  
780 If the client supplies this attribute, it MUST be the second attribute of each ‘collection’ value. If this  
781 attribute is present, then the client MUST also supply “input-documents” or “output-documents”.

782 If the first member attribute is “input-documents”, this attribute applies only to the other member  
783 attributes that affect Output-Documents and Sheets. The Printer MUST ignore this attribute for the  
784 other member attributes that affect Input-Documents.

### 785 **5.1.4 document-format (mimeMediaType)**

786 This attribute has the same meaning as in IPP/1.1. It indicates the document-format for one or more  
787 specified Input-Documents. The Printer MUST support this attribute. A client OPTIONALLY  
788 supplies it.

### 789 **5.1.5 document-name (name (MAX))**

790 This attribute has the same meaning as in IPP/1.1. It indicates the document-name for one or more  
791 specified Input-Documents. The Printer MUST support this attribute. A client OPTIONALLY  
792 supplies it.



### 793 5.1.6 compression (type3 keyword)

794 This attribute has the same meaning as in IPP/1.1. It indicates the compression for one or more  
795 specified Input-Documents. The Printer MUST support this attribute. A client OPTIONALLY  
796 supplies it.

### 797 5.1.7 document-natural-language (naturalLanguage)

798 This attribute has the same meaning as in IPP/1.1. It indicates the document-natural-language for  
799 one or more specified Input-Documents. The Printer MAY support this attribute. A client  
800 OPTIONALLY supplies it.

### 801 5.1.8 page-ranges (1setOf rangeOfInteger (1:MAX))

802 This attribute has the same meaning as in IPP/1.1. It redefines each Input-Documents to contain only  
803 the specified Input-Pages. See section 5.2.3 for how this attribute interacts with “pages”.. The  
804 “multiple-document-handling” attribute affects the algorithm for numbering Input-Pages when this  
805 attribute is a Job attribute but when it is a Document-Exception attribute. When this attribute is a  
806 Document-Exception attribute, the values of the “page-ranges” attribute specify the Input-Pages to  
807 select from each of the identified Input-Documents separately, For example, if this attribute has the  
808 value “3:5” and is associated with two Input-Documents A and B, Input-Documents A redefined to  
809 contain just two pages: 3 and 5, and Input-Documents B also contains just pages 3 and 5. The Printer  
810 MAY support this attribute. A client OPTIONALLY supplies it.

811  
812 See section 5.2.4 for details of how this attribute affects number of pages with the “pages” attribute.

### 813 5.1.9 finishings (1setOf type2 enum)

814 This attribute has the same meaning as in IPP/1.1. It indicates the finishings for one or more  
815 specified Output-Documents. As a Job Template attribute, it affects each Output-Documents  
816 produced by the Job. For example, all the sheets of each Output-Documents are stapled together. As  
817 a Document-Exceptions attributes, it affects only the specified Output-Documents. The Printer  
818 MAY support this attribute. A client OPTIONALLY supplies it.

819 The next section gives further information about this attribute, but this information is the same for  
820 all Output-Documents attributes that might be added later.

#### 821 5.1.9.1 Common Behavior for Output-Documents Attributes

822 This attribute is directly associated with an Input-Documents or Output-Documents. This means that it  
823 is effectively associated with one or more Output-Documents according to the rules of section 16,  
824 and this attribute affects those Output-Documents.

825  
826 If the “document-copies” attribute is present, the attribute affects only the specified copies of the  
827 Output-Documents.



### 828 5.1.10 sides (type2 keyword)

829 This attribute has the same meaning as in IPP/1.1. It indicates the sides for one or more specified  
830 Output-Pages. As a Job Template attribute, it affects each Sheet produced by the Job. As a  
831 Document-Exceptions attributes, it affects only the specified Sheets. The Printer MAY support this  
832 attribute. A client OPTIONALLY supplies it.

833 The next section gives further information about this attribute, but this information is the same for  
834 all Sheet attributes, including “media” which is discussed in section 5.1.11

#### 835 5.1.10.1 Common Behavior for Sheet Attributes

836 This attribute is directly associated with an Input-Document or Output-Document. This means that it  
837 is effectively associated with one or more Output-Pages according to the rules of section 15, and this  
838 attribute affects the Sheets containing the specified Output-Pages.

839 If the “document-copies” attribute is present, the attribute affects only the Output-Pages in the  
840 specified copies of the Output-Documents.

841 Because this attribute affects a Sheet, but is effectively associated with an Output-Page, a Sheet that  
842 contains two or more Output-Pages may have conflicting values of this attribute. This observation  
843 leads to two rules, one for the first Output-Page that this attribute is effectively associated with and  
844 one for the last Output-Page that this attribute is effectively associated with.

- 845 a) For the first Output-Page: if the value of this attribute is effectively associated with Output-  
846 Page i, and if Output-Page i is not the first Output-Page contained on a Sheet and if the value  
847 of this attribute differs from the value of this attribute for the preceding Output-Page i-1,  
848 then Output-Page i MUST start a new Sheet and the Printer MUST issue a warning by  
849 adding ‘job-warnings-detected’ to the “job-state-reasons” and by increasing the value of the  
850 “job-warnings-count” Job Description attribute by 1.
- 851 b) For the last Output-Page: if the value of this attribute is effectively associated with Output-  
852 Page i, and if Output-Page i is not the last Output-Page contained on a Sheet and if the value  
853 of this attribute differs from the value of this attribute for the following Output-Page i+1,  
854 then Output-Page i+1 MUST start a new Sheet and the Printer MUST issue a warning by  
855 adding ‘job-warnings-detected’ to the “job-state-reasons” and by increasing the value of the  
856 “job-warnings-count” Job Description attribute by 1.

### 857 5.1.11 media (type3 keyword | name(MAX))

858 This attribute has the same meaning as in IPP/1.1. It indicates the media for one or more specified  
859 Output-Pages. As a Job Template attribute, it affects each Sheet produced by the Job. As a  
860 Document-Exceptions attributes, it affects only the specified Sheets. The Printer MAY support this  
861 attribute. A client OPTIONALLY supplies it.

