Office Digital Printing ICS

Version 1.3

Date: 2007-07-27

File: ICS-ODP-1.3.doc, .pdf

Office Printing WG

Abstract

This CIP4 JDF Interoperability Conformance Specification (ICS) specifies the Conformance Requirements for a subset of JDF defined as Level 0 Digital Printing. This subset is useful for black and white and limited color digital printing systems with "traditional" office finishing features such as stapling and collation. It encompasses a subset of IPP semantics [IPP-std].

Table of Contents

Tables

1   Introduction

JDF is a very comprehensive Job ticket format that allows for many different ways to specify a digital print Job. To minimize complexity and to better guarantee interoperability between JDF Producers and Consumers, this ICS identifies a relatively small subset of JDF for Office Digital Printing.

1.1   Scope

This ICS defines a subset of JDF referred to as Office Digital Printing. Office Digital Printing is useful for color and black and white digital printing systems typically used within an office environment (this includes most networked multifunction Devices and includes finishing options such as stapling or collation). It encompasses a subset of IPP semantics.

2   Glossary

This section defines terminology used throughout this document. References to other documents are indicated with square brackets, e.g. [JDF1.3]. For most terms, see the Glossary section in [JDF1.3] and [Base-ICS].

This section contains terms that pertain to this ICS:

Table 1: Glossary

Term	Definition
Combined Digital Printing Node	A JDF Combined Node (value of the *Type* Attribute is "`Combined`") that contains a **DigitalPrinting** Process and that conforms to the requirements of this ICS.
Device	As defined in the JDF Specification [JDF1.3]. It interprets JDF Node and executes instructions representing a Job.
Office Digital Printer	A *Device* that Supports the **DigitalPrinting** Process along with some Prepress Processes and perhaps some Postpress Processes. The term **Worker** refers to the *Office Digital Printer* in this ICS.
Office Digital Printing Controller	A Controller that sends a JDF Instance to an *Office Digital Printer*. The term *Manager* refers to the Integrated Digital Printing Controller in this ICS.

3   Conformance Levels

This ICS defines two Conformance Levels, namely Levels 1 and 2.

See Appendix A "*How to Read ICS Documents*" in [Base-ICS] for an explanation of Conformance Tables.

To be conformant to a level of this ICS specified in the first column of Table 2, an *Office Digital Printing Controller* MUST conform to the Manager part and a *Office Digital Printer* MUST conform to the Worker part of the ICSs and levels specified in all but the first and last columns of Table 2 below.

Table 2: Conformance Levels

Level of this ICS	[Base-ICS]	[JMF-ICS]	[MIS-ICS]	Description
1	0 or higher	-	-	Support for Hot Folders is not required.

Level of this ICS	[Base-ICS]	[JMF-ICS]	[MIS-ICS]	Description
				Support for JMF is not required. Any form of submission may be used though its definition is outside the scope of this ICS.
2	0 or higher	-	-	Support for Hot Folders is not required. The ability to write final JDF is not required. MUST Support SubmitQueueEntry Message and KnownMessages Message. A Device that accepts a Job via SubmitQueueEntry MUST Support submission by MIME packaging. Full Support for the JMF ICS is not required.

4 Conformance Tables – JDF Instances

The tables in this section summarize the JDF Resources and Elements that are Supported by the [IDP-ICS].

4.1 JDF Node

Table 3: JDF Node

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Category	w			r?			
DigitalPrinting	w			r?			
ICSVersions	w←			r?			
ODP_L1-1.3	w			r?			
ODP_L2-1.3		w		r?			
Type	w			r			
Combined	w			r			
Types	w			r			**Order constraint:** The values of this Attribute MUST be in the order shown below, except that for *Folding* and *Stitching* : • each MUST occur zero or one time, and • they MAY be interleaved in any order.
LayoutPreparation	w			r			Exactly one MUST be present..
Imposition	w			r			Exactly one MUST be present..
Interpreting	w			r			Exactly one MUST be present.

