The Printer Working Group

IPP FaxOut Service

Status: Approved

Abstract: This standard defines an IPP extension to support the PWG Semantic Model FaxOut service over IPP.

This document is a PWG Candidate Standard. For a definition of a "PWG Candidate Standard", see: ftp://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf

This document is available electronically at:

>ftp://ftp.pwg.org/pub/pwg/candidates/cs-ippfaxout10-20131115-5100.15.docx
>ftp://ftp.pwg.org/pub/pwg/candidates/cs-ippfaxout10-20131115-5100.15.pdf

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About the IEEE-ISTO PWG

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

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

For additional information regarding the Printer Working Group visit:

http://www.pwg.org

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About the Internet Printing Protocol Work Group

The Internet Printing Protocol (IPP) working group has developed a modern, full-featured network printing protocol, which is now the industry standard. IPP allows a print client to query a printer for its supported capabilities, features, and parameters to allow the selection of an appropriate printer for each print job. IPP also provides job information prior to, during, and at the end of job processing.

For additional information regarding IPP visit:

http://www.pwg.org/ipp/

Implementers of this specification are encouraged to join the IPP mailing list in order to participate in any discussions of the specification. Suggested additions, changes, or clarification to this specification, should be sent to the IPP mailing list for consideration.

Table of Contents

List of Tables

1. Introduction

This document specifies an IPP binding of the PWG FaxOut Service Semantic Model and Service Interface [PWG5108.05]. Because outgoing facsimile and printing share the same general output model, this binding is essentially an extension of IPP that defines a small number of new attributes specific to facsimile.

2. Terminology

2.1 Conformance Terminology

Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD, SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as defined in Key words for use in RFCs to Indicate Requirement Levels [RFC2119]. The term CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that applies to a particular capability or feature.

2.2 Printing Terminology

Normative definitions and semantics of printing terms are imported from IETF Printer MIB v2 [RFC3805], IETF Finisher MIB [RFC3806], and IETF Internet Printing Protocol/1.1: Model and Semantics [RFC2911].

This document also defines the following terms in order to specify unambiguous conformance requirements:

Client: Initiator of outgoing IPP session requests and sender of outgoing IPP operation requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC2616] User Agent).

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

Imaging Device: A logical or physical device that supports printing, facsimile, and other imaging services.

ith: referring to a specific 1setOf value - the first value, the second value, and so forth.

Job: An object created and managed by a Printer that contains description, processing, and status information. The Job also contains zero or more Document objects.

Job Description: Attributes supplied by the Client or end user including job processing instructions which are intended to override any Printer object defaults and/or instructions embedded within the document data (IPP Model and Semantics [RFC2911]).

Job Template: Attributes describing the Job object's identification, state, size, etc. (IPP Model and Semantics [RFC2911])

Job Ticket: The combination of Job Description and Job Template attributes.

Logical Device: a print server, software service, or gateway that processes jobs and either forwards or stores the processed job or uses one or more Physical Devices to render output.

Physical Device: a hardware implementation of a endpoint device, e.g., a marking engine, a fax modem, etc.

Printer: Listener for incoming IPP session requests and receiver of incoming IPP operation requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC2616] Server) that represents one or more Imaging Devices.

Spooling Device: An Imaging Device that stores a Job's document data prior to processing.

Streaming Device: An Imaging Device that processes a Job's document data as it is received from the Client.

2.3 Acronyms and Organizations

IANA: Internet Assigned Numbers Authority, http://www.iana.org/

IETF: Internet Engineering Task Force, http://www.ietf.org/

ISO: International Organization for Standardization, http://www.iso.org/

PSTN: Public Switched Telephone Network

PWG: Printer Working Group, http://www.pwg.org/

3. Requirements

3.1 Rationale for the IPP FaxOut Service

The Internet Printing Protocol Version 2.0 Second Edition [PWG5100.12] defines a collection of existing IPP specifications that form the basis for IPP/2.0.

The MFD Model and Common Semantics [PWG5108.1] defines a common semantic model and service interface for multi-function devices based on IPP.

The FaxOut Service Semantic Model and Service Interface v1.0 [PWG5108.05] defines the semantics and interfaces specific to outgoing facsimile.

The PWG Raster Format [PWG5102.4] defines simple page-based raster format for printing.

Therefore, this IPP FaxOut Service specification should support outgoing facsimile using IPP based on the semantics and interfaces defined by the FaxOut Service Semantic Model and Service Interface v1.0.

3.2 Use Cases

3.2.1 Fax from an Application

Jane wishes to send a contract to a customer via her multi-function device with facsimile capabilities. She opens the contract in her word processor, initiates a print operation, selects the facsimile service for her MFD, supplies the recipient's name, fax number, and a subject and message for the fax cover page, and then confirms the submission of the fax job. The document is then transformed as needed and queued on the MFD for sending. Jane is able to monitor the status of the transmission from her computer. Finally, her customer receives the fax with the contract.

3.2.2 Fax to Multiple Recipients with Retry and Failure

John needs to submit a printed report to several government entities using his multi-function device with facsimile capabilities. He opens the report program, initiates a print operation, selects the facsimile service for his MFD, supplies the recipient names, fax numbers, and a subject and message for the fax cover pages, and then confirms the submission of the fax job. John is able to monitor the status of the transmissions from his computer for each recipient. As the MFD sends the report to each recipient, it negotiates the necessary format and resolution of the transmission separately and without any action by John.

When a transmission error occurs for the first recipient, John is notified through the client user interface and the MFD automatically retries the transmission. The last recipient turned their fax machine off and so the MFD reports each failed transmission to John's computer and aborts the transmission after five failed attempts.

3.2.3 Fax Using a Resource-Constrained MFD

Mary has a MFD with facsimile capabilities but only enough memory to hold a single page of output in memory at any given time. When faxing, Mary's computer streams simple page-based raster data to the MFD, pausing and retrying as needed to allow the fax job to complete.

3.2.4 Fax After Verification

John is visiting a satellite office and needs to send a facsimile to the main corporate office. He prepares the fax document, initiates a facsimile operation, selects a local facsimile service at the satellite office, and then requests verification of the Imaging Device that was

selected. After seeing or hearing that the correct Imaging Device will be used, John confirms the sending of the facsimile.

3.3 Out of Scope

The design of the client's user interface and the methods of performing facsimile are out of scope for this specification.

3.4 Design Requirements

The use cases in section 3.2 identify several design requirements:

1. FaxOut should closely mirror the semantic model for printing.
2. The Client can supply information for a cover page to be generated by the Printer.
3. The Client can specify one or more recipients by name and telephone number.
4. The Printer handles negotiation and conversion of documents for facsimile when the receiving facsimile does not support the Client-supplied document data.
5. The Client can stream basic page-based raster data.
6. The Client resubmits jobs when the Printer is unable to send the document to the recipient(s).
7. The Client can monitor the status of transmission to each recipient.
8. The Client can request identification of the Imaging Device.

4. FaxOut Service Definition

4.1 FaxOut Job Processing

From the Client's perspective, FaxOut jobs are largely processed the same way as a Print job, and IPP FaxOut reuses operations, attributes, and status codes from the Internet Printing Protocol/1.1: Model and Semantics [RFC2911] wherever possible. Spooling Printers handle retransmission of whole jobs automatically while streaming Printers put the burden of retransmission on the Client.

One primary difference with FaxOut is that the output resolution and color space depend on the receiver of the fax job, and can be different for each destination. In order to simplify implementation and preserve the IPP model and semantics, Printers MUST support scaling and color space conversion of document data to match the negotiated facsimile image format at job processing time. Attribute fidelity specified with the "ipp-attribute-fidelity" [RFC2911] and "job-mandatory-attributes" [PWG5100.7] operation attributes applies only when a Job is created - Printers indicate that fidelity was not honored during transmission by reporting the 'job-completed-with-warnings' keyword in the "job-state-reasons" Job attribute.

Another difference is that FaxOut Jobs generally expose different capabilities and use different resources than Print jobs, e.g., fax modems and scanner subunits. Imaging Devices MUST support FaxOut on endpoint(s)/path(s) separate from the Print service(s) in order to expose the capabilities and status corresponding to the service being accessed by the Client.

When supported by the Printer, FaxOut Jobs can also be directed to multiple destinations. This requires some additional state information to manage the transmission of the job to each destination.

4.1.1 Spooling Devices

Imaging Devices that spool print jobs MUST automatically retry fax transmission for PSTN fax and support multiple destination URIs. Such Imaging Devices typically support the PDF ("application/pdf") and/or OpenXPS ("application/openxps") document formats, however they MAY NOT support spooling for all formats. Clients MUST include and Printers MUST support the "document-format" operation attribute in Get-Printer-Attributes requests in order to determine the spooling capabilities of the Printer for a given format.