862 See section 5.1.10.1 for additional information. The section describes the common behavior of all  
863 Sheet attributes.

### 864 **5.1.12 Handling of Error conditions**

865 If a client omits a required member attribute or includes two member attributes that should never  
866 both be present (e.g. “input-document” and “output-document”), a Printer MUST reject all attributes  
867 in the ‘collection’ value and treat the ‘collection’ values, but not other sibling ‘collection’ values, as  
868 unsupported.

869 If a client puts a member attribute in some position other than its required position (e.g. “input-  
870 documents” MUST be first), a Printer MUST either:

- 871 a) use the specified value of the member attribute and ignore its wrong position or  
872 b) reject all attributes in the ‘collection’ value and treat the ‘collection’ values, but not other  
873 sibling ‘collection’ values, as unsupported.

### 874 **5.1.13 Why not “document-exceptions-default”**

875 There is no “document-exceptions-default” attribute because it adds complicated rules for a Printer  
876 to implement. The problems are best illustrated with examples.

877 If there were a “document-exceptions-default” and it contained a “sides” and “media” exception for  
878 the first Output-Page, and if a client submitted a Job with no “sides” attribute and with “media” as a  
879 Job attribute with no exceptions, a possible meaning is that the Printer uses the client’s requested  
880 media for the entire Job and the sides specified by the “sides-default” and the “sides” value in  
881 “document-exceptions-default”. So in this example, the Printer ignores the “document-exceptions-  
882 default” attribute for “media”, but uses it for “sides” because the Printer uses it for an attribute  
883 “xxx” only when it uses “xxx-default”.

### 884 **5.1.14 document-exceptions-supported (1setOf type1 keyword)**

885 This attribute specifies the supported values of the “document-exceptions” attribute. A client can  
886 use this attribute to determine what Document-Exceptions attributes the Printer supports.

887 This attribute contains the name of each attribute that the Printer supports in a ‘collection’ value of  
888 the “document-exceptions” attribute. This attribute MUST contain the keywords “input-  
889 documents” and “output-documents” because a Printer MUST support these attributes. This  
890 attribute MUST also contain the name of each attribute that can be a document-exception. For  
891 example, this attribute contains the keyword “sides” if and only if the Printer supports “sides” in a  
892 ‘collection’ value of the “document-exceptions” attribute.

893 Standard keyword values are:

894  
895 'none': no attributes are supported in the “document-exceptions” attribute

896 'input-documents': the “input-document” attribute is supported

897 'output-documents': the "output-document" attribute is supported  
898 'document-copies': the "document-copies" attribute is supported  
899 'document-format': The "document-format" attribute is supported  
900 'document-name': The "document-name" attribute is supported  
901 'compression': The "compression" attribute is supported  
902 'document-natural-language': The "document-natural-language" attribute is supported  
903 'page-ranges': The "page-ranges" attribute is supported  
904 'finishings': The "finishing" attribute is supported  
905 'sides': The "sides" attribute is supported  
906 'media': The "media" attribute is supported

## 907 **5.2 page-exceptions (1setOf collection)**

908 This OPTIONAL Job Template attribute contains attributes that are associated with Input-Pages and  
909 Output-Pages and that are treated as page exceptions. Such attributes are called "Page-Exceptions"  
910 ~~attributes.~~

911 attributes. The remainder of this section describes features that an implementation MUST support or MAY  
912 support if an implementation supports this attribute

913  
914 If this attribute is not present in a Job, there are no Page-Exceptions attributes within the Job. If it is present,  
915 the value consists of one or more 'collection' values, where each 'collection' value identifies one or more  
916 Input-Pages or Output-Pages and contains one or more Job Template attributes which act as exceptions to  
917 the corresponding Job Template attributes for the specified Input-Pages or Output-Pages.

918 The first attribute of each 'collection' value MUST be either "input-documents" or "output-documents".

919 The second attribute MAY be "document-copies". If present, this attributes identifies the copies of the  
920 Output-Document. If this attribute is not present in a 'collection' value, then the 'collection' value applies  
921 to all Output-Document-Copies.

922 ~~MUST be "pages" and this~~If "document-copies" is present, the "pages" attribute MUST be the third  
923 attribute; otherwise, it MUST be the second attribute. The "pages" attribute identifies either

924  
925 the Input-Pages relative to the Input-Document specified by "input-documents" or

926  
927 the Output-Pages relative to the Output-Document specified by "output-documents".  
928  
929

930 The Page-Exceptions attributes applies to the identified Input-Pages or Output-Pages, which need not be  
 931 contiguous.

932  
 933 The remaining attributes in the ‘collection’ value are the Job Template attributes that are exceptions for the  
 934 specified Input-Pages or Output-Pages.

935 There may be more than one way for a client to arrange Page-Exception attributes in ‘collection’ values.  
 936 For example, if an Output-Document contains 10 Output-Pages to be printed 1-sided on white letter paper  
 937 and Output-Page 1 is to be two sided with blue letter paper and Document 2 is to be two sided with white  
 938 letter paper, there are two possible ways to group the exceptions. The client could specify the two  
 939 exceptions for Output-Page 1 in one ‘collection’ value and the single exception for Output-Page 2 in second  
 940 ‘collection’ values, or it could specify “two-sided” for Output-Pages 1 and 2 in one ‘collection’ value and  
 941 “blue letter paper” for Output-Document 1 in another ‘collection’ value.

942 If the “pages”, “document-copies” and the “input-documents” or “output-documents” identify ~~Input Pages~~  
 943 ~~or Input-Pages~~, Output-Pages that either don’t exist or are within nonexistent Output-Document-Copies,  
 944 Input-Documents or Output-Documents, the Printer silently ignores them and associates the Page-  
 945 Exceptions with those Input-Pages or Output-Pages that do exist. A client MUST not allow two  
 946 ‘collection’ values to be associated with the same ~~Input- Input-Page~~ or Output-Page and to contain the  
 947 same Page-Exception attribute with different values. If there is such a conflict, the Printer can use either  
 948 value, and it MUST issue a warning. It does so by adding ‘~~job- job-~~warnings-detected’ to the “job-state-  
 949 reasons” and by increasing the value of the “job-warnings-count” Job Description attribute by 1. If the  
 950 Printer detects this conflict while it is processing a Job-Submission operation, it MUST return the ignored  
 951 value in the Unsupported attributes.