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Rendering	w			r			Exactly one MUST be present.
DigitalPrinting	w			r			Exactly one MUST be present.
Folding	w←			r?			MUST be present if folding is requested. Zero or one MUST be present.
Stitching	w←			r?			MUST be present if stitching is requested. Zero or one MUST be present..
all remaining values	w?			r?			The Manager SHOULD NOT write additional Processes that are not recognized by the Worker. A Worker NEED NOT process a Node that contains values that it does not Support.
Comment	w←			r←			If Comment[@Name="Instruction"] is present and the Worker displays instructions to the operator, the Worker MUST display the instruction part of this Comment to the operator. See Table 4: Comment.

4.2   Comment

Table 4: Comment

Referenced by: JDF Node

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Name	w			r			
Instruction	w←			r			**r-Test:** The Worker MUST display the content of each Comment Element having this value to the operator, regardless of the number of such Comment Elements in a JDF Node, except the Worker MAY filter out Comment instances based on Comment/@Language as specified by the operator. MAY be used in conjunction with (JDF/@Activation = "Held" or Command[@Type = "SubmitQueueEntry"]/ QueueSubmissionParams/@Hold = "true").
<content of Element>	w←			r			**r-Test:** if exists(Comment[@Name ="Instruction"]) and the Worker displays instructions to the operator, the Worker MUST display the "content of Element" of this Comment to the operator.

5   Conformance Tables – Processes

5.1   DigitalPrinting Combined Node

This section specifies Processes that a conforming implementation Supports.

The following 3 tables specify the input, output, and intermediate Resources (respectively) that [ODP-ICS] Supports.

Table 5: DigitalPrinting Combined Node – Input Resources

Name	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ColorantControl	w←			r			MUST NOT appear more than once. If present, MUST be an input to both ***DigitalPrinting*** and ***Interpreting***. See Table 8: ColorantControl.
DigitalPrintingParams	w			r			MUST appear once. See Table 9: DigitalPrintingParams.
FoldingParams	w←			r?			MUST NOT appear more than once. MUST be present if JDF/@*Types* includes "`Folding`". See Table 13: FoldingParams.
InterpretingParams	w			r			MUST appear once. See Table 15: InterpretingParams.
LayoutPreparationParams	w			r			MUST appear once. See Table 17: LayoutPreparationParams.
Media	w←			r			MAY appear more than once. See Table 19: Media.
RenderingParams	w			r			MUST appear once. For this ICS, all **RenderingParams** Attributes are optional; there is no table to reference. See [JDF1.3].
RunList (Document)	w			r			MUST appear once. See Table 21: RunList.
StitchingParams	w←			r?			MUST NOT appear more than once. MUST be present if JDF/@*Types* includes "`Stitching`". See Table 22: StitchingParams.

Table 6: DigitalPrinting Combined Node – Output Resources

Name	Manager			Worker			Description
Level →	1	2	3	1	2	3	
Component	w			r			MUST appear once. See Table 7: ComponentLink.

6   Conformance Tables – ResourceLinks

6.1   ComponentLink

Table 7: ComponentLink

Output from: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level →	1	2	3	1	2	3	
Amount	w←			r			**r-Test:** the Device SHOULD produce the number of copies of the document that the *Amount* value specifies. Used to specify the number of copies to make.

7   Conformance Tables – Resources

7.1   ColorantControl

Table 8: ColorantControl

Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level →	1	2	3	1	2	3	
ProcessColorModel	w←			r			
`DeviceCMYK`	w←			r?			**r-Test:** Color Devices MUST Support `DeviceCMYK`. Black and white Devices MAY convert color to black and white.
`DeviceGray`	w←			r			**r-Test:** The Printer MUST produce a monochrome gray scale output for a color input document.

7.2 DigitalPrintingParams

Table 9: DigitalPrintingParams

Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Collate	w←			r			
None	w←			r			**r-Test:** The output document copies MUST NOT be collated.
Sheet	w←			r			**r-Test:** The output document copies MUST be collated.
ManualFeed	w←			r?			
OutputBin	w?			r←			Worker MUST Support if Device has multiple output bins. If *OutputBin* is Supported, the names used are Device dependent. If the Manager specifies an *OutputBin* not Supported by the Worker, the Worker MUST use "*AutoSelect*". **r-Test:** the output must be placed in the identified bin.
AutoSelect	w←			r			
Disjointing	w?			r?			See Table 10: Disjointing.
Media	w←			r			See Table 19: Media.

