# Layout Creator to Imposition ICS

## Version 1.3

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## Abstract

This ICS defines the interface between a layout creation tool and a Consumer of the fully-populated **Layout** Resource that it produces. The layout creation tool may be entirely manually driven, or it may be controlled using the JDF ***Stripping*** or ***LayoutPreparation*** Processes. Example Consumers include a tool that produces an imposed content file, or a Device or prepress workflow system that performs a ***RIPing*** Process including the ***Imposition*** Process. When the Consumer is a prepress workflow system, it will be configured in such a way that the JDF instance supplied by the imposition design tool is not merged with JDF from other sources.

For cases where the Consumer (e.g. prepress workflow system) accepts a JDF instance containing an unpopulated, or partially Populated **RunList** from an imposition design tool, or where that JDF instance is merged with JDF data from elsewhere, see alternative ICS documents that may be available from CIP4.

This version applies to interactions using JDF version 1.3.

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# 1 Introduction

The creation of imposition layouts is often performed by specialist Products. Such Products may be stand-alone, or may be entirely and transparently embedded within a prepress workflow system.

Whether such tools are stand-alone, they are used in two different ways:

- To supply a JDF instance that contains one or more **Layout** Resources, and possibly one or more **RunList** Resources, but where those **RunList** Resources are not fully ***Populated***. Such a file would normally be consumed by a prepress workflow system that uses it as a template for Job data obtained from other sources, or merges it with other JDF Elements from other sources.
- To supply a JDF instance containing one or more **Layout** Resources and one or more associated **RunList** Resources that fully identify all of the content Pages and marks that will be used to fill them. Such a JDF instance is suitable for immediate submission to a Device that performs the ***Imposition*** Process.

This ICS applies only to the latter case where fully-***Populated*** **RunList** Resources are required.

# 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 [Base-ICS].

This section contains terms that pertain to this ICS:

**Table 1: Glossary**

| Term | Definition |
|---|---|
| ***Populated*** **RunList** | A **RunList** whose RunList/LayoutElement/FileSpec/@URL Attribute references a file that holds either content Pages or marks. |

# 3 Conformance Levels

This ICS, the *[LayCrImp-ICS]*, defines only one Conformance Level, namely Level 1.

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

While the Producer in the interface described by this ICS will typically be a JDF Device, the Consumer of the JDF instance so produced may be either another Device or a Controller. In most cases, the Consumer will be a Device, but that behavior is not mandated by this ICS. All descriptions and tables below therefore refer to Managers and Workers.

If a JDF instance in isolation conforms to this ICS, there is no guarantee that the complete file set (comprising the JDF instance plus referenced Page description files) will also conform to this ICS. See FileSpec/@URL in Table 6: FileSpec.

To be conformant to a level of this ICS specified in the first column of Table 2, a Manager MUST conform to the Manager part and a Worker MUST conform to the Worker part of the ICSs and levels specified in Table 2 below.

**Table 2: Conformance Levels**

| Level of this ICS | [Base-ICS] | [JMF-ICS] | [MIS-ICS] | Description |
|---|---|---|---|---|
| 1 | 0 | - | - | |

## 3.1 Certification

The read test for the "r" Attributes are evaluated on the output by comparing to a reference output. A high-resolution TIFF file is acceptable instead of the physical output.

# 4 Conformance Tables – JDF Instances

## 4.1 JDF Node

Table 3 specifies the JDF Node structures Supported by this ICS. They include a stand-alone ***Imposition*** Process and a Process Group (also Gray Box) that includes an ***Imposition*** Process. Only JDF Nodes that have a *ICSVersions* Attribute containing `LayCrImp_L1-1.3` are covered by the next table.

**Table 3: JDF Node**

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *ICSVersions* | w← | | | r? | | | |
| `LayCrImp_L1-1.3` | w← | | | r? | | | |
| *Type* | w | | | r | | | . |
| `Combined` | w← | | | r | | | A Worker MUST accept a Combined Process where `contains(@Types, "Imposition")`. |
| `Imposition` | w← | | | r | | | A Worker MUST accept a Node with a single ***Imposition*** Process. |
| `ProcessGroup` | w← | | | r | | | A Worker MUST accept a Process Group where `contains(@Types, "Imposition")`. The JDF Node MUST NOT contain any child Nodes. |
| *Types* | w← | | | r | | | MUST be specified if `(@Type="ProcessGroup" or @Type="Combined")`. |
| `Imposition` | w | | | r | | | *Types* list MUST contain exactly one "`Imposition`" and MAY contain other Processes. |

# 5 Conformance Tables – Processes

## 5.1 Imposition

**Table 4: Imposition – Input Resources**

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| Layout | w | | | r | | | See Table 8: Layout. |
| RunList (Document) | w | | | r | | | See Table 14: RunList. |
| RunList (Marks) | w← | | | r | | | Manager MUST write if the Subelements of the **Layout** Resource contain any MarkObject Elements with *Ord* Attributes.<br>See Table 14: RunList. |

# 6 Conformance Tables – Resources

Manager MUST set the *Status* Attribute of all Input Resources (direct or indirect) of the ***Imposition*** Process to have the value of *Available*.