952 When a Client receives this attribute in a Get-Jobs or Get-Job-Attributes, the value MUST contain the same  
 953 ‘collection’ values received in Job-Submission operations, except for those ‘collection’ values the Printer  
 954 returned in the Unsupported Attributes.

955 Each ‘collection’ value of this attribute has either of the two forms as defined below. The ‘collection’  
 956 values NEED NOT all be of the same form.

957 For the first form, the client MUST supply “input-documents” as the first ~~attribute and the~~ attribute. If the  
 958 client supplies the “document-copies” attribute, it MUST be the second attribute. The “pages” attribute ~~as~~  
 959 ~~the second~~ MUST be the next attribute. The client OPTIONALLY supplies the remaining attributes in any  
 960 order.

<u>Attribute name</u>	<u>syntax</u>	<u>In request</u>	<u>Printer Support</u>
input-documents	rangeOfInteger(MAX)	MUST	MUST
<u>document-copies</u>	<u>rangeOfInteger(MAX)</u>	<u>MAY</u>	<u>MAY</u>
pages	rangeOfInteger(MAX)	MUST	MUST
sides	type2 keyword	MAY	MAY
media	type3 keyword   name(MAX)	MAY	MAY

961 For the second form, the client MUST supply “output-documents” as the first ~~attribute and~~ attribute. If the  
 962 client supplies the “document-copies” attribute, it MUST be the second attribute. The the “pages” attribute

963 ~~as the second~~**MUST be the next** attribute. The client **OPTIONALLY** supplies the remaining attributes in  
964 any order.

<u>Attribute name</u>	<u>syntax</u>	<u>In request</u>	<u>Printer Support</u>
output-documents	rangeOfInteger(MAX)	MUST	MUST
<del>document-copies</del>	<del>rangeOfInteger(MAX)</del>	<del>MAY</del>	<del>MAY</del>
pages	rangeOfInteger(MAX)	MUST	MUST
sides	type2 keyword	MAY	MAY
media	type3 keyword   name(MAX)	MAY	MAY

965 The following sections describe each attribute in the above table.

### 966 **5.2.1 input-documents (rangeOfInteger (1:MAX))**

967 See section 5.1.1 for details of this attribute.

### 968 **5.2.2 output-documents (rangeOfInteger (1:MAX))**

969 See section 5.1.2 for details of this attribute.

### 970 **5.2.3 document-copies (rangeOfInteger (1:MAX))**

971 This attribute identifies one or more Output-Document-Copies by specifying a range of numbers.  
972 The Page-Exceptions apply to the Output-Pages within the identified Output-Documents-Copies  
973 within Output-Documents specified either directly by “output-documents” or indirectly by “input-  
974 documents” (see section 16 for further details).

975 A Printer MAY support this attribute. A client MAY supply this attribute in each ‘collection’ value.  
976 It MUST be the second attribute of each ‘collection’ value if the client supplies it. If this attribute is  
977 present, then the client MUST also supply the “input-documents” or “output-documents” attribute.

### 978 **5.2.4 pages (1setOf rangeOfInteger(1:MAX))**

979 This attribute identifies one or more Input-Pages or Output-Pages by specifying one or more ranges  
980 of numbers (see section 4.1 for the rules on associating a number with each Input-Page or Output-  
981 Page). The “1setOf” allows noncontiguous Input-Page or Output-Pages. The Page-Exceptions apply  
982 to the identified Input-Pages or ~~Output-Pages.~~ Output-Pages within the Output-Documents specified  
983 directly by “output-documents” or indirectly by “input-documents”. The “document-copies”  
984 specifies particular copies of Output-Documents.

985 If the “page-ranges” attribute (see section 5.1.8) is associated with an Input-Document, the Input-  
986 Pages identified by this attribute are the same as when “page-ranges” is not present. However, this  
987 attribute may identify pages that are deselected for printing by the “page-ranges” attribute. For  
988 example, if the value of “page-ranges” is “5:10” and this attribute identifies Input-Pages “3:6”, this  
989 attribute identifies two Input-Pages (3 and 4) that are not printed and two that are (5 and 6)

990 If a Printer support the “page-exceptions” attribute, it MUST support this attribute. A client MUST  
991 supply this attribute in each ‘collection’ value of the “page-exceptions” attribute and it MUST be  
992 the second attribute of each ‘collection’ value. ~~If this attribute is not the in the correct position in a~~  
993 ~~‘collection’ value (i.e. first~~

994 ~~or second as defined above), a Printer, depending on implementation, MUST either~~

995 ~~e) ignore the “pages” attribute or~~  
996 ~~d) reject all attributes in the ‘collection’ value and treat the ‘collection’ values, but not other~~  
997 ~~sibling ‘collection’ values, as unsupported.~~  
998

1000 When a client supplies this attribute in a Send-Document or Send-URI request, this attribute MUST  
1001 NOT identify Output-Pages sent in an earlier operation. If a Printer receives such a value in a  
1002 ‘collection’ value, it MUST treat all such values, but not other sibling ‘collection’ values, as  
1003 unsupported values.

1004  
1005 See section 5 for details of usage of this attribute.

### 1006 **5.2.5 sides (type2 keyword)**

1007 This attribute has the same meaning as in IPP/1.1. It indicates the sides for one or more specified  
1008 Output-Pages. As a Job Template attribute, it affects each Sheet produced by the Job. As a Page-  
1009 Exceptions attributes, it affects only the specified Sheets. The Printer MAY support this attribute. A  
1010 client OPTIONALLY supplies it.

1011 See section 5.1.10.1 for additional information. The section describes the common behavior of all  
1012 Sheet attributes.

### 1013 **5.2.6 media (type3 keyword | name(MAX))**

1014 This attribute has the same meaning as in IPP/1.1. It indicates the media for one or more specified  
1015 Output-Pages. As a Job Template attribute, it affects each Sheet produced by the Job. As a Page-  
1016 Exceptions attributes, it affects only the specified Sheets. The Printer MAY support this attribute. A  
1017 client OPTIONALLY supplies it.