7.3 Disjointing

Table 10: Disjointing

Referenced by: DigitalPrintingParams

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
OffsetDirection	w←			r			
Alternate	w←			r			**r-Test:** Each document Copy MUST be offset from each other.
None	w←			r			**r-Test:** Each document Copy MUST NOT be offset from each other.

7.4   FileSpec

Table 11: FileSpec
Referenced by: LayoutElement

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
URL	w			r			
cid:...	w←			r			Required for MIME Multipart/Related.
all remaining values	w?			r?			All other forms of URL are optional.

7.5   FitPolicy

Table 12: FitPolicy
Referenced by: LayoutPreparationParams

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
SizePolicy	w?			r			
ClipToMaxPage	w?			r			**r-Test:** Worker MUST clip according to [JDF1.3].

7.6   FoldingParams

Table 13: FoldingParams
Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
FoldCatalog	w←			r?			
F4-1	w←			r?			booklets.
F6-2	w←			r?			brochures.
F6-4	w←			r?			c-fold.
F6-6	w←			r?			z-fold (uneven) .
NoOp	w←			r			**r-Test:** A Worker MUST NOT produce folding if the value is "*true*".

7.7   GeneralID

Table 14: GeneralID
Referenced by: Media

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
IDUsage	w			r			
DeviceProductID	w			r			**r-Test:** Only apply *IDValue* if *IDUsage* is set to *DeviceProductID*.
IDValue	w			r			**r-Test:** The ID assigned by the Worker for this Media. The Worker MAY use the supplied value: (1) to include in the display to the user at the Printer if the Worker identifies this **Media** to the user at the Printer and (2) to select the requested Media automatically from amongst the loaded **Media**.

7.8   InterpretingParams

Table 15: InterpretingParams
Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
PrintQuality	w←			r			Implementation of *PrintQuality* is vendor specific.
Draft	w←			r?			
High	w←			r?			
Normal	w←			r			

7.9   LayoutElement

Table 16: LayoutElement
Referenced by: RunList

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
FileSpec	w←			r			See Table 11: FileSpec.

7.10 LayoutPreparationParams

Table 17: LayoutPreparationParams

Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Sides	w←			r			**r-Test:** The Worker MUST image on the requested sides.
OneSidedFront	w←			r			
TwoSidedFlipX	w←			r←			Worker MUST Support if the Device is a duplexing printer.
TwoSidedFlipY	w←			r←			Worker MUST Support if the Device is a duplexing printer.
FitPolicy	w←			r			See Table 12: FitPolicy.
ImageShift	w←			r?			See Table 18: ImageShift.

7.10.1 ImageShift

Table 18: ImageShift

Referenced by: LayoutPreparationParams

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
ShiftBack	w←			r			**r-Test:** see output.
ShiftFront	w←			r			**r-Test:** see output.

7.11 Media

Table 19: Media

Referenced by: DigitalPrintingParams

Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Dimension	w←			r			MUST be supplied if (Location/@LocationName = "AutoSelect"). **r-Test:** The Device prints on media of the specified dimensions +/- 5 points.

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
MediaColorName	w←			r?			
MediaColorNameDetails	w←			r?			
MediaType	w←			r?			
Paper	w←			r?			
Transparency	w←			r?			
MediaTypeDetails	w←			r?			
Envelope	w←			r?			
Stationery	w←			r?			Same as Paper.
Location	w←			r?			MUST Support if Device has multiple input bins. See Table 20: Location.
GeneralID	w?			r?			GeneralID/@IDUsage is the ID assigned by the Worker for this **Media**. Support for **GeneralID** is not a requirement of this ICS but it is the recommended method for implementing named medias. See Table 14: GeneralID.

7.11.1 Location

Table 20: Location
Referenced by: Media

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
LocationName	w←			r←			Worker MUST Support if there is more than 1 tray.
AutoSelect	w←			r			**r-Test:** Select an appropriate media from whichever location matches the criteria specified by **Media**.