4.1.2 Streaming Devices

Imaging Devices that can only stream print jobs to a single destination URI MUST support retransmission of the current page. When an error occurs that requires retransmission of larger portions of the job by the Client, Printers MUST move the job to the aborted state, add the appropriate keyword to the "job-state-reasons" Job Description attribute for the Job, and return the server-error-device-error status code to the Client.

Some document formats, e.g., PWG Raster ("image/pwg-raster"), are considered to be streaming-only formats. Clients MUST include and Printers MUST support the "document-format" operation attribute in Get-Printer-Attributes requests in order to determine the spooling capabilities of the Printer for a given format.

4.1.3 Job Terminating State

The terminating state of an IPP FaxOut Job reflects the final disposition of the Job. Jobs in the 'canceled' state were canceled by a User using the Cancel-Job, Cancel-Jobs, or Cancel-My-Jobs operations, regardless of whether any or all of the Job has been processed or partially transferred to its destination URI(s). The "destination-statuses" Job Description attribute (section 7.3.1) provides detailed information regarding the progress of the job prior to cancellation with the value of the "destination-state" member attribute set to 'completed' for Jobs that were completely sent to the destination or 'canceled' otherwise.

Jobs in the 'aborted' state were aborted by the IPP FaxOut service itself, typically due to a fatal processing error or a failed transfer to any of a Job's destination URIs. The "destination-statuses" Job Description attribute (section 7.3.1) provides detailed information regarding the progress of the Job prior to being aborted by the service with the

value of the "destination-state" member attribute set to 'completed' for Jobs that were completely sent to the destination or 'aborted' otherwise. The "job-state-reasons" Job Description attribute will contain the keyword 'destination-uri-failed' if the Job was aborted due to a transfer error to one or more destination URIs.

Jobs in the 'completed' state were successfully processed and transferred to at least one of the Job's destination URIs. The "destination-statuses" Job Description attribute (section 7.3.1) provides detailed information regarding the terminating state of each destination URI. Printers MUST report the 'job-completed-with-errors' keyword in the "job-state-reasons" attribute if the Job was not successfully transferred to any destination URI.

4.1.4 Job History

IPP FaxOut Job history MUST be retained for a minimum of 300 seconds. The values of certain Job Description attributes, e.g., job-id, job-originating-user-name, destination-uris, etc. MUST be durably logged to the location specified in the "printer-fax-log-uri" (section 7.4.26) Printer attribute before a Job can be deleted.

This requirement comes from Section 7 of [PWG5108.05].

4.1.5 Printer URIs

Each instance of an IPP FaxOut service is identified by a URI. The path component of an IPP FaxOut URI MUST be "/ipp/faxout" for the only (or default) instance of the service on an Imaging Device and "/ipp/faxout/*instance-name*" for each additional, non-default instance on the Imaging Device.

4.1.6 Destination URIs

IPP FaxOut supports sending of facsimile jobs to one or more destination URIs. The following URI schemes are identified by this specification:

'ipp', 'ipps': Facsimile jobs are submitted to the destination URI using the Internet Printing Protocol [RFC2911], typically for printing.

'mailto': Facsimile jobs are converted to TIFF G3 or PDF files and sent to the destination email address using Multimedia Internet Mail Exchange [RFC2045] attachments.

'sip', 'sips': Facsimile jobs are converted to a compatible format and sent to the destination address using the Session Initiation Protocol [RFC3161].

'tel': Facsimile jobs are converted and sent to the destination using a PSTN fax modem.

4.2 IPP Operations

Table 1 lists the operations for a Printer conforming to this FaxOut service specification. The Create-Job and Send-Document operations are required in order to support reliable job management (e.g., cancellation) during fax job submission, but Printers are not required to support multiple document jobs.

Table 1 - Operations for FaxOut (note 1)

Code	IPP Operation Name	SM Operation Name	Reference
0x0004	Validate-Job	ValidateFaxOutJobTicket	RFC 2911
0x0005	Create-Job	CreateFaxOutJob	RFC 2911
0x0006	Send-Document	SendFaxOutDocument	RFC 2911
0x0007	Send-URI (O)	SendFaxOutURI	RFC 2911
0x0008	Cancel-Job	CancelFaxOutJob	RFC 2911
0x0009	Get-Job-Attributes	GetFaxOutJobElements	RFC 2911
0x000A	Get-Jobs	GetActiveFaxOutJobs, GetFaxOutJobHistory	RFC 2911
0x000B	Get-Printer-Attributes	GetFaxOutService Elements	RFC 2911
0x0010	Pause-Printer (O)	PauseFaxOutService	RFC 2911
0x0011	Resume-Printer (O)	ResumeFaxOutService	RFC 2911
0x0013	Set-Printer-Attributes (O)	SetFaxOutService Elements	RFC 3380
0x0014	Set-Job-Attributes (O)	SetFaxOutJobElements	RFC 3380
0x0015	Get-Printer-Supported-Values (O)	-	RFC 3380
0x0016	Create-Printer-Subscriptions (O)	-	RFC 3995
0x0017	Create-Job-Subscriptions (O)	-	RFC 3995
0x0018	Get-Subscription-Attributes (O)	-	RFC 3995
0x0019	Get-Subscriptions (O)	-	RFC 3995
0x001A	Renew-Subscription (O)	-	RFC 3995
0x001B	Cancel-Subscription (O)	-	RFC 3995
0x001C	Get-Notifications (O)	-	RFC 3996
0x0022	Enable-Printer (O)	EnableFaxOutService	RFC 3998
0x0023	Disable-Printer (O)	DisableFaxOutService	RFC 3998
0x0024	Pause-Printer-After-Current-Job (O)	PauseFaxOutService AfterCurrentJob	RFC 3998
0x0025	Hold-New-Jobs (O)	HoldNewFaxOutJobs	RFC 3998
0x0026	Release-Held-New-Jobs (O)	ReleaseHeldFaxOutJobs	RFC 3998
0x0027	Deactivate-Printer (O)	-	RFC 3998
0x0028	Activate-Printer (O)	-	RFC 3998

0x0029	Restart-Printer (O)	RestartFaxOutService	RFC 3998
0x002A	Shutdown-Printer (O)	ShutdownFaxOut Service	RFC 3998
0x002B	Startup-Printer (O)	StartupService (note 3)	RFC 3998
0x002D	Cancel-Current-Job (O)	CancelCurrentFaxOut Job	RFC 3998
0x002E	Suspend-Current-Job (O)	SuspendCurrentFaxOutJob	RFC 3998
0x002F	Resume-Job (O)	ResumeFaxOutJob	RFC 3998
0x0030	Promote-Job (O)	PromoteFaxOutJob	RFC 3998
0x0031	Schedule-Job-After (O)	PromoteFaxOutJob	RFC 3998
0x0033	Cancel-Document (O)	CancelFaxOut Document	PWG 5100.5
0x0034	Get-Document-Attributes (O)	GetFaxOutDocument Elements	PWG 5100.5
0x0035	Get-Documents (O)	GetFaxOutDocuments	PWG 5100.5
0x0036	Delete-Document (O)	-	PWG 5100.5
0x0037	Set-Document-Attributes (O)	SetFaxOutDocument Elements	PWG 5100.5
0x0038	Cancel-Jobs (O)	CancelFaxOutJobs	PWG 5100.11
0x0039	Cancel-My-Jobs	CancelMyFaxOutJobs	PWG 5100.11
0x003A	Resubmit-Job (O)	ResubmitFaxOutJob	PWG 5100.11
0x003B	Close-Job	CloseFaxOutJob	PWG 5100.11
0x003C	Identify-Printer	IdentifyFaxOutService	PWG 5100.13
0x003D	Validate-Document (O)	ValidateFaxOutDocument Ticket	PWG 5100.13
0x003E	Add-Document-Images (note 2)	AddFaxOutHardCopy Document	PWG 5100.15

"(O)" = OPTIONAL

Note 1: The legacy IPP Print-Job (0x0002), Print-URI (0x0003), Hold-Job (0x000C), Release-Job (0x000D), Restart-Job (0x000E), Purge-Jobs (0x0012). and Resubmit-Job (0x002C) operations MUST NOT be supported by a conforming IPP FaxOut implementation.

Note 2: RECOMMENDED when the Imaging Device supports scanning of hardcopy documents.

Note 3: StartupService is an operation on the Semantic Model System Control Service.

4.3 IPP Printer Description Attributes

Table 2 lists the REQUIRED Printer Description attributes for a Printer.

