MIS ICS

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MIS WG

Abstract

This CIP4 JDF Interoperability Conformance Specification (ICS) defines the interoperability requirements related to the communication between MIS and production equipment. It describes requirements that are generic for all stages of the production process (pre-press, press and post-press). It focuses on the main JDF structure, to way to submit JDF from an MIS to a Device and the way Devices communicate back to the MIS.

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1   Introduction

The MIS plays a central role in a MIS-managed print shop. The MIS normally is the conduit between the print shop's customers and the print shop's production facilities (and sub-contractors). As a result, an MIS supports two major interfaces:

- One with the print shop's customers – primarily JDF product Intent and specified in a separate *Product Description ICS*
- Another with the print shop's production facilities – primarily JDF Process definitions. and specified in the *[MIS-ICS]* (**this document**)

 JDF plays a major role in both interfaces.

Note: in this document, terms identified with ***bold-italics*** are defined in the *[Base-ICS]* if their definition does not appear immediately in this document.

Using *[Base-ICS]* terminology, the [MIS-ICS] specifies the generic parts of the ***Manager Interface*** (in an MIS) when it communicates with the ***Worker Interface*** (in production Workflow Components, such as Controllers and Devices). It also specifies the corresponding generic parts of the Worker Interface (in a Controller or Device) when it communicates with a Manager Interface (in an MIS).

This ICS includes:

- Specifications of JDF Elements that are not specific to either Prepress, Press or Postpress,
- AuditPool Elements for job costing and
- Specifications JMF Messages used for JobPartID synchronization, Job Tracking and Device utilization statistics.

Definitions that are specific to either Prepress, Press and Postpress are described in separate ICS documents.

This ICS describes the data flow in a print shop in a MIS-managed environment. However, this data flow does not necessarily also apply to non-MIS-managed environments.

1.1   Conformance Requirements

This ICS specifies three ***Conformance Levels*** of Conformance Requirements. These levels mainly differ in the type of communication between the ***Manager*** (in the MIS) and the ***Worker*** (in the controller or device)

1.1.1   Level 1

This subsection defines the conformance requirements for Level 1.

To be conformant to Level 1 of this ICS, a Manager (in an MIS) MUST

- Conform to Level 1 of the *[Base-ICS]* and

To be conformant to Level 1 of this ICS, a Worker (in a Controller or Device) MUST

- Conform to Level 1 of the *[Base-ICS]* and

1.1.2   Level 2

To be conformant to Level 2 of ICS, a Manager (in a MIS) MUST

- Conform to Level 2 of the *[Base-ICS],*
- Conform to Level 1 of the *[MIS-ICS]*,
- Place conformant JMF Query Messages with Subscription elements in the ***JDF Instance*** and

To be conformant to Level 2 of this ICS a worker (in a controller or device) MUST

- Conform to Level 2 of the *[Base-ICS],*
- Conform to Level 1 of the *[MIS-ICS]*,
- Be able to accept conformant JMF Query Messages with Subscription elements via the ***JDF Instance***

1.1.3 Level 3

To be conformant to Level 3 of this ICS, a Manager (in a MIS) MUST

- Conform to Level 3 of the *[Base-ICS],*
- Conform to Level 2 of the *[MIS-ICS]*,
- Be able to send conformant JMF Query and Command Messages to a Worker via HTTP,
- Be able to receive additional (to Level 2) conformant JMF Signal Messages and
- Be able to receive and execute conformant JMF Command Messages via HTTP,

To be conformant to Level 3 of this ICS, a Worker (in a Controller or Device) MUST

- Conform to Level 3 of the *[Base-ICS],*
- Conform to Level 2 of the *[MIS-ICS]*,
- Be able to send out conformant JMF Command Messages and additional (to Level 2) conformant Signal Messages,
- Be able to receive and execute conformant JMF Query and Command Messages from the Manager via HTTP and
- Be able to return the JDF Instance to the Manager (in the MIS) via HTTP.

1.2 Terminology

This section defines terminology used throughout this document. References to other documents are indicated with square brackets, e.g. [JDF1.2]. For most terms, see the Terminology section in [Base-ICS].

This section contains MIS-related terms that pertain to this ICS:

Gray Box – A Process Group node with a non-empty *Types* Attribute and no child Nodes. Each Gray Box specifies a loose combination of several processes with a specific goal. The *Types* Attribute identifies the processes. Usually, a Manager creates a Gray Box and a Worker expands it by replacing each value (or set of values) of the *Types* Attribute with a corresponding child Node for a Process or Gray Box. See [MIS-Pre-ICS] for more details.

1.3 JDF Instances

This ICS specifies the JDF Elements that are not specific to either prepress, press or postpress. These Elements include the JDF Root Node and a number of Elements close to the root, like CustomerInfo. The ICS also includes guidelines (rules) on the use of certain Attributes in these and other Elements.

1.4 Gray Boxes

A Gray Box specifies a loose combination of several processes with a specific goal. A Gray Box does not specify all processes or all resources – except for output resources.

When an MIS (acting as a Manager) uses Gray Boxes, its specifies only the Processes and Resources that are of real interest to the MIS, that is, everything it needs to track the produced output resources. When a Worker receives a Gray Box, it fills in the details. See [MIS-Pre-ICS] for examples of Gray Boxes.