7.12 RunList

Table 21: RunList

Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Pages	w?			r←			MUST be Supported for non-streaming PDLs, such as PDF. **r-Test:** if specified, only the Pages defined by these ranges MUST be printed. For streaming PDLs, such as PostScript, the Worker NEED NOT select and image the requested Pages: (1) unless they are in increasing order including negative specification, such as -1 for the last Page, and (2) do not repeat any Pages.
LayoutElement	w←			r			See Table 16: LayoutElement.

7.13 StitchingParams

Table 22: StitchingParams

Input to: *DigitalPrinting Combined Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
NoOp	w←			r			**r-Test:** A Worker MUST NOT stitch when the value is "*true*".
StitchType	w←			r			
Corner	w←			r			**r-Test:** A Worker MUST stitch in a corner.
Saddle	w←			r?			MAY only be specified if *FoldCatalog* is F4-1.
Side	w←			r?			

8 Conformance Tables – JMF Messages

At level 1, this ICS does not require JMF Support.

At level 2, conforming implementations MUST implement the SubmitQueueEntry Message and KnownMessages Message. A Device that accepts a Job via SubmitQueueEntry MUST Support submission by MIME packaging.

A conforming Producer MUST Support packaging of the JDF Job ticket, PDF file, and any ancillary Resources in the MIME format. A conforming Consumer MUST Support the reading of a MIME packaged set of files.

A conforming Producer and Consumer MUST Support JMF via HTTP.

Table 23: List of JMF Messages

Message Type	Family	Manager			Worker			Description
	Level ➜	1	2	3	1	2	3	
KnownMessages	Query		w			r		See Table 24: Query – KnownMessages.
KnownMessages	Response		r			w		See Table 26: Response – KnownMessages.
SubmitQueueEntry	Command		w			r		See Table 28: Command – SubmitQueueEntry.
SubmitQueueEntry	Response		r			w		See Table 31: Response – SubmitQueueEntry.

8.1 KnownMessages

Note: In this section, the Conformance-Table columns for Manager and Worker are relabeled *Producer* and *Consumer*. See [JMF-ICS].

8.1.1 Query – KnownMessages

The KnownMessages Query is the recommended way to "ping" another Device or Controller, even if you aren't really interested in the Messages that are Supported. It is a good way to check if configuration is correct.

Table 24: Query – KnownMessages

In: List of JMF Messages

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Type		w			r		
KnownMessages		w			r		
xsi:type		w			r?		
QueryKnownMessages		w			r?		
KnownMsgQuParams		w			r		See Table 25: KnownMsgQuParams.

8.1.1.1 KnownMsgQuParams

Table 25: KnownMsgQuParams

Referenced by: Query – KnownMessages

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Exact		w←			r		
false		w←			r		

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
true		w?			r?		Implementing Capabilities in KnownMessages is optional at all levels.
ListCommands		w?			r		
ListQueries		w?			r		
ListRegistrations		w?			r		
ListSignals		w?			r		
Persistent		w?			r		

8.1.2 Response – KnownMessages

Note: the Producer in the following Response tables is returning the Response to the Consumer. The Query Producer is the Response Consumer, and the Response Producer is the Query Consumer.

Table 26: Response – KnownMessages

In: List of JMF Messages

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Type		w			r		
KnownMessages		w			r		
xsi:type		w			r?		
ResponseKnownMessages		w			r?		
MessageService		w			r		Producer MUST supply at least two MessageService Elements, one to indicate that it Supports the KnownMessages Message and the other to indicate that is Supports the SubmitQueueEntry Message. See Table 27: MessageService.

8.1.2.1 MessageService

Table 27: MessageService

Referenced by: Response – KnownMessages

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Acknowledge		w←			r		
Command		w←			r		

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
JMFRole		w			r		
Persistent		w←			r		
Query		w←			r		
Registration		w←			r		
Signal		w←			r		
Type		w			r		
KnownMessages		w←			r		
SubmitQueueEntry		w←			r		
URLSchemes		w			r		
cid:...		w←			r		Required for MIME Multipart/Related.
all remaining values		w?			r?		All other forms of URL are optional.