## 6.1 DeviceMark

**Table 5: DeviceMark**
**Referenced by:** JobField

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *Font* | !w | | | r? | | | Explicit selection of a *Font* makes handling of localized text in different scripts difficult. |
| *FontSize* | w? | | | r | | | Default="9". |
| *MarkJustification* | !w | | | r? | | | **JobField** marks are positioned by MarkObject/@CTM. |
| *MarkOffset* | !w | | | r? | | | **JobField** marks are positioned by MarkObject/@CTM. |
| *MarkOrientation* | !w | | | r? | | | **JobField** marks are positioned by MarkObject/@CTM. |

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *MarkPosition* | !w | | | r? | | | **JobField** marks are positioned by MarkObject/@CTM. |

## 6.2 FileSpec

**Table 6: FileSpec**
**Referenced by:** LayoutElement

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *Compression* | w? | | | r? | | | *Compression* other than "*None*", the Default, are outside the scope of this ICS. |
| *None* | w | | | r? | | | |
| *MimeType* | w | | | r? | | | |
| *URL* | w | | | r | | | When RunList[LayoutElement/FileSpec] is an Input Resource to the ***Imposition*** Process, the Manager MUST write *URL* values that can be resolved by the Worker to the page description language files to be used.<br>See [FileURL-AN] for more discussion. |
| *"" (empty URL)* | !w | | | r? | | | If a ContentObject or MarkObject is blank, the Manager MUST specify such with LayoutElement/@IsBlank ="*true*" and MUST NOT specify it with LayoutElement/FileSpec/@URL =""". |
| *./…* | w← | | | r | | | This value represents any Relative ***URL*** that is relative to the Hot Folder. Relative ***URLs*** MUST be Supported relative to a "file" scheme and MAY be Supported relative to other schemes. |
| *file:…* | w← | | | r | | | Any ***URL*** whose scheme is "file", except as restricted below. |

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *file://localhost/...* | !w | | | r? | | | A ***URL*** MUST be resolvable by the Worker. A localhost ***URL*** can only be resolved by a Worker that is running on the same computer as the Manager, and which therefore sees the file system from the same viewpoint.<br>Note also that many early Products based on Mac OS/X create badly constructed ***URLs*** for files stored on other computers, starting "*file://localhost/Volumes/*", or "*file:///Volumes/*". |
| *file:///...* | !w | | | r? | | | See above row about localhost. |
| ***all remaining values*** | w? | | | r? | | | |

## 6.3 JobField

The **JobField** specifies content only. Its format depends on the Worker implementation.

**Table 7: JobField**

**Referenced by:** MarkObject

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *OperatorText* | w← | | | r | | | Manager MUST write if *ShowList* includes *OperatorText*. |
| *ShowList* | w | | | r | | | |
| *DeviceID* | w? | | | r | | | |
| *OperatorText* | w? | | | r | | | |
| *StartTime* | w? | | | r | | | |
| *UserText* | w? | | | r | | | |
| ***all remaining values*** | w? | | | r? | | | A Worker MAY ignore any of these values and it MUST NOT treat any as an error condition. |
| *UserText* | w← | | | r | | | Manager MUST write if *ShowList* includes *UserText*. |
| **DeviceMark** | w← | | | r | | | See Table 5: DeviceMark. |

## 6.4 Layout

**Table 8: Layout**
**Input to:** *Imposition*

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *Automated* | !w | | | r? | | | Disallow automated **Layout** Resources. (PJTF: PL). That is, allow only fully specified **Layout** Resources. |
| *PartIDKeys* | w | | | r | | | Manager MUST write into the outermost **Layout** Element of the Resource.<br>When a Manager supplies *PartIDKeys*, the order of Partition Keys in its value (other than those marked with a "!w" value) MUST follow the order shown in the following table rows. The Manager MUST include all three Partition keys.<br>This makes normative the recommendation in [JDF1.3], Section 7.2.108.1.1 "Partition Key restrictions" in order to allow simple translation into the format used in [JDF1.2]. |
| *SignatureName* | w | | | r | | | |
| *SheetName* | w | | | r | | | |
| *Side* | w | | | r | | | Jobs intended to be printed on only one side MUST include only a single *Side* Partition within each *SheetName* Partition. Work & Turn and Work & Tumble Jobs MUST include only a single *Side* Partition within each *SheetName* Partition, and those *Side* Partitions MUST set *Side*= "*Front*". |
| ***all remaining values*** | !w | | | r? | | | |
| *SurfaceContentsBox* | w← | | | r | | | Manager MUST write *SurfaceContentsBox* in enough **Layout** *Side* or *SheetName* Partitions so that each **Layout** *Side* Partition either contains this Attribute, or inherits it from its immediate parent (*SheetName*) Partition.<br>The first two numbers in the rectangle MUST be 0, 0. |
| ContentObject | w← | | | r | | | Manager MUST write a ContentObject in a **Layout** *Side* Partition if it places content Pages from input files on the Surface. Manager MUST NOT write a ContentObject into a **Layout** *SignatureName* or *SheetName* Partition.<br>Manager MUST write at least one |