[JDF 1.2] introduces the Process Group with a *Types* Attribute to allow the MIS to specify large modules (like Prepress) with incompletely specified Processes and Resources. By contrast, a Combined Process requires that all of its Processes and Resources be specified

In a JDF Instance, a Process Group with a Types Attribute and no child nodes represents a Gray Box.

For more details, see:

- Section 3.1.4.1 "Use of the Types Attribute in ProcessGroup nodes" of [JDF1.2].
- The Types Attribute in table 3-4 "Contents of a JDF node" of [JDF1.2].

Note: Gray boxes MUST NOT be spawned by Partition. See [JDF] 4.4.3.

1.5   JMF Messages

This ICS describes how JMF Messages are used to

- Provide information about Device utilization and Job progress,
- Provide information about costs from a Worker in a production Controller or Device to a Manager in an MIS and
- Facilitate creation of new JDF Instances and synchronize JobPartIDs.

This ICS describes the conformance requirements for

- Command Messages for NewJDF
- Response Messages and Acknowledge Messages for NewJDF
- Query Messages with Subscription Element to create a Persistent Channel for NewJDF, Status and Resource.
- Signal Messages for NewJDF, Status and Resource.
- Command Message for StopPersistentChannel.

Other JMF messages are possible (e.g. Resource update messages) but these are outside the scope of this ICS.

This ICS describes both the JMF Message formats and the transfer protocol. This ICS describes the HTTP transfer protocol for JMF messages. In order to be conformant to Levels 2 and 3 of this ICS both the Manager and the Worker MUST support the HTTP protocol.

2   Conformance Tables – JDF Instances

See Appendix A "*How to Read ICS Documents*" in [Base-ICS] for an explanation of the table format and the codes used to specify conformance

This section specifies conformance requirements for a JDF Instance. When Manager (in a MIS) submits a JDF Instance to a Worker (in a controller or device), they all MUST conform to these conformance requirements.   When a Worker returns a JDF Instance to a Manager, they all MUST conform to these conformance requirements.

2.1   JDF Node

Table 1specifies the Attributes and Elements for a JDF Node, whether it is a Root Node or a Sub-node. Some Attributes and Elements are specified only for a Root Node and are so noted in the first line of the Description.

<div align="center">

Table 1: JDF Node

Root Node of: JDF Instance

Referenced by: *JDF Node*, *JDF Node – Returned*

</div>

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Activation		r			W←		MUST be set if the JDF Instance is a snapshot in a JobPhase

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Informative		r			w⬅		MUST be set to "Informative" if the JDF Instance is a snapshot in a `JobPhase`
Category	w⬅			r			The Manager MUST supply *Category* if the Node is a **Gray Box**, and MAY supply *Category* if *Type* = *Combined* or *ProcessGroup*.
all values	w⬅			r			See [JDF1.2] section 4.2.1
ICSVersions	w⬅			r?			MUST appear in the Root node and MAY appear in sub nodes. For example "*Base_L1-1.0 MIS_L1-1.0*"
MIS_L1-1.0	w			r?			Specifies that the JDF Instance conforms to [MIS-ICS] level 1.
MIS_L2-1.0		w		r?			Specifies that the JDF Instance conforms to [MIS-ICS] level 2.
MIS_L3-1.0			w	r?			Specifies that the JDF Instance conforms to [MIS-ICS] level 3.
ProjectID	w?			r?			MUST NOT be specified in sub nodes. An ID assigned by the MIS for grouping multiple jobs into one "Customer Order".
Type	w			r			
Product	w⬅			r			Specifies that this Node describes a final or partial product and it MAY have nested JDF Sub-nodes
ProcessGroup	w⬅			r			Specifies that this Node describes multiple processes and that it may take several devices to process them, possibly with spawning.
Combined	w⬅			r?			Specifies that this Node describes multiple processes (specified by the *Types* Attribute) and that a single Device or coordinated set of Devices can process them.
<Process Name>	w⬅			r?			Specifies that this Node describes a single process (specified by the value of this Attribute) and that a single Device can process it.
Types	w⬅			r?			MUST be specified when Type is Combined.
all values	w?			r?			The Product-Sector ICSs specify particular values
AuditPool	w r			r? w			See *[Base-ICS]* for more details.
Comment	w? r?			r? w?			The Manager MAY supply one or more Comment Elements with information for the

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
							Worker.
							See Table 4: Comment – Manager Created
							The Worker MAY supply one or more additional Comment Elements with information for the Manager.
							See Table 5: Comment – Worker
CustomerInfo	w←			r?			MUST appear in Root Node.
							See Table 6: CustomerInfo
JDF	w?			r			Child JDF Nodes.
							See this table.
NodeInfo	w←			r			MUST appear in the Root node and MAY appear in sub nodes.
							See Table 2: NodeInfo
ResourcePool	w←			r			The Product-Sector ICSs specify particular **Resource** children of this Element
							See Table 10: Consumable Resource

Table 2: NodeInfo
Referenced by: *JDF Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
BusinessInfo	!w			r?			
Employee	w←			r?			MUST appear in the Root node and MAY appear in sub nodes.
							The employee is an internal customer service representative.
							See Table 3: Employee
JMF		w?			r		This JMF Element is the Level 2 way for a Manager to start a Persistent Channel. For level 2, this mechanism allows a Manager to send JMF to a Worker without using HTTP.
							See Table 20: JMF, Table 43: Query – Status , Table 45: Query – Resource and section 5.3.1 "*Persistent Channels*"