1018 See section 5.1.10.1 for additional information. The section describes the common behavior of all  
1019 Sheet attributes.

### 1020 **5.2.7 Handling of Error conditions**

1021 See section 5.1.12.

### 1022 **5.2.8 Why not “page-exceptions-default”**

1023 There is no “page-exceptions-default”. See section 5.1.12 for the reasons.

### 1024 5.2.9 page-exceptions-supported (1setOf type1 keyword)

1025 This attribute specifies the supported values of the “page-exceptions” attribute. A client can use this  
1026 attribute to determine what exception attributes the Printer supports.

1027 This attribute contains the name of each attribute that the Printer supports in a ‘collection’ value of  
1028 the “page-exceptions” attribute. This attribute MUST contain the keywords “input-documents”,  
1029 “output-documents” and “pages” because a Printer MUST support these attributes. This attribute  
1030 MUST also contain the name of each attribute that can be a page-exception. For example, this  
1031 attribute contains the keyword “sides” if and only if the Printer supports “sides” in a ‘collection’  
1032 value of the “page-exceptions” attribute.

1033 Standard keyword values are:

1034  
1035 'none': no attributes are supported in the “page-exceptions” attribute

1036 'input-documents': the “input-document” attribute is supported

1037 'output-documents': the “output-document” attribute is supported

1038 'document-copies': the “document-copies” attribute is supported

1039 'pages': The "pages " attribute is supported

1040 'sides': The "sides" attribute is supported

1041 'media': The "media" attribute is supported

### 1042 5.3 pages-per-subset (1setOf integer)

1043 A client OPTIONALLY supplies this attribute, and a Printer OPTIONALLY supports this attribute.  
1044 If a Printer supports the Page-Subset Document Case, it MUST support this attribute.

1045  
1046 When this attribute is present, it effectively partitions one or more Input-Documents into  
1047 contiguous subsets of Input-Pages. Each subset is defined to be an Output-Document

1048  
1049 The value of the attribute is a set of one or more integers, where each integer specifies the number  
1050 of Input-Pages in a subset, and the set is treated as a repeating sequence of integers. Thus, when the  
1051 attribute contains a single integer, the integer specifies the number of Input-Pages in each subset, as  
1052 a repeating sequence of the single integer. When the number of integers in this attribute exceeds 1,  
1053 the first integer specifies the number of Input-Pages in the first subset, the second integer specifies  
1054 the number of Input-Pages in the second subset and so on. If numbers in this attribute are exhausted  
1055 before partitioning all of the Input-Pages, the Printer starts at the beginning of the sequence again  
1056 and continues until all Input-Pages are partitioned.

1057



1058 If the job contains more than one Input-Document, the Input-Pages are treated as a single stream of  
1059 Input-Pages which are partitioned into contiguous subsets with some subsets possibly belonging to  
1060 more than one Input-Document.

1061

1062 If the number of Input-Pages available for the last subset is less than the number specified by this  
1063 attribute, the Printer MUST treat the last subset as an Output-Document and MUST issue a warning  
1064 by adding 'job-warnings-detected' to the "job-state-reasons" and by increasing the value of the  
1065 "job-warnings-count" Job Description attribute by 1.

### 1066 **5.3.1 Why not "pages-per-subset-default"**

1067 There is no "pages-per-subset-default" because there is no mechanism for a client to specify that  
1068 there are no Input-Page subsets except to omit this attribute, which would cause the Printer to use  
1069 the "pages-per-subset-default" attribute and create the default subsets. Without this attribute, a  
1070 client can achieve subsets only by including the "pages-per-subset" attribute in the Job and the  
1071 default is no subsetting. Also, if there were a defaulting mechanism, it isn't clear that customers  
1072 would use the same partitioning over and over..

### 1073 **5.3.2 pages-per-subset-supported (Boolean)**

1074 This attribute specifies whether the Printer supports the Page-Subset Document Case. If the  
1075 attribute is present and has a value of "true", the Printer supports the Page-Subset Document Case.  
1076 Otherwise, the Printer doesn't support the Page-Subset Document Case

## 1077 **6. New Job Description attributes**

### 1078 **6.1.1 job-warnings-count (integer)**

1079 This OPTIONAL attribute specifies the total number of warnings that a Printer has generated while  
1080 processing and printing the Job. At the beginning of a Job, the value MUST be 0. It MUST increase  
1081 by 1, each time the Printer generates a warning.

## 1082 **7. New Job Description Values**

### 1083 **7.1.1 job-warnings-detected value for job-state-reasons (1setOf type2 keyword)**

1084 If the Printer supports the value 'job-warnings-detected', the Printer MUST add it to "job-state-  
1085 reasons" when it generates the first warning message. That is, a single occurrence of this value is  
1086 present in the "job-state-reasons" if the Printer has generated one or more warnings.



1087

## 8. Extended Role of Some Operation Attributes

1088

In IPP/1.1, the following attributes are operation attributes in all Job-Submission operations except Create-Job, but the Printer doesn't put their values into the Job object.

1089

1090

1091

document-format

1092

document-name

1093

compression

1094

document-natural-language

1095

1096

With the Exception Extension, these attributes also become:

1097

1098

Operation attributes in the Create-Job and Validate-Job operation when all or most Input-Documents have the same attribute value.

1099

1100

Job Template attributes, so their values are accessible to a client via the Get-Job-Attributes and Get-Jobs operation.

1101

1102

Job Description attributes, for legacy reasons so their values are accessible to a client via the Get-Job-Attributes and Get-Jobs operation via the Job Description group name.

1103

1104

Document-Exceptions attributes, so the values are associated with one Input-Document (possible in IPP/1.1) and a client can query the attributes via Get-Job-Attributes and Get-Jobs operation (not possible in IPP/1.1).

1105

1106

1107

If a Printer supports the Exception Extension and if it supports an attribute in this section, it MUST support the attribute in the three contexts above. In IPP/1.1, a Printer MUST support all attributes in this section except the "document-natural-language" attribute. This effectively means that if a Printer supports this extension, it MUST support all of the attributes in this section except "document-natural-language" in the three contexts described above.