Table 2 - Required Printer Description Attributes

Attribute	Reference
charset-configured	RFC 2911
charset-supported	RFC 2911
color-supported (note 3)	RFC 2911
compression-supported	RFC 2911
confirmation-sheet-print-default	PWG 5100.15
copies-default (note 2)	RFC 2911
copies-supported (note 2)	RFC 2911
cover-sheet-info-default (note 1)	PWG 5100.15
cover-sheet-info-supported (note 1)	PWG 5100.15
destination-uri-schemes-supported	PWG 5100.15
document-format-default	RFC 2911
document-format-supported	RFC 2911
generated-natural-language-supported	RFC 2911
input-attributes-default (note 4)	PWG 5100.15
input-attributes-supported (note 4)	PWG 5100.15
input-color-mode-supported (note 4)	PWG 5100.15
input-media-supported (note 4)	PWG 5100.15
input-orientation-requested-supported (note 4)	PWG 5100.15
input-quality-supported (note 4)	PWG 5100.15
input-resolution-supported (note 4)	PWG 5100.15
input-sides-supported (note 4)	PWG 5100.15
input-source-supported (note 4)	PWG 5100.15
ipp-features-supported	PWG 5100.13
ipp-versions-supported	RFC 2911
job-ids-supported	PWG 5100.11
logo-uri-formats-supported (note 1)	PWG 5100.15
logo-uri-schemes-supported (note 1)	PWG 5100.15
media-bottom-margin-supported	PWG 5100.13
media-col-database	PWG 5100.11
media-col-default	PWG 5100.3
media-col-supported	PWG 5100.3
media-default	RFC 2911
media-left-margin-supported	PWG 5100.13
media-right-margin-supported	PWG 5100.13
media-size-supported	PWG 5100.3
media-supported	RFC 2911
media-top-margin-supported	PWG 5100.13
multiple-destination-uris-supported	PWG 5100.15
multiple-document-handling-supported (note 1)	RFC 2911

Attribute	Reference
multiple-document-jobs-supported	RFC 2911
multiple-operation-time-out	RFC 2911
multiple-operation-time-out-action	PWG 5100.13
natural-language-configured	RFC 2911
number-of-retries-default	PWG 5100.15
number-of-retries-supported (note 6)	PWG 5100.15
operations-supported	RFC 2911
page-ranges-supported (note 1)	RFC 2911
print-quality-default	RFC 2911
print-quality-supported	RFC 2911
printer-alert	PWG 5100.9
printer-alert-description	PWG 5100.9
printer-config-change-date-time	PWG 5100.13
printer-config-change-time	PWG 5100.13
printer-device-id	PWG 5107.2
printer-fax-log-uri	PWG 5100.15
printer-fax-modem-info	PWG 5100.15
printer-fax-modem-name	PWG 5100.15
printer-fax-modem-number	PWG 5100.15
printer-geo-location	PWG 5100.13
printer-get-attributes-supported (note 5)	PWG 5100.13
printer-icons	PWG 5100.13
printer-info	RFC 2911
printer-is-accepting-jobs	RFC 2911
printer-location	RFC 2911
printer-make-and-model	RFC 2911
printer-more-info	RFC 2911
printer-name	RFC 2911
printer-organization	PWG 5100.13
printer-organizational-unit	PWG 5100.13
printer-resolution-default	RFC 2911
printer-resolution-supported	RFC 2911
printer-state	RFC 2911
printer-state-change-date-time	RFC 3995
printer-state-change-time	RFC 3995
printer-state-message	RFC 2911
printer-state-reasons	RFC 2911
printer-up-time	RFC 2911
printer-uri-supported	RFC 2911
printer-uuid	PWG 5100.13
pwg-raster-document-resolution-supported	PWG 5102.4
pwg-raster-document-type-supported (note 3)	PWG 5102.4
queued-job-count	RFC 2911
retry-interval-default (note 6)	PWG 5100.15
retry-interval-supported (note 6)	PWG 5100.15

Attribute	Reference
retry-time-out-default (note 6)	PWG 5100.15
retry-time-out-supported (note 6)	PWG 5100.15
uri-security-supported	RFC 2911
uri-authentication-supported	RFC 2911
which-jobs-supported	PWG 5100.11

Note 1: CONDITIONALLY REQUIRED for Printers that support the "application/openxps" or "application/pdf" MIME media types.

Note 2: Always one copy for fax jobs.

Note 3: Define color support of the Printer, not of the recipient.

Note 4: CONDITIONALLY REQUIRED for Printers with scanning accessories.

Note 5: MUST include "destination-uri" in order to filter capabilities by URI scheme.

Note 6: CONDITIONALLY REQUIRED for Spooling Devices

4.4 IPP Operation Attributes

Table 3 lists the REQUIRED operation attributes for a Printer.

Table 3 - Required Operation Attributes

Attribute	Reference
compression	RFC 2911
document-format	RFC 2911
document-format-version	PWG 5100.7
document-name	RFC 2911, PWG 5100.5
first-index	PWG 5100.13
input-attributes (note 1)	PWG 5100.15
ipp-attribute-fidelity	RFC 2911
job-ids	PWG 5100.11
job-name	RFC 2911
last-document	RFC 2911
limit	RFC 2911
requesting-user-name	RFC 2911
requesting-user-uri	PWG 5100.13
which-jobs	RFC 2911, PWG 5100.11

Note 1: CONDITIONALLY REQUIRED for Printers with scanning accessories.

4.5 IPP Job Template Attributes

Table 4 lists the REQUIRED Job Template attributes for a Printer.

Table 4 - Required Job Template Attributes

Attribute	Reference
confirmation-sheet-print	PWG 5100.15
copies (note 2)	RFC 2911
cover-sheet-info (note 1)	PWG 5100.15
destination-uris	PWG 5100.15
media	RFC 2911
media-col	PWG 5100.3
media-col.media-bottom-margin	PWG 5100.13
media-col.media-left-margin	PWG 5100.13
media-col.media-right-margin	PWG 5100.13
media-col.media-size	PWG 5100.3
media-col.media-top-margin	PWG 5100.13
multiple-document-handling (note 1)	RFC 2911
number-of-retries (note 3)	PWG 5100.15
page-ranges (note 1)	RFC 2911
print-quality	RFC 2911
printer-resolution	RFC 2911
retry-interval (note 3)	PWG 5100.15
retry-time-out (note 3)	PWG 5100.15

Note 1: CONDITIONALLY REQUIRED for Printers that support the "application/openxps" or "application/pdf" MIME media types.

Note 2: Always one copy for fax jobs.

Note 3: CONDITIONALLY REQUIRED for Spooling Devices

4.5.1 Other Job Template Attributes

Printers MAY support additional Job Template attributes such as "imposition-template", "number-up", "orientation-requested", "overrides", "presentation-direction-number-up", "print-color-mode", "print-content-optimize", "print-rendering-intent", and so forth. These attributes are applied by the Printer when generating the content to be transmitted to the destination, just as if the content was being printed.

4.6 IPP Job Description Attributes

Table 5 lists the REQUIRED Job Description attributes for a Printer.

Table 5 - Required Job Description Attributes

Attribute	Source
compression-supplied	PWG 5100.7
date-time-at-completed	RFC 2911
date-time-at-creation	RFC 2911
date-time-at-processing	RFC 2911
destination-statuses	PWG 5100.15
document-format-supplied	PWG 5100.7
document-format-version-supplied	PWG 5100.7
document-name-supplied	PWG 5100.7
job-id	RFC 2911
job-impressions	RFC 2911
job-impressions-completed	RFC 2911
job-name	RFC 2911
job-originating-user-name	RFC 2911
job-printer-up-time	RFC 2911
job-printer-uri	RFC 2911
job-state	RFC 2911
job-state-message	RFC 2911
job-state-reasons	RFC 2911
job-uri	RFC 2911
job-uuid	PWG 5100.13
time-at-completed	RFC 2911
time-at-creation	RFC 2911
time-at-processing	RFC 2911

5. Document Formats

Printers MUST support documents conforming to the PWG Raster Format [PWG5102.4] ("image/pwg-raster"). IPP/2.1 and IPP/2.2 Printers MUST and IPP/2.0 Printers SHOULD support documents conforming to Document management — Portable document format — Part 1: PDF 1.7 [ISO32000] ("application/pdf"). IPP/2.0, IPP/2.1, and IPP/2.2 Printers are defined in IPP/2.0 Second Edition [PWG5100.12].

Printers SHOULD support documents conforming to the Open XML Paper Specification [ECMA388] ("application/openxps").

Printers MAY support legacy documents conforming to the Equivalences between 1988 X.400 and RFC-822 Message Bodies [RFC1494] ("image/g3fax"), Tag Image File Format (TIFF) - image/tiff MIME Sub-type Registration [RFC3302] ("image/tiff"), Real-time Facsimile (T.38) - image/t38 MIME Sub-type Registration [RFC3362] ("image/t38"), or Tag Image File Format Fax eXtended (TIFF-FX) - image/tiff-fx MIME Sub-type Registration [RFC3950] ("image/tiff-fx").