Table 3: Employee

Referenced by: *NodeInfo*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
PersonalID	w			r?			
Roles	w			r?			
CSR	w			r?			Customer Service Representative

Table 4: Comment – Manager Created

Referenced by: *JDF Node*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Name	w			r			
JobDescription	w←			r?			For a comment that describes the overall job. It MUST only be in JDF Root Node or in the AncestorPool of a spawned job
Description	w←			r?			For a comment that describes the Node. It MUST only be in JDF Sub-nodes.
Instruction	w←			r?			For instructions to the operator. It MUST only be JDF Nodes that are a Process Group Nodes (e.g. Gray Box), Combined process Nodes and Process Nodes.
<content of element>	w			r			The Worker MUST retain any white space and new line characters in the content of the element when rendering it.

Table 5: Comment – Worker Created

Referenced by: *JDF Node, PhaseTime*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Name	r			w			
OperatorText	r			w←			For comments created by the Operator to be placed in the JDF Root Node or Sub-node that is returned to the MIS
<content of element>	r			w			The Manager MUST retain any white space and

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
							new line characters in the content of the element when rendering it.

Table 6: CustomerInfo
Referenced by: *JDF Node,* JDF – Skeleton

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
CustomerID	w			r?			
CustomerJobName	w←			r?			A specific job name that is present if the customer provides it.
CustomerOrderID	w←			r?			Enables automated processing of the NewJDF command
CustomerProjectID	w?			r?			An ID provided by the customer for grouping multiple jobs into one "Customer Order".
Contact	w			r?			The contact person for the customer See Table 7: Contact

Table 7: Contact
Referenced by: *CustomerInfo*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ContactTypes	w			r?			
Customer	w			r?			
Administrator	w			r?			
Company	w←			r?			See Table 8: Company
Person	w			r?			See Table 9: Person

Table 8: Company

Referenced by: Contact

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
OrganizationName	w			r?			Name of the customer's organization.

Table 9: Person

Referenced by: Contact

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
FamilyName	w			r?			

2.2   Consumable Resource

Table 10: Consumable Resource

Referenced by: *ResourcePool*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
DescriptiveName	w			r?			If the Worker identifies this consumable resource to the operator, the Worker MUST display this value.
ProductID	w?			r			If the Manager supplies this Attribute and the Worker identifies this consumable resource to the operator, the Worker MUST include this value in the display.

2.3   Component – Output

Each Product Node's ResourceLinkPool MUST contain at least one output ComponentLink (which, of course, links to a **Component**). To put it more succinctly, each Product Node MUST link to at least one output **Component**. If a root Product Node links to an output **Component**, the **Component** is the final product. If any other Product Node links to an output **Component**, the **Component** is a partial product. Table 11 shows the conformance requirements for such output **Component**s.

Table 11: Component

Referenced by: *ResourcePool*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
ComponentType	w			r			
FinalProduct	w←			r			MUST be *ComponentType*'s value for a **Component** that represents the single finished product that the Customer ordered .
Dimensions	w			r?			
IsWaste	w?			r			
ProductType	w←			r			The Manager MUST supply this Attribute for a partial product so that prepress systems can take special action based on the type of product.
BackCover	w←			r			
Body	w←			r			For non-cover sections of bound products
Cover	w←			r			For Covers of bound products
FrontCover	w←			r			
all remaining values	w?			r?			

2.4 ComponentLink – Output

See [Base-ICS] for Conformance of ComponentLink. Table 12: Part – ComponentLink adds requirements for partitioning by *Condition*.

Table 12: Part – ComponentLink

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Condition	w			r			

2.5 JDF Instance – Worker Updated

2.5.1 AuditPool – Created or Updated

When a Worker returns a JDF Instance to its Manager, the Worker MUST return the same JDF Instance that it received from the Manager except for certain parts of the JDF Instance that a Worker MAY modify. In particular, the Worker MUST add information into the AuditPool of the JDF Root Node and each Process node that was executed (See Table 13: JDF Node – Returned). The Worker MUST NOT return a portion of the JDF Instance that it received from the Manager.

Table 13: JDF Node – Returned
Root Node of: JDF Instance
Referenced by: *JDF Node*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
AuditPool	r			w←			The Worker MUST add an AuditPool Element if the JDF Node doesn't already have one. See Table 14: AuditPool

Table 14: AuditPool
Referenced by: *JDF Node – Returned*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Audit	r			w			From [JDF] section 3.9: Audit entries are ordered chronologically, with the last entry in the AuditPool representing the newest. A ProcessRun Element containing the scheduling data finalizes each process run. All subsequent entries belong to the next process run. See Table 15: Audit – Abstract and Table 16: Audit – Derived Elements

Table 15 shows the Attributes that exist on each type of Audit Element that is defined in Table 16: Audit – Derived Elements. The subsequent tables show the details of each specific type of Audit.

Table 15: Audit – Abstract
Referenced by: *AuditPool*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
ID	r			w			
refID	r			w?			References another Audit that this Audit corrects.

Table 16: Audit – Derived Elements
Referenced by: *AuditPool*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ProcessRun	r?			w			See Table 17: ProcessRun
PhaseTime			r			w	See Table 18: PhaseTime
ResourceAudit			r?			w?	See Table 19: ResourceAudit

2.5.1.1 ProcessRun

Table 17: ProcessRun
Derived from: *Audit*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Duration	r			w			
End	r			w			
EndStatus	r			w			
all values	r			w←			
Start	r			w			
Part	r			w←			If this Audit Element doesn't describe all parts of a process, then the Worker MUST supply this Part Element and it MUST specify the parts of a process that this Audit Element belongs to.