1108

1109

1110

1111

1112

1113

When one of the attributes in this section is an operation attribute in Print-Job, Print-URI or Create-Job, it becomes a Job Template attribute in the newly created Job object. If one of these attributes is a Document-Exceptions attribute, that attribute overrides the Job level attribute for the specified Input-Document.

1114

1115

1116

1117

When one of the attributes in this section is an operation attribute in Validate-Job, it is validated as if it were an operation attribute of Create-Job.

1118

1119

1120

When one or more of the attributes in this section is an operation attribute in Send-Document or Send-URI request, they are put into a 'collection' value that is added to the "document-exceptions" attribute. See section 5.10 for a discussion of possible conflicts.

1121

1122

1123

## 9. Extensions to Printer Operations

1124

1125

1126

1127

The sections below specify the extensions to the groups within IPP 1.1 operations. If an operation or a group within an operation is not mentioned, this extension does not change that operation or group, respectively.

1128

### 9.1 Create-Job and Validate-Job Operation Requests

1129

1130

1131

1132

1133

1134

1135

Attributes are added to the operation attributes group.

Group 1: Operation Attributes

Add the attributes specified in section 6: “document-format”, “document-name”, “compression” and “document-natural-language”, so that a client can specify these attributes, at the job level.

1136

### 9.2 Send-Document and Send-URI Operation Requests

1137

1138

1139

1140

1141

1142

1143

1144

1145

1146

1147

1148

1149

1150

1151

1152

Attributes are added to the Operation Attributes group.

Group 1: Operation Attributes

"input-document-number" (integer):

The client **OPTIONALLY** supplies this attribute in order to inform the printer about the order of documents when the printer is sending the Input-Documents asynchronously. The first Input-Document is 1, and subsequent Input-Documents are numbered sequentially. If the value of “last-document” is ‘true’, then the value of this attribute is also the total number of Input-Documents in the Job. If a client supplies this attribute in one Send-Document or Send-URI operation in a Job, it **MUST** send it in all such operations. A Printer deals with missing Input-Documents in the same way as without this attribute except that a time-out can occur with Input-Documents anywhere in the Job. For example, a Printer could receive Input-Documents 1 and 3 and not 2.

"document-exceptions" (1setOf collection):

The client **OPTIONALLY** supplies this attribute. See section 5.1 for details. The Printer **MUST** support this attribute if it supports the “document-exceptions” Job Template attribute. If the job doesn’t contain a “document-exceptions” attribute, this attribute is added to the Job. Otherwise, the ‘collection’ values from this attribute are appended to the existing “document-exceptions” attribute. See section 5.1 for rules of resolving conflicts. Also the “input-documents” attribute is added to any ‘collection’ value that contains neither an “input-documents” nor “output-documents” attribute.

1162

1163 "page-exceptions" (1setOf collection):

1164  
1165 The client **OPTIONALLY** supplies this attribute. See section 5.2 for details. The Printer  
1166 **MUST** support this attribute if it supports the "page-exceptions" Job Template attribute.  
1167 If the job doesn't contain a "page-exceptions" attribute, this attribute is added to the Job.  
1168 Otherwise, the 'collection' values from this attribute are appended to the existing "page-  
1169 exceptions" attribute. See section 5.2 for rules of resolving conflicts. Also the "input-  
1170 documents" attribute is added to any 'collection' value that contains neither an "input-  
1171 documents" nor "output-documents" attribute.

## 1172 10. Examples

1173 This section currently contains 3 examples for various relationships of Input-Documents and Output-  
1174 Documents.. The first example is for the Degenerate Case only. The second and third cases are for the  
1175 Separate-Document Case, the Single-Documents Case and the Page-Subset Documents Case.

1176 Brackets are used to delimit the beginning and end of each Collection value.

### 1178 10.1 First Page of Single Document is Letterhead

1179 In the first example, the Printer produces 1 copy of a single Output-Document. It is printed on letter-  
1180 paper using Print-Job. The first Output-Page of the Output-Document is letterhead paper.

#### 1182 10.1.1 Degenerate Case.

1183 There is one Input-Document A which produces one Output-Document.

```
1184 Print-Job
1185     job attributes group
1186         media: letter
1187         page-exceptions: {
1188             output-documents: 1:1          (I could have used input-documents: 1:1 as well)
1189             pages: 1:1
1190             media: letterhead }
1191     end-of-attributes
1192     Input-Document A
```

### 1195 10.2 First Page of Several Documents is Blue

1196 In the second example, the Printer produces 3 copies of each Output-Document. Each is stapled and  
1197 printed on letter-paper, two-sided using Create-Job. The first Output-Page of each Output-Document is  
1198 blue-letter paper and one-sided. All Input-Documents are PostScript.

1200 Attributes that differ between cases are in bold. The values for the attribute “input-documents” changes  
1201 with each example, but could be “1:100” for all.

### 1202 **10.2.1 Separate-Documents Case.**

1203 There are two Input-Documents A and B which produce two Output-Documents.

1204  
1205 Create-Job  
1206 operations attributes group  
1207 document-format: application/PostScript  
1208 job attributes group  
1209 \* **multiple-document-handling: separate-documents-collated-copies**  
1210 sides: two-sided-long-edge  
1211 media: letter  
1212 copies: 3  
1213 finishings: stapling  
1214 page-exceptions: {  
1215 output-documents: 1:2 (I could have used input-documents: 1:2 as well)  
1216 pages: 1:1  
1217 sides: one-sided  
1218 media: blue-letter }  
1219 end-of-attributes  
1220 Send-Document  
1221 end-of-attributes  
1222 Input-Document A  
1223 Send-Document  
1224 end-of-attributes  
1225 Input-Document B  
1226