5.1 Document Conversion

Printers MUST support conversion of supported document formats into the negotiated format, color space, and resolution for 'tel' (PSTN fax) destinations.

Printers SHOULD support conversion of supported document formats into supported formats for 'ipp', 'ipps', 'sip', and 'sips' destinations.

Printers SHOULD support conversion of supported document formats into Portable Document Format: Image-Streamable (PDF/is) [PWG5102.3] or Document management — Portable document format — Part 1: PDF 1.7 [ISO32000] ("application/pdf") files for 'mailto' destinations.

6. New Operation

6.1 Add-Document-Images Operation

The RECOMMENDED Add-Document-Images operation adds a scanned document to an existing job object. Printers with one or more scanning accessories SHOULD support this operation. It is semantically similar to the Send-URI operation, however document data comes from a named input source representing a scanning accessory associated with the Printer. Clients discover the available input sources by querying the "input-source-supported" (section 7.4.18) Printer Description attribute. The source and other input attributes are specified using the "input-attributes" (section 7.1.1) operation attribute.

A client SHOULD check to see if the Printer supports the Add-Document-Images operation by querying the values of the "operations-supported" Printer Description attribute.

Access Rights: The authenticated user (see [RFC2911] section 8.3) performing this operation must either be the job owner (as determined in the Create-Job operation) or an operator or administrator of the Printer object (see [RFC2911] Sections 1 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

6.1.1 Add-Document-Images Request

The following attributes are part of the Add-Document-Images Request:

Group 1: Operation Attributes

    Natural Language and Character Set:

        The "attributes-charset (charset)" and "attributes-natural-language (naturalLanguage)" attributes as described in [RFC2911] section 3.1.4.1.

    Target:

        The "printer-uri (uri)" plus "job-id (integer(1:MAX))" which define the target for this operation as described in [RFC2911] section 3.1.5. The client MUST NOT supply and the Printer MUST NOT support the "job-uri (uri)" operation attribute for this operation.

    Requesting User Name:

        The "requesting-user-name (name(MAX))" and "requesting-user-uri (uri)" attributes SHOULD be supplied by the client as described in [RFC2911] section 8.3 and [PWG5100.13] section 6.1.

"input-attributes (collection)"

> The Client OPTIONALLY supplies this attribute and the Printer MUST support this attribute. If the combination of member attribute values are not supported by the Printer, the Printer MUST reject the operation with the 'client-error-attributes-or-values-not-supported' status code and place the "input-attributes" attribute in the unsupported attributes group of the response.

Group 2: Document Template Attributes

> Any Document Template attributes supported by the Printer, to be applied to this hardcopy document.

6.1.2 Add-Document-Images Response

The following attributes are part of the Add-Document-Images Response:

Group 1: Operation Attributes

Status Message:

> In addition to the REQUIRED status code returned in every response, the response OPTIONALLY includes a "status-message (text(255))" and/or a "detailed-status- message (text(MAX))" operation attribute as described in [RFC2911] sections 13 and 3.1.6.

Natural Language and Character Set:

> The "attributes-charset (charset)" and "attributes-natural-language (naturalLanguage)" attributes as described in [RFC2911] section 3.1.4.2.

Group 2: Unsupported Attributes

> See [RFC2911] section 3.1.7 for details on returning Unsupported Attributes.

Group 3: Document Description Attributes

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

> The number of the document that has been added to the Job.

7. New Attributes

7.1 Operation Attribute

7.1.1 input-attributes (collection)

The CONDITIONALLY REQUIRED "input-attributes" operation attribute specifies the scanning source and other attributes for hardcopy documents in an Add-Document-Images (section 6.1) operation. Printers that support the Add-Document-Images operation MUST support this attribute. The following member attributes are defined: "input-color-mode", "input-orientation-requested", "input-media", "input-quality", "input-resolution", "input-sides", and "input-source". The "input-attributes-supported" Printer attribute (section 7.4.8) defines which of the "input-attributes" member attributes are supported.

Note: The Semantic Model FaxOut Service [PWG5108.05] defines a single InputSource element, which does not capture all of the necessary input intent. IPP FaxOut instead maps elements from the Semantic Model Copy Service [PWG5108.04] CopyDocumentProcessing.CopyInput group.

7.1.1.1 input-auto-exposure (boolean)

The "input-auto-exposure" member attribute specifies that the Printer should automatically determine the optimal "input-brightness", "input-contrast", and "input-sharpness" values. If specified with the 'true' value, Clients MUST NOT send and Printers MUST NOT accept the "input-brightness", "input-contrast", or "input-sharpness" member attributes.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-auto-exposure" member attribute.

7.1.1.2 input-auto-scaling (boolean)

The "input-auto-scaling" member attribute specifies that the Printer should automatically determine the optimal "input-scaling-height" and "input-scaling-width". If specified with the 'true' value, Clients MUST NOT send and Printers MUST NOT accept the "input-scaling-height" or "input-scaling-width" member attributes.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-auto-scaling" member attribute.

7.1.1.3 input-auto-skew-correction (boolean)

The "input-auto-skew-correction" member attribute specifies that the Printer should automatically correct the scanned image for media skew.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-auto-skew-correction" member attribute.

7.1.1.4 input-brightness (integer(-100:100))

The "input-brightness" member attribute specifies the brightness of the scanned images. Negative numbers darken the images and positive numbers lighten the images.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-brightness" member attribute.

7.1.1.5 input-color-mode (type2 keyword)

The "input-color-mode" member attribute specifies the color scanning mode for hardcopy documents in an Add-Document-Images (section 6.1) operation. The following values are currently defined:

'auto': Scans documents in 'color' and automatically reduces to 'monochrome' or 'bi-level' as appropriate

'bi-level': Scans documents using a thresholding mode or algorithm to produce a two tone image, typically black and white

'color': Scans documents in full color

'monochrome': Scans documents in a single color, typically grayscale

The "input-color-mode-supported" Printer attribute (section 7.4.9) defines the supported values. Printers MUST support and Clients MUST supply this member attribute, either directly or through the "input-attributes-default" Printer attribute (section 7.4.6) value.

7.1.1.6 input-content-type (type2 keyword)

The "input-content-type" member attribute specifies a hint concerning the type of document being scanned. The following values are defined in this specification:

'auto': Automatically determine the type of document

'halftone': The document contains halftoned images

'line-art': The document contains line art

'magazine': The document is a magazine

'photo': The document is a photograph

'text': The document only contains text

'text-and-photo': The document contains a combination of text and photographs

The "input-content-type-supported" Printer attribute (section 7.4.10) defines the supported values.

7.1.1.7 input-contrast (integer(-100:100))

The "input-contrast" member attribute specifies the contrast of the scanned images. Negative values will reduce the apparent difference between light and dark pixels in the images. Positive values will increase the apparent difference between light and dark pixels in the images.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-contrast" member attribute.

7.1.1.8 input-film-scan-mode (type2 keyword)

The "input-film-scan-mode" member attribute specifies the type of film being scanned. The following values are defined in this specification:

'black-and-white-negative-film': The film is black-and-white negatives

'color-negative-film': The film is color negatives

'color-slide-film': The film is color slides (positives)

'not-applicable': The type of film is not applicable to the usage

The "input-film-scan-mode-supported" Printer attribute (section 7.4.11) defines the supported values.

7.1.1.9 input-images-to-transfer (integer(1:MAX))

The "input-images-to-transfer" member attribute specifies the number of images to scan.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-images-to-transfer" member attribute.

7.1.1.10 input-media (type2 keyword | name(MAX))

The "input-media" member attribute specifies the size of the media being scanned. Defined keyword values are 'auto' (automatically determine size) and any "media" Job Template attribute.

The "input-media-supported" Printer attribute (section 7.4.12) defines the supported values. Printers MUST support this member attribute.

7.1.1.11 input-orientation-requested (type2 enum)

The "input-orientation-requested" member attribute specifies the orientation of the document being scanned. Defined enum values are the same as the "orientation-requested" Job Template attribute.

The "input-orientation-requested-supported" Printer attribute (section 7.4.13) defines the supported values.

7.1.1.12 input-quality (type2 enum)

The "input-quality" member attribute specifies the overall quality of the scanned image(s) of the hardcopy document. Defined enum values are the same as the "print-quality" Job Template attribute. When the "input-resolution" member attribute is not specified, the Printer will select a suitable value based on the "input-color-mode" and "input-quality" member attribute values.

The "input-quality-supported" Printer attribute (section 7.4.14) defines the supported values. Printers MUST support this member attribute with at least the value '4' (normal).