2.5.1.2 PhaseTime

Table 18: PhaseTime
Derived from: *Audit*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
End			r			w	
Start			r			w	
Status			r			w	For the Attribute Values, see Table 34: JobPhase/@*Status* and PhaseTime/@*Status*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
StatusDetails			r?			w←	For the Attribute Values, see [JDF 1.2] See [MIS-AN] for details
Comment			r?			w?	See Table 5: Comment – Worker Created
Device			r			w	See Table 31: Device
Employee			r			w←	See Table 32: Employee – Operator
MISDetails			r?			w?	See Table 37: MISDetails
Part			r			w←	If this Audit Element doesn't describe all parts of a process, then the Worker MUST supply this Part Element and it MUST specify the parts of a process that this Audit Element belongs to.
ResourceLink			r			w?	This ResourceLink is a copy of the ResourceLink that references a Resource that was consumed (or modified) during the execution of the Node. See [Base-ICS]

2.5.1.3   ResourceAudit

Table 19: ResourceAudit
Derived from: *Audit*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Reason			r			w?	
ProcessResult			r			w←	
ResourceLink			r			w	This ResourceLink is a copy of the ResourceLink that references a **Resource**, that was consumed (or modified) during the execution of the Node. See [Base-ICS]

3   Conformance Tables – JMF Messages

This section and a similar section in [Base-ICS] specify conformance requirements for JMF Messages:

- Command, Response, Acknowledge and Query Messages that a Manager sends to a Worker and
- Command, Response, Acknowledge and Signal Messages that a Worker sends to a Manager.

Very Important Note: For the first two tables in this section, the Conformance-Table columns for Manager and Worker are relabeled *Producer* and *Consumer*. The term *Producer* represents either a Manager or Worker, depending on the context. The same is true for the term *Consumer*. When a Manager sends a JMF Message to a Worker, the Manager is the Producer and the Worker is the Consumer. When a Worker sends a JMF Message to a Manager, the Worker is the Producer and the Manager is the Consumer. All tables starting with Table 21 switch back to columns with Manager and Worker. Table 21 provides the mapping between the Manager/Worker and the Producer/Consumer. See the note before Table 21 for details of the mapping.

Table 20: JMF
Root Node of: JMF Instance
Referenced by: *NodeInfo*

Name or Value	Producer			Consumer			Description
Level ➜	1	2	3	1	2	3	
ResponseURL	!w			r?			This ICS does NOT allow file based JMF messaging.
Message		w			r		See Table 21: Message – Derived Message . See similar tables in the [Base-ICS]

Note: Table 21 provides the mapping between the Manager/Worker and the Producer/Consumer.

- If the Manager column contains a "write" for a Message, then the Manager is a Producer and the Worker is a Consumer for that Message.
  For example, for a Command StopPersistentChannel, the Manager acting as a Producer sends a Message to a Worker acting as a Consumer. The same is true for the Acknowledge NewJDF

- If the Manager column contains a "read" for a Message, then the Worker is a Producer and the Manager is a Consumer for that Message.
  For example, for a Response Status, the Worker is acting as a Producer sends a Message to a Manager acting as a Consumer. The same is true for the Command NewJDF.

Note: The first column of Table 21 specifies the name of the Message Family and the second column of Table 21 specifies the value of the /JMF/Message/@Type Attribute. It specifies the particular Message.

Table 21: Message – Derived Message Families
Referenced by: *JMF*

Message Family Name	@Type	Manager			Worker			Description
	Level ➜	1	2	3	1	2	3	
Command	*NewJDF*			r			w	See Table 22: Command – NewJDF
Response	*NewJDF*		w				r	See Table 26: Response – NewJDF
Query	*NewJDF*		w				r	See Table 41: Query – NewJDF
Acknowledge	*NewJDF*		w				r	See Table 40: Acknowledge –

Message Family Name	@Type	Manager			Worker			Description
	Level ➜	1	2	3	1	2	3	
								NewJDF
Signal	*NewJDF*		r			w		See Table 28: Signal – NewJDF
Query	*Status*	w?	w		r?	r		See Table 43: Query – Status
								Note: the "w?" and "r?" in this row and others below in this table emphasize that Queries with Subscription are an optional way to activate Signals in Level 2.
Response	*Status*	r?	r		w?	w		See the Response table in the [Base-ICS]
Signal	*Status*		r			w		See Table 29: Signal – Status
Query	*Resource*	w?	w		r?	r		See Table 45: Query – Resource
Response	*Resource*	r?	r		w?	w		See the Response table in the [Base-ICS]
Signal	*Resource*		r			w		See Table 38: Signal – Resource
Command	*StopPersistentChannel*	w?	w		r?	r		See Table 48: Command – StopPersistentChannel
Response	*StopPersistentChannel*	r?	r		w?	w		See the Response table in [Base-ICS]

3.1   NewJDF

3.1.1   Command – NewJDF

Table 22: Command – NewJDF

Derived From: *Message*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
AcknowledgeURL			r			w	The Worker MUST write and Support this Attribute because potential user intervention between the Command and Response may cause a considerable time lag.
Type			r			w	
NewJDF			r			w	
xsi:type			r?			w	