### 1227 **10.2.2 Single-Documents Case**

1228 There are two Input-Documents A and B and only one Output-Document.

1229  
1230 Create-Job  
1231 operations attributes group  
1232 document-format: application/PostScript  
1233 job attributes group  
1234 **multiple-document-handling: single-document**  
1235 sides: two-sided-long-edge  
1236 media: letter  
1237 copies: 3  
1238 finishings: stapling  
1239 page-exceptions: {  
1240 output-documents: 1:1 (I could have used input-documents: 1:1)  
1241 pages: 1:1  
1242 sides: one-sided  
1243 media: blue-letter }  
1244 end-of-attributes  
1245 Send-Document  
1246 end-of-attributes  
1247 Input-Document A  
1248 Send-Document

1249 end-of-attributes  
 1250 Input-Document B  
 1251

### 1252 10.2.3 Page-Subset Documents Case

1253 There are two Input-Documents A and B. . The first Input-Document contains 10 Pages and the second  
 1254 one 15 pages. There are 7 Output-Documents with 3 pages, 5 pages, 4 pages, 2 pages, 3 pages, 5 pages  
 1255 and 3 pages. The “ pages-per-subset” attributes wraps after the first four Output-Documents and starts  
 1256 with “3” again. After consuming 22 Input-Pages, the next number is “4”, but only 3 pages remain. So  
 1257 the last Output-Document is short. These value show two boundary cases.

1258  
 1259 Create-Job  
 1260 operations attributes group  
 1261 document-format: application/PostScript  
 1262 job attributes group  
 1263 **multiple-document-handling: separate-documents-collated-copies**  
 1264 **pages-per-subset: 3, 5, 4, 2**  
 1265 sides: two-sided-long-edge  
 1266 media: letter  
 1267 copies: 3  
 1268 finishings: stapling  
 1269 page-exceptions: {  
 1270 output-documents: 1:7 (I could have used output-documents: 1:100 to be safe)  
 1271 pages: 1:1  
 1272 sides: one-sided  
 1273 media: blue-letter }  
 1274 end-of-attributes  
 1275 Send-Document  
 1276 end-of-attributes  
 1277 Input-Document A  
 1278 Send-Document  
 1279 end-of-attributes  
 1280 Input-Document B

## 1281 10.3 First Page is Blue and First Document is not stapled

1282 In the third example, the Printer produces 3 copies of each Output-Document. Each is stapled and  
 1283 printed on letter-paper, two-sided using Create-Job. The third and fourth Output-Pages of each Output-  
 1284 Document is blue-letter paper and one-sided. The second Output-Document is not stapled. All files are  
 1285 PostScript except the second which is html.

1286  
 1287 Attributes that differ between cases are in bold. The values for the attribute “input-documents” changes  
 1288 with each example, but could be “1:100” for all.

### 1289 10.3.1 Separate-Documents Case

1290 There are two Input-Documents A and B which produce two Output-Documents.  
 1291

1292 There are three version presented here in order to show three different places to put the attributes  
 1293 associated with an Input-Document. The differences are in *bold-italic*.

1294  
 1295 First solution:

1296 Create-Job  
 1297 operations attributes group  
 1298 document-format: application/PostScript  
 1299 job attributes group  
 1300 **multiple-document-handling: separate-documents-collated-copies**  
 1301 sides: two-sided-long-edge  
 1302 media: letter  
 1303 copies: 3  
 1304 finishings: stapling  
 1305 document-format: application/PostScript  
 1306 document-exceptions: {  
 1307 output-documents: 2:2 (I could have used input-documents: 2:2 & merged with next)  
 1308 finishings: none }  
 1309 {  
 1310 **input-documents: 2:2** *next value of multi-value*  
 1311 **document-format: text/html**  
 1312 page-exceptions: {  
 1313 output-documents: 1:2 (I could have used input-documents: 1:2 as well)  
 1314 pages: 3:4  
 1315 sides: one-sided  
 1316 media: blue-letter }  
 1317 end-of-attributes  
 1318 Send-Document  
 1319 end-of-attributes  
 1320 Input-Document A  
 1321 Send-Document  
 1322 end-of-attributes  
 1323 Input-Document B  
 1324

1325  
 1326 Second solution:

1327 Create-Job  
 1328 operations attributes group  
 1329 document-format: application/PostScript  
 1330 job attributes group  
 1331 **multiple-document-handling: separate-documents-collated-copies**  
 1332 sides: two-sided-long-edge  
 1333 media: letter  
 1334 copies: 3  
 1335 finishings: stapling  
 1336 document-format: application/PostScript  
 1337 document-exceptions: {  
 1338 output-documents: 2:2  
 1339 finishings: none }  
 1340 page-exceptions: {  
 1341 output-documents: 1:2 (I could have used input-documents: 1:2 as well)  
 1342 pages: 3:4  
 1343

1344 sides: one-sided  
 1345 media: blue-letter }  
 1346 end-of-attributes  
 1347 Send-Document  
 1348 end-of-attributes  
 1349 Input-Document A  
 1350 Send-Document  
 1351 ***Operation attributes group***  
 1352 ***document-format: text/html***  
 1353 end-of-attributes  
 1354 Input-Document B  
 1355  
 1356 Third solution:  
 1357  
 1358 Create-Job  
 1359 operations attributes group  
 1360 document-format: application/PostScript  
 1361 job attributes group  
 1362 **multiple-document-handling: separate-documents-collated-copies**  
 1363 sides: two-sided-long-edge  
 1364 media: letter  
 1365 copies: 3  
 1366 finishings: stapling  
 1367 document-format: application/PostScript  
 1368 page-exceptions: {  
 1369 output-documents: 1:2 (I could have used input-documents: 1:2 as well)  
 1370 pages: 3:4  
 1371 sides: one-sided  
 1372 media: blue-letter }  
 1373 end-of-attributes  
 1374 Send-Document  
 1375 end-of-attributes  
 1376 Input-Document A  
 1377 Send-Document  
 1378 ***Operation attributes group***  
 1379 ***document-exceptions: {***  
 1380 ***input-documents: 2:2***  
 1381 ***document-format: text/html***  
 1382 ***finishings: none }***  
 1383 end-of-attributes  
 1384 Input-Document B  
 1385