7.1.1.13 input-resolution (resolution)

The "input-resolution" member attribute specifies the resolution of the scanned image(s) of the document. If unspecified, the default value depends on the value of the "input-color-mode" and "input-quality" member attributes.

The "input-resolution-supported" member attribute (section 7.4.15) defines the supported values. Printers SHOULD support this member attribute.

7.1.1.14 input-scaling-height (integer(1:1000))

The "input-scaling-height" member attribute specifies that the Printer should scale the images vertically by the specified percentage. Values less than 100 cause the images to be shortened while values greater than 100 cause the images to be lengthened.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-scaling-height" member attribute.

7.1.1.15 input-scaling-width (integer(1:1000))

The "input-scaling-width" member attribute specifies that the Printer should scale the images horizontally by the specified percentage. Values less than 100 cause the images to be widened while values greater than 100 cause the images to be narrowed.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-scaling-width" member attribute.

7.1.1.16 input-scan-regions (1setOf collection)

The "input-scan-regions" member attribute specifies rectangles to be scanned. Each value consists of four member attributes: "x-origin (integer)" and "y-origin (integer)" specifying the lower lefthand corner of the rectangle and "x-dimension (integer)" and "y-dimension (integer)" specifying the size of the rectangle. All values are in hundredths of millimeters, which is equivalent to 1/2540th of an inch.

The "input-scan-regions-supported" Printer attribute (section 7.4.16) specifies the range of origin and dimension values supported by the Printer.

7.1.1.17 input-sharpness (integer(-100:100))

The "input-sharpness" member attribute specifies the sharpness of the scanned images. Positive values enhance object edges and negative values reduce object edges.

The "input-attributes-supported" Printer attribute (section 7.4.8) specifies whether the Printer supports the "input-sharpness" member attribute.

7.1.1.18 input-sides (type2 keyword)

The "input-sides" member attribute specifies whether the source document is single or double-sided. Defined keyword values are the same as the "sides" Job Template attribute.

The "input-sides-supported" Printer attribute (section 7.4.17) defines the supported values. Printers with duplex-capable document feeders MUST support this member attribute.

7.1.1.19 input-source (type2 keyword)

The "input-source" member attribute specifies the scanning source for hardcopy documents in an Add-Document-Images (section 6.1) operation. The following values are defined:

'adf': Scans documents from the auto-document feeder

'film-reader': Scans documents from a microfilm reader

'platen': Scans a single page document from the scanner glass or platen

The "input-source-supported" Printer attribute (section 7.4.6) defines the supported values. Printers MUST support and Clients MUST provide this member attribute, either directly or through the "input-attributes-default" Printer attribute (section 7.4.6) value.

7.2 Job Template Attributes

7.2.1 confirmation-sheet-print (boolean)

The REQUIRED "confirmation-sheet-print" Job Template attribute specifies whether a confirmation sheet is printed when the Job reaches a terminating state.

7.2.2 cover-sheet-info (collection | no-value)

The CONDITIONALLY REQUIRED "cover-sheet-info" Job Template attribute specifies the information that is shown on the fax cover sheet sent to each recipient. Printers supporting the PDF ("application/pdf") or OpenXPS ("application/oxps") MIME media types MUST support this attribute. The no-value value disables the Printer-generated cover sheet. The "cover-sheet-info-supported" (section 7.4.3) Printer attribute list the member attributes that are supported by the Printer. Clients MAY include any of the supported member attributes below to override the values in the "cover-sheet-info-default" (section 7.4.2) Printer attribute.

7.2.2.1 from-name (text(MAX))

The "from" member attribute provides the sender's name to be shown on the cover page. If not specified, the default value comes from the "job-originating-user-name" Job Description attribute.

Note: The name for this member attribute was changed from the Semantic Model element "From" to avoid confusion.

7.2.2.2 logo (uri)

The "logo" member attribute provides a URI to a logo image to be shown on the cover page.

7.2.2.3 message (text(MAX))

The "message" member attribute provides freeform plain text to be shown on the cover page. Long lines are typically wrapped to fit within a message area on the cover page with newlines starting new paragraphs.

7.2.2.4 organization-name (text(MAX))

The "organization-name" member attribute provides the company or organization name to be shown on the cover page.

Note: The name for this member attribute was changed from the Semantic Model element "CompanyName" to align IPP FaxOut with existing standards such as LDAP.

7.2.2.5 subject (text(MAX))

The "subject" member attribute provides a subject line to be shown on the cover page.

7.2.2.6 to-name (text(MAX))

The "to-name" member attribute provides a recipient name to be shown on the cover page.

Note: The name for this member attribute was changed from the Semantic Model element "To" to avoid confusion.

7.2.3 destination-uris (1setOf collection)

The REQUIRED "destination-uris" Job Template attribute specifies the recipients of the fax job. Besides the mandatory destination URI, destinations using the "tel" URI scheme also support pre- and post-dial strings of the form:

```
DialString = 1*(phonedigit / dtmf-digit / pause-character)
pause-character = one-second-pause / wait-for-dial-tone
one-second-pause = "p"
wait-for-dial-tone = "w"
dtmf-digit = "*" / "A" / "B" / "C" / "D" / "#"
phonedigit = DIGIT / [ visual-separator ]
visual-separator = "-" / "." / "(" / ")" / "'"
```

7.2.3.1 destination-uri (uri)

The REQUIRED "destination-uri" member attribute specifies the phone number to dial as a "tel" URI [RFC3966], an IPP Printer using an "ipp" [RFC3510] or "ipps" URI [IPPS], an email address as a "mailto" URI [RFC6068], or a session using a "sip" or "sips" URI [RFC3261].

7.2.3.2 post-dial-string (text(127))

The OPTIONAL "post-dial-string" member attribute specifies additional numbers to dial after the number specified by a 'tel' "destination-uri" has connected.

7.2.3.3 pre-dial-string (text(127))

The OPTIONAL "pre-dial-string" member attribute specifies additional numbers to dial before the number specified by a 'tel' "destination-uri" has been dialed.

7.2.3.4 t33-subaddress (integer(0:MAX))

The OPTIONAL "t33-subaddress" member attribute specifies additional numbers (typically an extension) to dial after any "post-dial-string" numbers have been sent.

7.2.4 number-of-retries (integer(0:MAX))

The CONDITIONALLY REQUIRED "number-of-retries" Job Template attribute specifies the number of retries that will be performed in order to successfully transmit the job to the recipient. Spooling Devices MUST support this attribute. When specified, the Printer MUST try sending the document at least "number-of-retries + 1" times in order to successfully send it to the recipient.

7.2.5 retry-interval (integer(1:MAX))

The CONDITIONALLY REQUIRED "retry-interval" Job Template attribute specifies the number of seconds the Printer will wait between subsequent retries. Spooling Devices MUST support this attribute.

7.2.6 retry-time-out (integer(1:MAX))

The CONDITIONALLY REQUIRED "retry-time-out" Job Template attribute specifies the maximum number of seconds the Printer will wait to successfully negotiate a facsimile connection. Spooling Devices MUST support this attribute.

7.3 Job Description Attributes

7.3.1 destination-statuses (1setOf collection)

The REQUIRED "destination-statuses" Job attribute provides the transmission status of each recipient specified by the "destination-uris" Job Template attribute. This attribute MUST have the same cardinality (contain the same number of values) as the "destination-uris" attribute. The "ith" value in the "destination-statuses" attribute corresponds to the "ith" value in the "destination-uris" attribute.

7.3.1.1 destination-uri (uri)

The "destination-uri" member attribute specifies the destination telephone number as found in the corresponding Job Template attribute value.

7.3.1.2 images-completed (integer(0:MAX))

The "images-completed" member attribute specifies the number of images (sides) that have been successfully transmitted to the recipient.

7.3.1.3 transmission-status (type2 enum)

The "transmission-status" member attribute specifies the status of the transmission to the recipient. Table 6 lists the values that may be used and purposely mirrors the allowed "job-state" values.

Table 6 - "transmission-status" Enumeration Values

Value	Symbolic Name and Description
'3'	'pending': Job is in queue waiting to be sent
'4'	'pending-retry': Job is in queue waiting to be retried
'5'	'processing': Job is being sent
'7'	'canceled': Job has been canceled
'8'	'aborted': Job has been aborted
'9'	'completed; Job has successfully been sent

7.3.2 input-attributes-actual (collection)

The "input-attributes-actual" Job Description attribute provides a receipt of the "input-attributes" (section 7.1.1) operation attribute values that were used in a Add-Document-Images (section 6.1). Printers that support the Add-Document-Images operation MUST support this attribute.

7.4 Printer Description Attributes

7.4.1 confirmation-sheet-print-default (boolean)

The default value supplied by the Printer if the Client omits the "confirmation-sheet-print" Job Template attribute.This value may be set by the Set-Printer-Attributes operation.