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| | | | | | | | PlacedObject in a **Layout** *Side* Partition. Each PlacedObject MUST be either a ContentObject or a MarkObject.<br>See Table 10: ContentObject. |
| MarkObject | w← | | | r | | | Manager MUST write a MarkObject in a **Layout** *Side* Partition if it places marks other than content Pages on the Surface. Manager MUST NOT write a MarkObject into a **Layout** *SignatureName* or *SheetName* Partition.<br>Manager MUST write at least one PlacedObject in a **Layout** Element Partitioned by *Side*. Each PlacedObject MUST be either a ContentObject or a MarkObject.<br>See Table 11: MarkObject. |
| **Media** | w? | | | r? | | | Manager SHOULD provide this Resource if it has the appropriate information.<br>See Table 13: Media. |
| Signature | !w | | | r? | | | A Partitioned **Layout** MUST be used; see *PartIDKeys*.<br>See [JDF1.3]. |
| **TransferCurvePool** | w? | | | r? | | | Manager SHOULD provide this Resource if it provides one or more TransferCurveSet Elements as specified in Table 15: TransferCurvePool.<br>This Resource provides the relationship between the coordinate system of the **Layout**, the physical printed **Media**, and any intermediate **Media** such as film or plates, to enable in-line plate-punching, etc.<br>See Table 15: TransferCurvePool. |

### 6.4.1 Abstract PlacedObject

The descriptions of *CTM* and *SourceClipPath* in [JDF1.3] refer to the "the native coordinate system of the object" and "the coordinates of the source Page" respectively. In both cases the lower left of the object (**MediaBox** in case of PDF, the whole of the raster for TIFF, etc) is used as the reference; X values increase to the right, and Y values increase towards the top. For those source file formats that define tags to indicate extra transformations, a Consumer conforming to this ICS MUST apply these transformations before identifying the lower left of the object. For example, the rotation defined by the PDF Rotate key MUST be applied first; or the orientation defined by the TIFF Orientation tag MUST be applied first. The Consumer MUST determine the location of the lower left corner before any transformation is applied by the *CTM*. The Consumer MUST apply all translation, scaling and rotation defined by *CTM* to the *SourceClipPath*.

A Worker conforming to this ICS MUST process the PlacedObject Elements (i.e., ContentObject and MarkObject Elements) in such a way that the final rendered appearance of the Surface concurs with the order of those Elements within the **Layout** *Side* Partition. Thus when two graphic objects defined in different PlacedObject Elements (i.e. MarkObject Elements or ContentObject Elements) overlap each other, the one specified later in the **Layout** *Side* Partition will appear to knock out or overprint the one specified earlier, depending on whether the graphic element is set to overprint or not.

**Table 9: Abstract PlacedObject**

**Superclass of:** ContentObject, MarkObject

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *ClipBox* | w? | | | r | | | |
| *ClipPath* | w? | | | r | | | Note that this is new in [JDF 1.3]. |
| *CTM* | w | | | r | | | See notes above. |
| *SourceClipPath* | w? | | | r | | | See notes above. |

### 6.4.1.1 ContentObject

See Section 6.4.1 *Abstract PlacedObject* for additional information.

**Table 10: ContentObject**

**Referenced by:** Layout

**Subclass of:** Abstract PlacedObject

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *DocOrd* | !w | | | r? | | | |
| *Ord* | w | | | r | | | *Ord* MUST NOT be equal to or greater than the total number of Pages in the document **RunList**. |
| *OrdExpression* | !w | | | r? | | | |
| *SetOrd* | !w | | | r? | | | |

### 6.4.1.2 MarkObject

A MarkObject may contain a number of Attributes and Elements, such as **CIELABMeasuringField**, **RegisterMark**, etc, alongside graphical content, referenced via the *Ord* index into the **RunList**. Such Attributes and Elements may provide metadata about the marks that could be useful to downstream closed loop control systems for color or registration, but a Worker conforming to this ICS is not required to act on them directly.

See Section 6.4.1 *Abstract PlacedObject* for additional information.