### 10.3.2 Single-Documents Case

1387 There are two Input-Documents A and B and only one Output-Document.

1388

1389 There are three solutions. The Page-Exception attributes are in Create-Job in the first solution and in  
 1390 Send-Document in the last two solutions. The Document-Exception attribute is directly in the operation  
 1391 attributes of Send-Document in the first two solutions and in the document-exceptions attributes of  
 1392 Send-Document in the third solution. The differences are in ***bold-italic***.  
 1393

1394 First solution:

1395

1396 Create-Job

1397 operations attributes group

1398 document-format: application/PostScript

1399 job attributes group

1400 **multiple-document-handling: single-document**

1401 sides: two-sided-long-edge

1402 media: letter

1403 copies: 3

1404 finishings: stapling

1405 document-exceptions: {

1406 output-documents: 2:2 (This is ignored because there is no 2<sup>nd</sup> document)

1407 finishings: none }

1408 **page-exceptions: {**

1409 **input-documents: 1:1** (*I could have used output-documents: 1:1*)

1410 **pages: 3:4**

1411 **sides: one-sided**

1412 **media: blue-letter }**

1413 end-of-attributes

1414 Send-Document

1415 end-of-attributes

1416 Input-Document A

1417 Send-Document

1418 Operation attributes group

1419 **document-format: text/html**

1420 end-of-attributes

1421 Input-Document B

1422

1423 Second solution:

1424

1425 Create-Job

1426 operations attributes group

1427 document-format: application/PostScript

1428 job attributes group

1429 **multiple-document-handling: single-document**

1430 sides: two-sided-long-edge

1431 media: letter

1432 copies: 3

1433 finishings: stapling

1434 document-exceptions: {

1435 output-documents: 2:2 (This is ignored because there is no 2<sup>nd</sup> document)

1436 finishings: none }

1437 end-of-attributes

1438 Send-Document

1439 Operation attributes group

1440 **page-exceptions: {**

1441 **input-documents: 1:1** (*I could have used output-documents: 1:1*)

1442 **pages: 3:4**

1443 **sides: one-sided**

1444 **media: blue-letter }**

1445 end-of-attributes

1446 Input-Document A



1447 Send-Document  
 1448     Operation attributes group  
 1449         *document-format: text/html*             (this can be here or in the document-exceptions)  
 1450     end-of-attributes  
 1451     Input-Document B  
 1452  
 1453 Third solution:  
 1454  
 1455 Create-Job  
 1456     operations attributes group  
 1457         document-format: application/PostScript  
 1458     job attributes group  
 1459         **multiple-document-handling: single-document**  
 1460         sides: two-sided-long-edge  
 1461         media: letter  
 1462         copies: 3  
 1463         finishings: stapling  
 1464         document-exceptions: {  
 1465             output-documents: 2:2             (This is ignored because there is no 2<sup>nd</sup> document)  
 1466             finishings: none }  
 1467     end-of-attributes  
 1468 Send-Document  
 1469     Operation attributes group  
 1470         *page-exceptions: {*  
 1471             *input-documents: 1:1*             (*I could have used output-documents: 1:1*)  
 1472             *pages: 3:4*  
 1473             *sides: one-sided*  
 1474             *media: blue-letter }*  
 1475     end-of-attributes  
 1476     Input-Document A  
 1477 Send-Document  
 1478     Operation attributes group  
 1479         *document-exceptions: {*  
 1480             *input-documents: 2:2*  
 1481             *document-format: text/html }*  
 1482     end-of-attributes  
 1483     Input-Document B

### 1484 10.3.3 Page-Subset Documents Case

1485 There are two Input-Documents A and B. . The first Input-Document contains 10 Pages and the second  
 1486 one 15 pages. There are 7 Output-Documents with 3 pages, 5 pages, 4 pages, 2 pages, 3 pages, 5 pages  
 1487 and 3 pages. The “pages-per-subset” attributes wraps after the first four Output-Documents and starts  
 1488 with “3” again. After consuming 22 Input-Pages, the next number is “4”, but only 3 pages remain. So  
 1489 the last Output-Document is short.

1490  
 1491 Create-Job  
 1492     operations attributes group  
 1493         document-format: application/PostScript  
 1494     job attributes group  
 1495         **multiple-document-handling: separate-documents-collated-copies**  
 1496         **pages-per-subset: 3, 5, 4, 2**  
 1497         sides: two-sided-long-edge

1498 media: letter  
 1499 copies: 3  
 1500 finishings: stapling  
 1501 document-exceptions: {  
 1502 output-documents: 2:2  
 1503 finishings: none }  
 1504 page-exceptions: {  
 1505 output-documents: 1:7 (I could have used input-documents: 1:100 to be safe)  
 1506 pages: 3:4  
 1507 sides: one-sided  
 1508 media: blue-letter }  
 1509 end-of-attributes  
 1510 Send-Document  
 1511 end-of-attributes  
 1512 Input-Document A  
 1513 Send-Document  
 1514 Operation attributes group  
 1515 document-format: text/html (this can be here or in the document-exceptions)  
 1516 end-of-attributes  
 1517 Input-Document B  
 1518

#### 1519 10.4 One document with 100 copies for distribution and one on transparencies.

1520 In the fourth example, the Printer produces 101 copies of the single Output-Document using Print-Job.  
 1521 The first 100 are stapled and printed on letter-paper, two-sided, except the first page is on blue paper,  
 1522 one-sided. The eleventh copy is printed on transparencies, one-sided and not stapled. The file is  
 1523 PostScript.

1524 Print-Job  
 1525 operations attributes group  
 1526 document-format: application/PostScript  
 1527 job attributes group  
 1528 sides: two-sided-long-edge  
 1529 media: letter  
 1530 copies: 101  
 1531 finishings: stapling  
 1532 document-format: application/PostScript  
 1533 document-exceptions: {  
 1534 output-documents: 1:1 (I could have used input-documents: 1:1 as well)  
 1535 document-copies: 101:101  
 1536 sides: one-sided  
 1537 media: transparency }  
 1538 finishings: none }  
 1539 page-exceptions: {  
 1540 output-documents: 1:1 (I could have used input-documents: 1:1 as well)  
 1541 document-copies: 1:100  
 1542 pages: 1:1  
 1543 sides: one-sided  
 1544 media: blue-letter }  
 1545 end-of-attributes  
 1546 Input-Document A  
 1547

1548

## 11. IANA Considerations

1550

1551 IANA will be called on to register the Job Template attributes defined in this document, using the  
1552 procedures outlined in [ipp-mod].