7.4.2 cover-sheet-info-default (collection | no-value)

The CONDITIONALLY REQUIRED "cover-sheet-info-default" Printer attribute provides the default value of the "cover-sheet-info" Job Template attribute. Printers supporting the PDF ("application/pdf") or OpenXPS ("application/oxps") MIME media types MUST support this attribute. The no-value value disables the Printer-generated cover sheet.

7.4.3 cover-sheet-info-supported (1setOf type2 keyword)

The CONDITIONALLY REQUIRED "cover-sheet-info-supported" Printer attribute lists the supported member attributes in the "cover-sheet-info" Job Template attribute. Printers supporting the PDF ("application/pdf") or OpenXPS ("application/oxps") MIME media types MUST support this attribute. Printers that support this attribute MUST support the "from-name", "subject", and "to-name" member attributes.

7.4.4 destination-uri-schemes-supported (1setOf uriScheme)

The REQUIRED "destination-rui-schemes-supported" Printer attribute lists the supported "destination-uri" URI schemes. Printers MUST support the "tel" URI scheme and MAY support the "ipp", "ipps", "mailto", "sip", and "sips" URI schemes.

7.4.5 destination-uris-supported (1setOf type2 keyword)

The REQUIRED "destination-uris-supported" Printer attribute lists the supported member attributes in the "destination-uris" (section 7.2.3) Job Template attribute. The value 'destination-uri' MUST be listed.

7.4.6 from-name-supported (integer(0:1023))

The "from-name-supported" Printer attribute specifies the maximum length of the "from-name" member attribute (section 7.2.2.1).

7.4.7 input-attributes-default (collection)

The CONDITIONALLY REQUIRED "input-attributes-default" Printer attribute defines the default value for the "input-attributes" operation attribute (section 7.1.1). Printers that support the Add-Document-Images operation MUST support this attribute.

7.4.8 input-attributes-supported (1setOf type2 keyword)

The CONDITIONALLY REQUIRED "input-attributes-supported" Printer attribute lists the member attributes that are supported in the "input-attributes" operation attribute (section 7.1.1). Printers that support the Add-Document-Images operation MUST support this attribute and list the values 'input-color-mode', 'input-media', 'input-quality', and 'input-source'.

7.4.9 input-color-mode-supported (1setOf type2 keyword)

The CONDITIONALLY REQUIRED "input-color-mode-supported" Printer attribute lists the supported values for the "input-color-mode" member attribute (section 7.1.1.5). Printers that support the Add-Document-Images operation MUST support this attribute and list the values 'monochrome' and 'bi-level'. Printer with color scanning accessories MUST list the value 'color'.

7.4.10 input-content-type-supported (1setOf type2 keyword)

The "input-content-type-supported" Printer attribute lists the supported values for the "input-content-type" member attribute (section 7.1.1.6).

7.4.11 input-film-scan-mode-supported (1setOf type2 keyword)

The "input-film-scan-mode-supported" Printer attribute lists the supported values for the "input-film-scan-mode" member attribute (section 7.1.1.8).

7.4.12 input-media-supported (1setOf type2 keyword | name(MAX))

The CONDITIONALLY REQUIRED "input-media-supported" Printer attribute lists the supported values for the "input-media" member attribute (section 7.1.1.10). Printers that support the Add-Document-Images operation MUST support this attribute and SHOULD support the value 'auto'.

7.4.13 input-orientation-requested-supported (1setOf type2 enum)

The "input-orientation-requested-supported" Printer attribute lists the supported values for the "input-orientation-requested" member attribute (section 7.1.1.11).

7.4.14 input-quality-supported

The CONDITIONALLY REQUIRED "input-quality-supported" Printer attribute lists the supported values for the "input-quality" member attribute (section 7.1.1.12). Printers that support the Add-Document-Images operation MUST support this attribute and list the value '4' (normal).

7.4.15 input-resolution-supported (1setOf resolution)

The RECOMMENDED "input-resolution-supported" Printer attribute lists the supported values for the "input-resolution" member attribute (section 7.1.1.13).

7.4.16 input-scan-regions-supported (collection)

The "input-scan-regions-supported" Printer attribute specifies the range of values supported for the "input-scan-regions" member attribute (section 7.1.1.16). The collection contains four member attributes: "x-dimension (rangeOfInteger)", "x-origin (rangeOfInteger)", "y-dimension (rangeOfInteger)", and "y-origin (rangeOfInteger)".

7.4.17 input-sides-supported (1setOf type2 keyword)

The CONDITIONALLY REQUIRED "input-sides-supported" Printer attribute lists the supported values for the "input-sides" member attribute (section 7.1.1.18). Printers that support the Add-Document-Images operation and have duplex scanning accessories MUST support this attribute.

7.4.18 input-source-supported (1setOf type2 keyword)

The CONDITIONALLY REQUIRED "input-source-supported" Printer attribute lists the supported values for the "input-source" member attribute (section 7.1.1.19). Printers that support the Add-Document-Images operation MUST support this attribute.

7.4.19 logo-uri-formats-supported (1setOf mimeMediaType)

The "logo-uri-formats-supported" Printer attribute lists the supported "logo" formats. Printers that support the "logo" member attribute of the "cover-sheet-info" Job Template

attribute MUST support the "logo-uri-formats-supported" Printer attribute and MUST list at least the "image/jpeg" MIME media type.

7.4.20 logo-uri-schemes-supported (1setOf uriScheme)

The "logo-uri-schemes-supported" Printer attribute lists the supported "logo" URI schemes. Printers that support the "logo" member attribute of the "cover-sheet-info" Job Template attribute MUST support the "logo-uri-schemes-supported" Printer attribute.

7.4.21 message-supported (integer(0:1023))

The "message-supported" Printer attribute specifies the maximum length of the "message" member attribute (section 7.2.2.3).

7.4.22 multiple-destination-uris-supported (boolean)

The REQUIRED "multiple-destination-uris-supported" Printer attribute specifies whether the Printer supports more than one "destination-uris" Job Template attribute value in a Job creation request.

7.4.23 number-of-retries-default (integer(0:MAX))

The default value supplied by the Printer if the Client omits the "number-of-retries" Job Template attribute. Spooling Devices MUST support this attribute. This value may be set by the Set-Printer-Attributes operation.

7.4.24 number-of-retries-supported (rangeOfInteger(0:MAX))

The range of allowed values for the "number-of-retries" Job Template attribute. Spooling Devices MUST support this attribute. This value may be set by the Set-Printer-Attributes operation and MUST reflect any local regulatory requirements.

7.4.25 organization-name-supported (integer(0:1023))

The "organization-name-supported" Printer attribute specifies the maximum length of the "organization-name" member attribute (section 7.2.2.4).

7.4.26 printer-fax-log-uri (uri)

The REQUIRED READ-WRITE "printer-fax-log-uri" Printer attribute provides the location of the persistent log that is maintained for every Job that is created. The log MUST be formatted as defined in the PWG Common Log Format [PWG5110.3]. Size limits and/or log rotation are implementation-defined. If the Printer supports setting the value of the "printer-fax-log-uri" Printer attribute using the Set-Printer-Attributes operation [RFC3380], it MUST list the attribute in the "printer-settable-attributes-supported" Printer attribute [RFC3380].

7.4.27 printer-fax-modem-info (1setOf text(MAX))

The RECOMMENDED READ-ONLY "printer-fax-modem-info" Printer attribute provides a description of every fax modem used by the FaxOut service.

This attribute MUST have the same cardinality (contain the same number of values) as the "printer-fax-modem-name" and "printer-fax-modem-number" Printer attributes. The ith value in the "printer-fax-modem-info" attribute corresponds to the ith values in the "printer-fax-modem-name" and "printer-fax-modem-number" attributes.

7.4.28 printer-fax-modem-name (1setOf name(MAX))

The RECOMMENDED READ-ONLY "printer-fax-modem-name" Printer attribute provides the name of every fax modem used by the FaxOut service. These names are used to populate the "output-device-assigned" Job Description attribute.

This attribute MUST have the same cardinality (contain the same number of values) as the "printer-fax-modem-info" and "printer-fax-modem-number" Printer attributes. The ith value in the "printer-fax-modem-name" attribute corresponds to the ith values in the "printer-fax-modem-info" and "printer-fax-modem-number" attributes.

7.4.29 printer-fax-modem-number (1setOf uri)

The RECOMMENDED READ-ONLY "printer-fax-modem-number" Printer attribute provides a "tel" URI [RFC3966] representing the line (source) number for every fax modem used by the FaxOut service.

This attribute MUST have the same cardinality (contain the same number of values) as the "printer-fax-modem-info" and "printer-fax-modem-name" Printer attributes. The ith value in the "printer-fax-modem-number" attribute corresponds to the ith values in the "printer-fax-modem-info" and "printer-fax-modem-name" attributes.