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
CommandNewJDF			r			w	
NewJDFCmdParams			r			w	See Table 23: NewJDFCmdParams

Table 23: NewJDFCmdParams
Referenced by: *Command – NewJDF*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
JDFDetails			r			w	
None			r			w←	
Brief			r			w←	
Full			r?			w?	
IDInfo			r			w	See Table 24: IDInfo – NewJDF Command

Table 24: IDInfo – NewJDF Command
Referenced by: *NewJDFCmdParams*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
JobID			r			w←	If supplied, the Manager creates a new JDF Sub-node within the job identified by the *JobID* (which must exist in the Manager). The manager assigns a *JobPartID*. If not supplied, the Manager creates a new JDF Root Node and assigns a *JobID* and *JobPartID*.
JobPartID			r?			!w	The Manager assigns a JobPartID.
ParentJobPartID			r			w←	MUST be supplied if a *JobID* is supplied. The value identifies the parent of the new JDF Node. MUST NOT be supplied if a *JobID* is not supplied.
JDF			r			w←	MUST be supplied when no *JobID* is supplied. See Table 25: JDF – Skeleton

Table 25: JDF – Skeleton
Referenced by: IDInfo – NewJDF Command

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Activation			r?			w	
Informative			r?			w	
DescriptiveName			r			w	A single line Job Title **Note**: many devices have limited possibilities to display the job description. The string value should be as short as possible.
CustomerInfo			r			w	See Table 6: CustomerInfo and switch Manager and Worker columns

3.1.2 Response – NewJDF

Table 26: Response – NewJDF
Derived From: Message

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Type			w			r	
NewJDF			w			r	
xsi:type			w			r?	
ResponseNewJDF			w			r	
IDInfo			w⇐			r	The Manager MUST write this Element unless the Manager is sending this Element either: • asynchronously via an Acknowledge Message or • synchronously and the Manager did not create a new JDF Node. In this case, the Manager MUST set the *ReturnCode* in the Response to 204. See Table 27: IDInfo – NewJDF Response

Note: compare Table 24: IDInfo – NewJDF Command in the Command "*NewJDF*"

Table 27: IDInfo – NewJDF Response

Referenced by: *Response – NewJDF*, *Acknowledge – NewJDF*

Name or Value	Producer			Consumer			Description
Level ➔	1	2	3	1	2	3	
JobID			w			r	The *JobID* of the new JDF Node
JobPartID			w			r	The *JobPartID* of the new JDF Node
ParentJobPartID			w←			r	JobPartID of the parent node of the new JDF node. MUST be supplied if JobID was supplied in the NewJDF command. MUST NOT be supplied if JobID was not supplied in the NewJDF command.
JDF			w←			r?	If the Manager created a new job (i.e. a new *JobID*), this JDF Node must still be submitted with a SubmitQueueEntry Command message. The JDF/@Activation MUST have a value of "*Informative*" See Table 1: JDF Node

3.2 Signal Messages

3.2.1 Signal – NewJDF

Table 28: Signal – NewJDF

Derived From: *Message*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
refID		r?			w←		If the Subscription was created by a Query, the Worker MUST supply the ID of the subscription Query
Type		r			w		
NewJDF		r			w		
xsi:type		r?			w		
SignalNewJDF		r			w		
IDInfo		r			w		See **Fehler! Verweisquelle konnte nicht gefunden werden.**

Table 28a: IDInfo – NewJDF Signal

Referenced by: Table 28: Signal – NewJDF

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
JobID		r			w		The *JobID* of the JDF Instance containing the new JDF Node
JobPartID		r			w		The *JobPartID* of the new JDF Node
JDF		r			w		The JDF Node that the Worker created. The JDF/@Activation MUST have a value of "*Informative*" See Table 1: JDF Node

3.2.2 Signal – Status

Table 29: Signal – Status

Derived From:　　　*Message*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
refID		r?			w←		If the Subscription was created by a Query, the Worker MUST supply the ID of the subscription Query
Type		r			w		
Status		r			w		
xsi:type		r?			w		
SignalStatus		r			w		
DeviceInfo		r			w		See Table 30: DeviceInfo

Table 30: DeviceInfo

Referenced by: Signal – Status

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
CounterUnit	r?			!w			The Worker MUST NOT supply this Attribute. See [JDF1.2] for default value.

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
DeviceOperationMode		r			w←		See the [MIS-AN] for details. The worker MUST supply this Attribute for an attended Device. The worker MAY supply it for an unattended Device.
all values		r			w←		
DeviceStatus		r			w		See the [MIS-AN] for details.
all values		r			w←		
ProductionCounter		r?			w←		If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.
Speed		r?			w←		If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.
StatusDetails		r?			w←		Gives further details on the DeviceStatus. It MUST be written with certain values of *@DeviceStatus*
TotalProductionCounter		r			w?		Counter since birth of the machine – probably the best value to calculate interval quantities. If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.
Device		r			w		See Table 31: Device
Employee		r			w?	w←	If a Device requires an operator for normal operation, its worker MUST supply an **Employee** Element with *Roles* including the value "*Operator*". For unattended Devices, its worker MUST NOT supply an **Employee** Element. See Table 32: Employee – Operator
JobPhase		r			w←		The Worker MUST supply one JobPhase element for each Job on the Device that is Active or whose *Status* has just become *Completed* or *Aborted*. The Worker MUST NOT supply any JobPhase elements during a non-productive time (e.g. maintenance or lack of jobs) except to convey information about jobs whose *Status* have just become *Completed* or *Aborted* .See Table 33: JobPhase