## 12. Internationalization Considerations

1554 The IPP extensions defined in this document require the same internationalization considerations as any of  
1555 the Job Template attributes defined in IPP/1.1 [ipp-mod].

## 13. Security Considerations

1557 The IPP extensions defined in this document require the same security considerations as any of the Job  
1558 Template attributes defined in IPP/1.1 [ipp-mod].

## 14. References

1560 [ipp-mod]

1561 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and  
1562 Semantics", <draft-ietf-ipp-model-v11-04.txt>, June 23, 1999.

1563 [RFC2566]

1564 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and  
1565 Semantics", RFC 2566, April 1999.

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## 1583 16. Appendix A: Rules for Attribute Association

1584 For each category of attribute, there is a rule:

- 1585
- 1586 **-1. Input-Documents:** such an attribute
- 1587 **-a)** cannot be directly associated with Input-Pages, Output-Pages, ~~or Output Documents.~~ **Output-**
- 1588 **Documents**
- 1589 b) can be directly associated with an Input-Document, and it affects the Input-Document it is
- 1590 associated with.
- 1591 **-c)** can be associated with a Job and it affects all Input-Documents that don't have the attribute
- 1592 associated with ~~it.~~
- 1593 **it.**
- 1594
- 1595 **2. Output-Documents:** such an attribute
- 1596 a) can never be directly associated with an Input-Page or Output-Page.
- 1597 **-b)** can be directly associated with an Output-Document, and it affects the Output-Document it is
- 1598 associated with.
- 1599 **-c)** can be directly associated with an Input-Document. If that Input-Document produces a first
- 1600 Output-Page for one or more Output-Documents, the attribute is effectively associated with each
- 1601 such Output-Document that doesn't have the attribute directly associated with it. **Now use rule**
- 1602 **0b).** If that Input-Document doesn't produce any first Output-Pages of an Output-Document, it is
- 1603 ignored and the Printer produces a warning message.
- 1604 **-d)** can be associated with a Job and it affects all Output-Documents that don't have the attribute
- 1605 associated with ~~it.~~
- 1606 **it.**
- 1607
- 1608 **-3. Sheets:** such attributes
- 1609 **-a)** can be directly associated with an Output-Page, and it affects the **associated** Output-Page ~~it is~~
- 1610 ~~associated with.~~
- 1611 **-b)** can be directly associated with an Input-Page, and it is effectively associated with the Output-
- 1612 Page determined by the relationship described for the four cases in section 4.2 if that Output-
- 1613 Page doesn't have the attribute directly associated with it. **Now use rule 0a)**
- 1614 c) can be directly associated with an Output-Document, and it affects all Output-Pages in the
- 1615 specified Output-Document that don't have the attribute associated directly with it or the
- 1616 corresponding Input-Page.
- 1617 **-d)** can be directly associated with an Input-Document, and it is effectively associated with all
- 1618 Input-Pages in the specified Input-Document that don't have the attribute associated directly

1619 with it. By transitivity, the attribute is effectively associated with all corresponding Output-  
1620 Pages (see section 4.2) that don't have the attribute associated directly with the them or the  
1621 containing Output-Document. Now use rule 0a)

1622 ~~-e)~~ can be associated with a Job and it affects all Output-Pages that don't have the attribute  
1623 associated with ~~it~~.  
1624 it.

1625  
1626 When an association includes the "document-copies" attribute, it modifies the meaning of the above rules  
1627 slightly for each effective association. If the attribute effectively associates with:

1628 Input-Documents, the Printer ignores the "document-copies" attribute.

1630 Output-Documents, the attribute affects the specified copies of the Output-Documents (See Item 0b))

1631 Sheets: the attribute affects the sheets of the specified copies of Output-Documents (See Items 0a) and  
1632 0c).

## 1633 17. Appendix B: Change History

1634 This section summarizes the changes to the document. Each sub-section is in reverse chronological order.  
1635 Adding or removing ISSUES that don't change the document are not listed here.

### 1636 17.1 Changes to the January 3, 2000 version to make the January 31, 2000 version

1637 The following changes to the January 3, 2000 version to make the January 31, 2000 version:

- 1638 1. Changed the format to be a PWG-DRAFT. No technical content changed.

## 1639 18. Appendix C: Description of the IEEE-ISTO PWG

1640 The Printer Working Group (or PWG) is a Program of the IEEE Industry Standards and Technology  
1641 Organization (ISTO) ~~and is an alliance among~~ with member organizations including printer manufacturers,  
1642 print server developers, operating system providers, network operating systems providers, network  
1643 connectivity vendors, and print management application developers. The group is chartered to make  
1644 printers and the applications and operating systems supporting them work together better. All references to  
1645 the PWG in this document implicitly mean "The Printer Working Group, a Program of the IEEE ISTO." In  
1646 order to meet this objective, the PWG will document the results of their work as open standards that define  
1647 print related protocols, interfaces, procedures and conventions. Printer manufacturers and vendors of printer  
1648 related software will benefit from the interoperability provided by voluntary conformance to these  
1649 standards.  
1650

1651 In general, a PWG standard is a specification that is stable, well understood, and is technically competent,  
1652 has multiple, independent and interoperable implementations with substantial operational experience, and  
1653 enjoys significant public support. ~~The PWG may issue a standard as a PWG standard and/or when~~  
1654 ~~appropriate submit~~  
1655 ~~the standard to other standards organizations, such as the IETF, ISO, ITU, IEEE, or ECMA.~~

1656

1657

1658 For additional information regarding the Printer Working Group visit:

1659

1660 <http://www.pwg.org>

1661

## 1662 19. Appendix D: IEEE Industry Standards and Technology Organization

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1664

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1674 Title: Internet Printing Protocol (IPP): Exception Attributes for Documents and Pages

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