8.2   SubmitQueueEntry

8.2.1   Command – SubmitQueueEntry

Table 28: Command – SubmitQueueEntry

In: List of JMF Messages

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Type		w			r		
SubmitQueueEntry		w			r		
xsi:type		w			r?		
CommandSubmitQueueEntry		w			r?		
QueueSubmissionParams		w			r		See Table 29: QueueSubmissionParams.
QueueFilter		w			r		Set the number of entries to return as None so that the Device doesn't have to return a list of entries in the Queue. See Table 30: QueueFilter.

8.2.1.1 QueueSubmissionParams

Table 29: QueueSubmissionParams

Referenced by: Command – SubmitQueueEntry

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ReturnURL		!w			r?		
URL		w			r		References a JDF Instance. If the scheme is not "*cid*", the Manager MUST keep the JDF available for the Worker to retrieve until the Worker completes or aborts the Job as indicated by sending the updated JDF with a ReturnQueueEntry Command.
cid:...		w			r		URL whose scheme is "*cid*". Support for submission via MIME package is required.
all remaining values		w?			r?		All other forms of URL are optional.

8.2.1.2 QueueFilter

Table 30: QueueFilter

Referenced by: Command – SubmitQueueEntry

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
MaxEntries		w←			r←		Worker can assume "*0*" if it doesn't read the value, which MUST be "*0*" for a SubmitQueueEntry Message.
QueueEntryDetails		w			r?		Worker can assume "*None*" if it doesn't read the value, which MUST be "*None*".
None		w			r		
all remaining values		!w			r?		

8.2.2 Response – SubmitQueueEntry

The Worker MUST return a SubmitQueueEntry Response before the HTTP connection would time out. In addition, the Worker MUST parse the JDF supplied in the SubmitQueueEntry.

Table 31: Response – SubmitQueueEntry

In: List of JMF Messages

Name or Value		Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Type		r			w		
SubmitQueueEntry		r			w		
xsi:type		r?			w		
ResponseSubmitQueueEntry		r?			w		
QueueEntry		r			w←		The Worker MUST write this Element unless the Command failed (@ReturnCode != "0"). See Table 32: QueueEntry.
Queue		r?			w		The Worker MUST write this Element. See Queue/QueueEntry for an explanation of why this Queue is empty (i.e. has no QueueEntry Elements). See Table 33: Queue.

8.2.2.1 QueueEntry

Table 32: QueueEntry

Referenced by: Response – SubmitQueueEntry, Queue

Name or Value		Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
JobID		r?			w			The Worker MUST return the *JobID* of the Root Node that was passed in the SubmitQueueEntry.
JobPartID		r?			w			The Worker MUST return the *JobPartID* of the Root Node that was passed in the SubmitQueueEntry.
QueueEntryID		r?			w			
Status		r?			w			

8.2.2.2 Queue

Table 33: Queue

Referenced by: Response – SubmitQueueEntry

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Status		r?			w		
DeviceID		r?			w		
QueueEntry		r?			! w		No entries will ever be present in the Queue because QueueFilter/@MaxEntries is REQUIRED to be 0 for SubmitQueueEntry in this ICS. See Table 32: QueueEntry.

9 References

9.1 Normative References

[Base-ICS]   Base ICS, Version 1.3, published July 2007. Available at: http://www.cip4.org.

[JMF-ICS]   JMF ICS, Version 1.3, published July 2007. Available at: http://www.cip4.org.

[JDF1.3]   JDF Specification, Version 1.3, published September 30, 2005, and Errata, JDF Specification, Version 1.3. Available at: http://www.cip4.org.

[MIS-ICS]   MIS ICS, Version 1.3, published April 2007, available at http://www.cip4.org.

[IPP-std]   Internet Printing Protocol/1.1: Model and Semantics, RFC 2911, September 2000. All IETF (Internet Engineering Task Force) RFCs (Request for Comments) are available at RFC Database search: http://www.rfc-editor.org/rfcsearch.html.

9.2 Informative References

[IDP-AN]   Integrated Digital Printing Application Note, Version 1.0, work in progress, available at http://www.cip4.org.