7.4.30 retry-interval-default (integer(1:MAX))

The default value supplied by the Printer if the Client omits the "retry-interval" Job Template attribute. Spooling Devices MUST support this attribute. Streaming Devices MAY support this attribute when retrying the transmission of a single page. This value may be set by the Set-Printer-Attributes operation and MUST reflect any local regulatory requirements.

7.4.31 retry-interval-supported (rangeOfInteger(1:MAX))

The range of allowed values for the "retry-interval" Job Template attribute. Spooling Devices MUST support this attribute. Streaming Devices MAY support this attribute when retrying the transmission of a single page. This value may be set by the Set-Printer-Attributes operation and MUST reflect any local regulatory requirements.

7.4.32 retry-time-out-default (integer(1:MAX))

The default value supplied by the Printer if the Client omits the "retry-time-out" Job Template attribute. Spooling Devices MUST support this attribute. Streaming Devices MAY support this attribute when retrying the transmission of a single page. This value may be set by the Set-Printer-Attributes operation and MUST reflect any local regulatory requirements.

7.4.33 retry-time-out-supported (rangeOfInteger(1:MAX))

The range of allowed values for the "retry-time-out" Job Template attribute. Spooling Devices MUST support this attribute. Streaming Devices MAY support this attribute when retrying the transmission of a single page. This value may be set by the Set-Printer-Attributes operation and MUST reflect any local regulatory requirements.

7.4.34 subject-supported (integer(0:1023))

The "subject-supported" Printer attribute specifies the maximum length of the "subject" member attribute (section 7.2.2.5).

7.4.35 to-name-supported (integer(0:1023))

The "to-name-supported" Printer attribute specifies the maximum length of the "to-name" member attribute (section 7.2.2.6).

7.5 Document Description Attributes

7.5.1 input-attributes-actual (collection)

The "input-attributes-actual" Document Description attribute provides a receipt of the "input-attributes" (section 7.1.1) operation attribute values that were used in the Add-Document-Images (section 6.1) request that created the Document object. Printers that support the Add-Document-Images operation and the IPP Document Object [PWG5100.5] MUST support this attribute.

8. Additional Values and Semantics for Existing Attributes

8.1 ipp-features-supported (1setOf type2 keyword)

This specification defines the REQUIRED keyword 'faxout' for the "ipp-features-supported" Printer attribute.

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

Table 7 lists the "job-state-reasons" keyword values that are specific to IPP FaxOut. The 'fax-modem-xxx' keywords are defined in Printer MIB and IPP MFD Alerts [PWG5107.3].

Table 7 - IPP FaxOut "job-state-reasons" Keyword Values

Keyword	Description
'connected-to-destination'	The Printer is connected to the destination URI
'connecting-to-destination'	The Printer is connecting to the destination URI (dialing, etc.)
'destination-uri-failed'	The Printer was unable to transfer the Job to one or more destination URIs.
'fax-modem-carrier-lost'	Lost connection to the receiver during send.
'fax-modem-equipment-failure'	Fax modem failed during send.
'fax-modem-inactivity-timeout'	Job timed out due to inactivity.
'fax-modem-line-busy'	Destination line was busy.
'fax-modem-no-answer'	Destination did not answer.
'fax-modem-no-dial-tone'	No dial tone.
'fax-modem-protocol-error'	Fax protocol error.
'fax-modem-training-failure'	The sender and receiver were unable to successfully negotiate a data rate.
'fax-modem-voice-detected'	Fax modem detected sound other than a carrier tone at the destination, e.g. a voice.
'job-transferring'	Job is being transmitted.
'job-transforming'	Job is being transformed to conform to the recipient capabilities.

9. Conformance Requirements

This section summarizes the Conformance Requirements detailed in the definitions in this document for Clients and Printers.

9.1 Conformance Requirements for this Specification

In order for a Client or a Printer to claim conformance to this specification a Client MUST be able to supply or a Printer MUST support the following:

1. The REQUIRED "printer-uri-supported" values defined in section 4.1.5,
2. The REQUIRED operations defined in sections 4.2 and 6,
3. The REQUIRED Printer Description attributes and values defined in sections 4.3 and 7.3.2,
4. The REQUIRED operation attributes and values defined in sections 4.4 and 7.1,
5. The REQUIRED Job Template attributes and values defined in sections 4.5 and 7.2,
6. The REQUIRED Job Description attributes and values defined in section 4.6,
7. The REQUIRED document formats and behaviors defined in section 5,
8. The REQUIRED values defined in section 8,
9. The internationalization considerations in section 10, and
10. The security considerations in section 11.

9.2 Conditional Conformance Requirements for Printer Objects

To claim conformance to this specification, Spooling Devices MUST support the following:

1. Automatic retries and retransmission of whole jobs as defined in section 4.1.1,
2. The "number-of-retries", "retry-interval", and "retry-timeout" Job Template attributes (section 7.2),
9. The "number-of-retries-default", "retry-interval-default", and "retry-timeout-"retry-timeout-supported" Printer Description attributes (section 7.3.2).
10. The "number-of-retries-supported", "retry-interval-supported", and "retry-timeout-supported" Printer Description attributes (section 7.3.2) which MUST reflect any local regulatory requirements.

To claim conformance to this specification, Printers that support PDF or OpenXPS documents MUST support the following:

1. The "cover-sheet-info", "multiple-document-handling", and "page-ranges" Job Template attributes as defined in sections 4.5 and 7.2.2,
11. The "cover-sheet-default", "cover-sheet-supported", "from-name-supported", "message-supported", "multiple-document-handling-supported", "organization-name-supported", "page-ranges-supported", "subject-supported", and "to-name-supported" Printer Description attributes as defined in sections 4.3 and 7.3.2.

10. Internationalization Considerations

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

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

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

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

11. Security Considerations

The IPP extensions defined in this document require the same security considerations as defined in the IPP Model and Semantics [RFC2911].

An end user's FaxOut data can be protected from disclosure by encrypting the content and protected from modification by signing the data file when the data is stored in a repository or being transmitted over a communication link. Spooling Devices MUST protect document data from disclosure to unauthorized parties.

12. IANA Considerations

12.1 Attribute Registrations

The attributes defined in this document will be published by IANA according to the procedures in IPP Model and Semantics [RFC2911] section 6.2 in the following file:

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

The registry entries will contain the following information:

```
Operation attributes:                              Reference
---------------------                              ---------
input-attributes (collection)                      [PWG5100.15]
   input-auto-scaling (boolean)                     [PWG5100.15]
   input-auto-skew-correction (boolean)             [PWG5100.15]
```

```
  input-brightness (integer(-100:100))                [PWG5100.15]
  input-color-mode (type2 keyword)                    [PWG5100.15]
  input-content-type (type2 keyword)                  [PWG5100.15]
  input-contrast (integer(-100:100))                  [PWG5100.15]
  input-film-scan-mode (type2 keyword)                [PWG5100.15]
  input-images-to-transfer (integer(1:MAX))           [PWG5100.15]
  input-media (type2 keyword | name(MAX))             [PWG5100.15]
  input-orientation-requested (type2 keyword)         [PWG5100.15]
  input-quality (type2 enum)                          [PWG5100.15]
  input-resolution (resolution)                       [PWG5100.15]
  input-scaling-height (integer(1:1000))              [PWG5100.15]
  input-scaling-width (integer(1:1000))               [PWG5100.15]
  input-scan-regions (1setOf collection)              [PWG5100.15]
    x-dimension (integer)                             [PWG5100.15]
    x-origin (integer)                                [PWG5100.15]
    y-dimension (integer)                             [PWG5100.15]
    y-origin (integer)                                [PWG5100.15]
  input-sharpness (integer(-100:100))                 [PWG5100.15]
  input-sides (type2 keyword)                         [PWG5100.15]
  input-source (type2 keyword)                        [PWG5100.15]

Document Description attributes:                      Reference
-------------------------------                       ---------
input-attributes-actual (collection)                 [PWG5100.15]

Job Template attributes:                              Reference
------------------------                              ---------
confirmation-sheet-print (boolean)                   [PWG5100.15]
cover-sheet-info (collection)                         [PWG5100.15]
  from-name (text(MAX))                               [PWG5100.15]
  logo (uri)                                          [PWG5100.15]
  message (text(MAX))                                 [PWG5100.15]
  organization-name (text(MAX))                       [PWG5100.15]
  subject (text(MAX))                                 [PWG5100.15]
  to-name (text(MAX))                                 [PWG5100.15]
destination-uris (1setOf collection)                 [PWG5100.15]
  destination-uri (uri)                               [PWG5100.15]
  post-dial-string (text(127))                        [PWG5100.15]
  pre-dial-string (text(127))                         [PWG5100.15]
  t33-subaddress (integer(0:MAX))                     [PWG5100.15]
number-of-retries (integer(0:MAX))                   [PWG5100.15]
retry-interval (integer(1:MAX))                      [PWG5100.15]
retry-timeout (integer(1:MAX))                       [PWG5100.15]

Job Status attributes:                                Reference
----------------------                                ---------
destination-statuses (1setOf collection)             [PWG5100.15]
  destination-uri (uri)                               [PWG5100.15]
  images-completed (integer(0:MAX))                   [PWG5100.15]
  transmission-status (type2 enum)                    [PWG5100.15]

Job Description attributes:                            Reference
--------------------------                            ---------
input-attributes-actual (collection)                 [PWG5100.15]

Printer Description attributes:                        Reference
```

```
    ------------------------------                     ---------
    confirmation-sheet-print-default (boolean)         [PWG5100.15]
    cover-sheet-info-supported (1setOf type2 keyword)  [PWG5100.15]
    destination-uri-schemes-supported (1setOf uriScheme) [PWG5100.15]
    destination-uris-supported (1setOf type2 keyword)  [PWG5100.15]
    from-name-supported (integer(0:1023))              [PWG5100.15]
    input-attributes-default (collection)              [PWG5100.15]
    input-attributes-supported (1setOf type2 keyword)  [PWG5100.15]
    input-color-mode-supported (1setOf type2 keyword)  [PWG5100.15]
    input-content-type-supported (1setOf type2 keyword) [PWG5100.15]
    input-film-scan-mode-supported (1setOf type2 keyword) [PWG5100.15]
    input-media-supported (1setOf (type2 keyword | name(MAX)))
                                                       [PWG5100.15]
    input-orientation-requested-supported (1setOf type2 enum)
                                                       [PWG5100.15]
    input-quality-supported (1setOf type2 enum)        [PWG5100.15]
    input-resolution-supported (1setOf resolution)     [PWG5100.15]
    input-scan-regions-supported (collection)          [PWG5100.15]
      x-dimension (rangeOfInteger)                     [PWG5100.15]
      x-origin (rangeOfInteger)                        [PWG5100.15]
      y-dimension (rangeOfInteger)                     [PWG5100.15]
      y-origin (rangeOfInteger)                        [PWG5100.15]
    input-sides-supported (1setOf type2 keyword)       [PWG5100.15]
    input-source-supported (1setOf type2 keyword)      [PWG5100.15]
    logo-uri-formats-supported (1setOf mimeMediaType)  [PWG5100.15]
    logo-uri-schemes-supported (1setOf uriScheme)      [PWG5100.15]
    message-supported (integer(0:1023))                [PWG5100.15]
    multiple-destination-uris-supported (boolean)      [PWG5100.15]
    number-of-retries-default (integer(0:MAX))         [PWG5100.15]
    number-of-retries-supported (rangeOfInteger(0:MAX)) [PWG5100.15]
    organization-name-supported (integer(0:1023))      [PWG5100.15]
    printer-fax-log-uri (uri)                          [PWG5100.15]
    printer-fax-modem-info (1setOf text(MAX))          [PWG5100.15]
    printer-fax-modem-name (1setOf name(MAX))          [PWG5100.15]
    printer-fax-modem-number (1setOf uri)              [PWG5100.15]
    retry-interval-default (integer(1:MAX))            [PWG5100.15]
    retry-interval-supported (rangeOfInteger(1:MAX))   [PWG5100.15]
    retry-time-out-default (integer(1:MAX)             [PWG5100.15]
    retry-time-out-supported (rangeOfInteger(1:MAX))   [PWG5100.15]
    subject-supported (integer(0:1023))                [PWG5100.15]
    to-name-supported (integer(0:1023))                [PWG5100.15]
```

12.2 Attribute Value Registrations

The keyword attribute values defined in this document will be published by IANA according to the procedures in the IPP Model and Semantics [RFC2911] section 6.1 in the following file:

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

The registry entries will contain the following information:

```
    Attributes (attribute syntax)
```

```
   Keyword Attribute Value                         Reference
   -----------------------                         ---------
cover-sheet-info-supported (1setOf type2 keyword) [PWG5100.15]
  date-time                                       [PWG5100.15]
  from-name                                       [PWG5100.15]
  logo                                            [PWG5100.15]
  message                                         [PWG5100.15]
  organization                                    [PWG5100.15]
  subject                                         [PWG5100.15]
  to-name                                         [PWG5100.15]

input-color-mode (type2 keyword)                  [PWG5100.15]
  auto                                            [PWG5100.15]
  bi-level                                        [PWG5100.15]
  color                                           [PWG5100.15]
  monochrome                                      [PWG5100.15]

input-color-mode-supported (1setOf type2 keyword) [PWG5100.15]
  <any input-color-mode value>                    [PWG5100.15]

input-content-type (type2 keyword)                [PWG5100.15]
  auto                                            [PWG5100.15]
  halftone                                        [PWG5100.15]
  line-art                                        [PWG5100.15]
  magazine                                        [PWG5100.15]
  photo                                           [PWG5100.15]
  text                                            [PWG5100.15]
  text-and-photo                                  [PWG5100.15]

input-content-type-supported (1setOf type2 keyword) [PWG5100.15]
  <any input-content-type value>                  [PWG5100.15]

input-film-scan-mode (type2 keyword)              [PWG5100.15]
  black-and-white-negative-film                   [PWG5100.15]
  color-negative-film                             [PWG5100.15]
  color-slide-film                                [PWG5100.15]
  not-applicable                                  [PWG5100.15]

input-film-scan-mode-supported (1setOf type2 keyword)[PWG5100.15]
  < any input-film-scan-mode value>               [PWG5100.15]

input-media (type2 keyword | name(MAX))           [PWG5100.15]
  auto                                            [PWG5100.15]
  <any media size name value>                     [PWG5100.15]

input-media-supported (1setOf (type2 keyword | name(MAX)))
                                                  [PWG5100.15]
  <any input-media value>                         [PWG5100.15]

input-sides (type2 keyword)                       [PWG5100.15]
  <any sides value>                               [PWG5100.15]

input-sides-supported (1setOf type2 keyword)      [PWG5100.15]
  <any sides value>                               [PWG5100.15]

input-source (type2 keyword)                      [PWG5100.15]
```

```
  adf                                                  [PWG5100.15]
  film-reader                                          [PWG5100.15]
  platen                                               [PWG5100.15]

input-source-supported (1setOf type2 keyword)          [PWG5100.15]
  <any input-source value>                             [PWG5100.15]

ipp-features-supported (1setOf type2 keyword)          [PWG5100.13]
  faxout                                               [PWG5100.15]

job-state-reasons (1setOf type2 keyword)               [RFC2911]
  connected-to-destination                             [PWG5100.15]
  connecting-to-destination                            [PWG5100.15]
  destination-uri-failed                               [PWG5100.15]
  job-transferring                                     [PWG5100.15]
  job-transforming                                     [PWG5100.15]
```

12.3 Type2 enum Attribute Value Registrations

The enumerations defined in this document will be published by IANA according to the procedures in the IPP Model and Semantics [RFC2911] section 6.2 in the following file:

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

The registry entries will contain the following information:

```
Attributes (attribute syntax)
  Enum Value      Enum Symbolic Name               Reference
  ----------      ------------------               ---------
input-orientation-requested (type2 enum)             [PWG5100.15]
  <any orientation-requested value>                  [PWG5100.15]

input-orientation-requested-supported (1setOf type2 enum)
                                                     [PWG5100.15]
  <any orientation-requested value>                  [PWG5100.15]

input-quality (type2 enum)                           [PWG5100.15]
  <any print-quality value>                          [PWG5100.15]

input-quality-supported (1setOf type2 enum)          [PWG5100.15]
  <any print-quality value>                          [PWG5100.15]

operations-supported (1setOf type2 enum)             [RFC2911]
  0x003E          Add-Document-Images                [PWG5100.15]

transmission-status (type2 enum)                     [PWG5100.15]
  3               pending                            [PWG5100.15]
  4               pending-retry                      [PWG5100.15]
  5               processing                         [PWG5100.15]
  7               canceled                           [PWG5100.15]
  8               aborted                            [PWG5100.15]
  9               completed                          [PWG5100.15]
```

12.4 Operation Registrations

The operations defined in this document will be published by IANA according to the procedures in the IPP Model and Semantics [RFC2911] section 6.2 in the following file:

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

The registry entries will contain the following information:

```
Operation Name                                          Reference
--------------                                          ---------
Add-Document-Images                                     [PWG5100.15]
```

13. References

13.1 Normative References

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