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
ModuleStatus		r?			w?		A Worker MAY supply ModuleStatus Elements to show the status of individual modules of its Device. Example of modules is: printing units of an offset press, or individual Machines for a Device that supports multiple physical Machines. See Table 36: ModuleStatus

Table 31: Device

Referenced by: *DeviceInfo*, *PhaseTime*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
DeviceID		r			w		

Table 32: Employee – Operator

Referenced by: *DeviceInfo*, *ModuleStatus*, *PhaseTime*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
PersonalID		r			w		
Roles		r			w		
Operator		r			w←		
Assistant		r?			w?		*Assistant* means assistant operator

Table 33: JobPhase

Referenced by: *DeviceInfo*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Amount		r?			w←		The cumulative amount produced since the Node started executing. If a Worker can distinguish between good and waste, it MUST write the waste amount in *Waste* and then exclude the waste amount from *Amount*.

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
							If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.
JobID		r			w		The *JobID* of the node that is executing.
JobPartID		r			w		The *JobPartID* of the node that is executing.
PhaseAmount		r?			w?	w←	The Amount produced during this JobPhase. If a Worker can distinguish between good and waste, it MUST write the waste amount in *PhaseWaste* and then exclude the waste amount from *PhaseAmount*. If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.
PhaseStartTime		r?			w?	w	Start time of this JobPhase
PhaseWaste		r?			w?	w←	The Amount of Waste produced during this JobPhase. If a Worker can distinguish between good and waste, it MUST write the waste amount in *PhaseWaste* and then exclude the waste amount from *PhaseAmount*. If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.
StartTime		r			w?	w	The date and time the Node started executing
Status		r			w		See [MIS-AN] for details. For values, see Table 34: JobPhase/@Status and PhaseTime/@Status
StatusDetails		r			w←		Gives further details on the Status. MUST be written with certain values of *Status.* See Table 35: JobPhase/@StatusDetails and PhaseTime/@StatusDetails
TotalAmount		r?			w?		The Amount to be produced
Waste		r			w←		The cumulative amount of waste produced since the Node started executing. If a Worker can distinguish between good and waste, it MUST write the waste amount in *Waste* and then exclude the waste amount from *Amount*. If a Worker's Device produces countable output (e.g. a Press or Folding Machine), the Worker MUST supply this Attribute.

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
JDF			r			w⬅	MUST be supplied if the StatusQuParams /@JobDetails = "*Full*". The Worker MUST supply a snapshot of the JDF Node specified by the *JobPartID* of this JobPhase. The specified JDF Node MUST also include all of its sub-nodes, if any. The snapshot MUST also include updated AuditPools of the JDF Node including this JobPhase/PhaseTime. See 5.2.1.1 Financial Period Costing / Analysis See Table 1: JDF Node. Note that the Worker copies, but doesn't alter the JDF Node.
MISDetails		r?			w?		See Table 37: MISDetails
Part		r?			w⬅		Identification of the Part worked on. See the [JDF1.2] for Attributes of Part. If the output Resource of the Process is partitioned, the Worker MUST supply at least one Part. Each Part MUST have all levels of Partitioning for the Node. The receiving Manager MAY consolidate the information from multiple partitions into a single partition, e.g. it may consolidate the information on per Sheet/Separation to per Sheet. Other ICS's specify the attributes for the Part Element.

Table 34: JobPhase/@*Status* and PhaseTime/@*Status*

Referenced by: *JobPhase*, *PhaseTime*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Setup		r			w⬅		A Worker MUST supply this value during the setup phase for a Device that has such a phase for each job.
InProgress		r			w⬅		
Cleanup		r			w⬅		A Worker MUST supply this value during the cleanup phase for a Device that has such a phase for each job.

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Stopped		r			w←		
Completed		r			w←		
Aborted		r			w←		
Pool		r			w←		A Worker MUST supply this value if the Device produces a partitioned Resource
all remaining values		r			w?		.

Table 35: JobPhase/@StatusDetails and PhaseTime/@StatusDetails
Referenced by: *JobPhase*, *PhaseTime*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Interrupted		r			w←		If **Status**="*Stopped*" and the job has been lifted to make way for another job. Processing of this job will continue later. **Note:** this is a value that is not listed in Appendix G of [JDF 1.2]

Table 36: ModuleStatus
Referenced by: *DeviceInfo*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
DeviceStatus		r			w		For Attribute Values see *DeviceInfo/@DeviceStatus* See Table 30: DeviceInfo
ModuleIndex		r			w		Zero-based
Employee		r?			w?		See Table 32: Employee – Operator

Table 37: MISDetails

Referenced by: *JobPhase*, *ResourceInfo*, *PhaseTime*

Name or Value		Manager			Worker			Description
Level ➔		1	2	3	1	2	3	
CostType			r			w?		
DeviceOperationMode			r			w←		The worker MUST supply this Attribute for an attended Device. The worker MAY supply it for an unattended Device.
all values			r			w←		
WorkType			r			w?		
all values			r			w←		