**Table 11: MarkObject**
**Referenced by:** Layout
**Subclass of:** Abstract PlacedObject

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *LayoutElementPageNum* | !w | | | r? | | | |
| *Ord* | w← | | | r | | | The Manager MUST write either *Ord* or **JobField**, but not both.<br>*Ord* MUST NOT be equal to or greater than the total number of Pages in the marks **RunList**.<br>The Manager MAY specify additional information to place on a Sheet by using the *Ord* value to reference text, icons etc. on a Page of a marks **RunList**. |
| DynamicField | !w | | | r? | | | See [JDF1.3]. |
| **JobField** | w← | | | r? | | | The Manager MUST write either *Ord* or **JobField**, but not both.<br>See Table 7: JobField. |
| **LayoutElement** | !w | | | r? | | | See [JDF1.3]. |

## 6.5 LayoutElement

**Table 12: LayoutElement**
**Referenced by:** RunList

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *ElementType* | w? | | | r? | | | This Attribute is present in this table to specify that a Manager MUST NOT include the value below if it supplies this Attribute. |
| *Reservation* | !w | | | r? | | | The **RunList** (Document) row of table 6-80 in section 6.4.33 “Stripping” of [JDF1.3] explains that this value is not suitable for a **RunList** that is an Input Resource of an ***Imposition*** Process.<br>Note: a Manager MUST denote that a ContentObject is blank by using *IsBlank* (see below), and not by using *ElementType* = "*Reservation*". |

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *IsBlank* | w← | | | r | | | Manager MUST write either **FileSpec** or *IsBlank*="`true`", but not both.<br>Manager MUST write *IsBlank* ="`true`" if and only if the corresponding `MarkObject` or `ContentObject` contains no graphical data. |
| FileSpec | w← | | | r | | | Manager MUST write either **FileSpec** or *IsBlank*="`true`", but not both.<br>Manager MUST write **FileSpec** if and only if the corresponding `MarkObject` or `ContentObject` contains graphical data.<br>See Table 6: FileSpec. |

## 6.6 Media

**Table 13: Media**

**Referenced by:** Layout

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *Dimension* | w | | | r? | | | |
| *MediaType* | w | | | r? | | | Manager MUST supply one of the values below, allowing transformations of coordinate systems from that of the **Layout** using the *CTM* in `TransferCurveSet` Elements. |
| `Film` | w← | | | r? | | | |
| `Paper` | w← | | | r? | | | |
| `Plate` | w← | | | r? | | | |

## 6.7 RunList

**Table 14: RunList**
**Input to:** *Imposition*

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *NPage* | w | | | r | | | Manager MUST write a value for *NPage* that:<br>• **if** *Pages* **is present**, is equal to the number of Pages listed in *Pages*, ,<br>• **otherwise if** *FirstPage* **is present**, should be equal to the number of Pages in the referenced **LayoutElement** as specified by *FirstPage* and *SkipPage*,<br>• **otherwise**, should not exceed the number of Pages in the referenced **LayoutElement** |
| **ByteMap** | !w | | | r? | | | Manager MUST reference common raster formats that might be used in post-RIP imposition (e.g. TIFF) via **LayoutElement**, not **ByteMap**, which is a JDF-specific format.<br>See [JDF1.3]. |
| DynamicInput | !w | | | r? | | | See [JDF1.3]. |
| **InsertSheet** | !w | | | r? | | | See [JDF1.3]. |
| **InterpretedPDLData** | !w | | | r? | | | See [JDF1.3]. |
| **LayoutElement** | w | | | r | | | See Table 12: LayoutElement. |

## 6.8 TransferCurvePool

**Table 15: TransferCurvePool**
**Referenced by:** Layout

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| TransferCurveSet | w? | | | r | | | Manager SHOULD supply one TransferCurveSet Element for each value of TransferCurveSet/@Name listed in this ICS where the corresponding TransferCurveSet/@CTM would not be the identity matrix.<br>See Table 16: TransferCurveSet. |

### 6.8.1 TransferCurveSet

**Table 16: TransferCurveSet**
**Referenced by:** TransferCurvePool

| Name | Manager | | | Worker | | | Description |
|---|---|---|---|---|---|---|---|
| Level ➔ | 1 | 2 | 3 | 1 | 2 | 3 | |
| *CTM* | w | | | r | | | The first 4 numbers of the *CTM* Attribute Value MUST match one of four values as defined by *Rotate0*, *Rotate90*, *Rotate180* and *Rotate270* in [JDF1.3] Table 2-3 "Matrices and Orientation values used to describe the orientation of a Component". |
| *Name* | w | | | r | | | The Supported values are the same as for Media/@MediaType. That is, they are the values of *Name* that overlap with Media/@MediaType. |
| *Film* | w← | | | r? | | | |
| *Paper* | w← | | | r? | | | |
| *Plate* | w← | | | r? | | | |

# 7 References

## 7.1 Normative References


[Base-ICS] Base 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.

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## 7.2 Informative References


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