3.2.3 Signal – Resource

Table 38: Signal – Resource

Derived From: *Message*

Name or Value		Manager			Worker			Description
Level ➔		1	2	3	1	2	3	
refID			r?			w←		If the Subscription is created by a Query, the Worker MUST supply the ID of the subscription Query
Type			r			w		
Resource			r			w		
xsi:type			r?			w		
SignalResource			r			w		
ResourceInfo			r			w		See Table 39: ResourceInfo

Table 39: ResourceInfo

Referenced by: *Signal – Resource*

Name or Value		Manager			Worker			Description
Level ➔		1	2	3	1	2	3	
ActualAmount			r			w		The current accumulated amount of the Resource that has been consumed

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ResourceName		r			w?		The Worker MUST specify either this Attribute or the **Resource** Element, but not both.
MISDetails		r?			w?		See Table 37: MISDetails
Part		r?			w←		Other ICS's specify the attributes for the Part Element.
Resource		r			w?		The Worker MUST specify either this Element or the *ResourceName* Attribute, but not both.

3.3   Asynchronous Responses

A Receiver of a JMF Command message MUST respond by returning a ResponseTypeObj either synchronously or asynchronously. An example of a ResponseTypeObj is a QueueEntry, Queue and/or IDInfo.

The table below shows the Attributes of the Acknowledge Message. A Worker MUST support asynchronous responses for NewJDF.

3.3.1   Acknowledge – NewJDF

Table 40: Acknowledge – NewJDF

Derived From: *Message*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
Type			w			r	
NewJDF			w			r	
xsi:type			w			r?	
AcknowledgeNewJDF			w			r	
IDInfo			w←			r	If the Command does not create a new JDF Node, the Manager MUST NOT supply this Element and MUST set the @*ReturnCode* to 204. See Table 27: IDInfo – NewJDF Response

3.4   Persistent Channels – Creating and Closing

The following tables specify the NewJDF Query Message, the Status Query Message and the Resource Query Message. Each Query Message has a Subscription Element, which causes the Worker to create a Persistent Channel and to send Signals to a specified URL.

3.4.1 Query – NewJDF

For the Response to this Query, see Table 26: Response – NewJDF

Table 41: Query – NewJDF

Derived From: *Message*

Name or Value		Manager			Worker			Description
Level ➜		1	2	3	1	2	3	
Type				w			r	
Status				w			r	
xsi:type				w			r?	
QueryNewJDF				w			r	
NewJDFQuParams				w			r	See Table 42: NewJDFQuParams
Subscription				w←			r	A Manager MUST always supply this Element if the Query Message is the only mechanism that it supports for establishing a persistent channel, See Table 47: Subscription

Table 42: NewJDFQuParams

Referenced by: *Query – NewJDF*

Name or Value		Manager			Worker			Description
Level ➜		1	2	3	1	2	3	
JobID				w←			r	If the Query Message is in a NodeInfo, *JobID* MUST be supplied
JobPartID				w?			r	

3.4.2 Query – Status

Table 43: Query – Status

Derived From: *Message*

Name or Value		Manager			Worker			Description
Level ➜		1	2	3	1	2	3	
Type			w			r		
Status			w			r		
xsi:type			w			r?		

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
QueryStatus		w			r		
StatusQuParams		w			r		See Table 44: StatusQuParams
Subscription		w←			r		A Manager MUST always supply this Element, if the Query Message is the only mechanism that it supports for establishing a persistent channel, See Table 47: Subscription

Table 44: StatusQuParams
Referenced by: *Query – Status*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
DeviceDetails		w			r		
Details		w			r		
all remaining values	!w			r?			
EmployeeInfo		w←			r?	r	The Product-Sector ICSs can specify stronger requirements. Employee details are essential for MIS. It is therefore highly recommended to include Employee Elements for devices that have one or more Operators.
JobDetails		w			r		
Brief		w←			r		With parent's Subscription/ @RepeatTime >60 and ≤ *600*
Full			w←			r	With parent's Subscription/ @RepeatTime >6000 and ≤ *10800*
JobID		w←			r		If the Query Message is in NodeInfo, *JobID* MUST be supplied.
JobPartID		w?			r		
QueueInfo		w?			r		
false		w			r		The Manager MUST NOT request a Queue, because there is no way to restrict the size of the returned Queue.

3.4.3 Query – Resource

Table 45: Query – Resource

Derived From: *Message*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Type		w			r		
Resource		w			r		
xsi:type		w			r?		
QueryResource		w			r		
ResourceQuParams		w			r		See Table 46: ResourceQuParams
Subscription		w←			r		A Manager MUST always supply this Element, if the Query Message is the only mechanism that it supports for establishing a persistent channel, See Table 47: Subscription

Table 46: ResourceQuParams

Referenced by: *Query – Resource*

Name or Value	Manager			Worker			Description
Level ➔	1	2	3	1	2	3	
Classes		w			r		
Consumable		w←			r		The Manager requests all Consumable Resources for the Worker's Device.
Handling		w←			r		The Manager requests all Handling resources from the Worker's Device.
JobID		w←			r		If the Query Message is in NodeInfo, *JobID* MUST be supplied.
JobPartID		w?			r		

3.4.4 Subscription Element

Table 47: Subscription

Referenced by: *Query – Status*, *Query – Resource*, *Query – NewJDF*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
RepeatTime		w?				r	For a Status Query. (This ICS does not specify a similar Attribute for a Resource Query or NewJDF Query). If not supplied for a Status Query, the Worker MUST assume a value less than 10800 seconds (3 hours)
<a number > 6000>		w←				r	If JMF/Query[@Type="Status"]/ StatusQuParams/@JobDetails= *"Full"*, the value of 10800 (i.e. 3 hours) is suggested.
<a number ≤ 6000>		w←				r	If JMF/Query[@Type= "Status"]/ StatusQuParams/@JobDetails =*"Brief"*, the value of 600 (i.e. 10 minutes) is suggested.
URL		w				r	URL of the persistent channel's receiving end.
http://...		w				r	URL whose scheme is "http"
all remaining values		!w			r?		

3.4.5 Command – StopPersistentChannel

Table 48: Command – StopPersistentChannel

Derived From: *Message*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ID			w			r	
Type			w			r	
StopPersistentChannel			w			r	
xsi:type			w			r?	
CommandStopPersistentChannel			w			r	
StopPersChParams			w			r	See Table 49: StopPersChParams

Table 49: StopPersChParams

Referenced by: *Command – StopPersistentChannel*

Name or Value	Manager			Worker			Description
Level ➜	1	2	3	1	2	3	
ChannelID		w?			r		The /JMF/Query/@ID in the Query Message that the Manager sent to create a Persistent Channel.
MessageType		w?			r		
Status		w←			r		
Response		w←			r		
DeviceID		w?			r		
URL		w?			r		URL of the receiver of the messages
http://...		w			r		URL whose scheme is "http"
all remaining values	!w			r?			

4   Job Submission

In the normal case, the MIS creates a Print Job and submits it to the production Device. In some cases, a production Device, such as a prepress Device, creates a Print Job. In this case, the Customer submits a content file for a Job that the MIS has not yet created. In other cases, the Device splits an existing Job into different production Jobs. In these cases where the MIS doesn't initially create a job, the **Device Worker** (the Worker part of a Device – see the Terminology section of [JDF 1.2] MUST ask the **MIS Manager** to create a Job and submit it to the Device Worker.

4.1   JDF Instance Structure

JDF Instances consist of Product, Process Group, and Process Nodes. A Product Node describes the final product the Customer will receive. The JDF Product Intent Resources define the characteristics of this final product.

JDF Product Nodes MUST contain Product Intent Resources. In other words, if the Intent cannot be described or is not available, the Root Node of the JDF Instance MUST be a Process or a Process Group. Product Intent Resources MUST only describe product characteristics that the Customer supplies. Product Intent resources MUST describe the Customer's view of a job. Intent Resources MUST NOT describe details of the production process of which the Customer has no knowledge (e.g. the individual printed sheets that make up the text of a brochure).

4.2   JDF Creation / Job(Part)ID assignment

In a MIS managed environment, only the MIS can assign *JobID*s. Sometimes, a Device requires a new *JobID* – for example, because a pre-press manager initiates the job. If so, the Device needs to ask the MIS for a new *JobID*. Table 22 defines the NewJDF Command Message that the Device Worker MUST use to ask the MIS Manager for a new *JobID*. In order to conform to Level 3 of this ICS, a Manager and Worker MUST support the NewJDF Command. If a NewJDF Command generates a completely new *JobID*, the NewJDF Command does not cause a job to be submitted to a Device. Therefore, the MIS Manager MUST perform a SubmitQueueEntry Command in order to submit this Job with the new *JobID* to the Device.

If a Device creates a new Node while it is expanding a "Gray Box", the Device MUST assign the *JobPartID*. See the *JobPartID* Attribute in the JDF Node table in *[Base-ICS]* for details on the algorithm for generating a *JobPartID*. To be compliant to Level 2 of this ICS, the Worker MUST, upon creating a new Node (and new *JobPartID*), send a NewJDF Signal to the Manager indicating this event if the Manager has created a Subscription for NewJDF. See Table 28: Signal – NewJDF. To be compliant with Level 3 of this ICS the Worker MUST also support the NewJDF Query so that the Manager can retrieve information about a an unknown Node for which it receives Signals. .See Table 41: Query – NewJDF. See the companion [MIS-AN] for more details.

5   JMF Messages

5.1   Goals

Within the scope of this ICS, the description is limited to the use of JMF Messages for the following main goals:

1. Job Tracking
2. Job Costing (limited)
3. Device monitoring and (utilization) analysis
4. Material consumption

See the companion [MIS-AN] for more details.

5.1.1   Job Tracking

The MIS has to generate the Job tracking information from the combination of the Attribute values in the DeviceInfo and JobPhase Elements. The companion [MIS-AN] shows a state transition diagram with the various state transitions that a Device can undergo with the appropriate settings for the DeviceInfo and JobPhase Attributes.

5.1.2   Job Costing

The MIS MAY generate the Job costing information from the combination of the Attribute values in the DeviceInfo and JobPhase Elements. However, there is no guarantee that the MIS will be provided with a complete set of messages. The communication between a Device and the MIS may be down for a period of time, for whatever reason. In such a situation, a Device MAY retry sending the messages.

Therefore, after a Device has completed a Job and returned the JDF Instance to the MIS, the MIS MAY interpret the AuditPool information in the JDF Instance to either create or update/modify the costing information that was gathered from previous JMF messages. The MIS may use business rules to limit updates and/or modifications to costing information.

5.1.3   Device Monitoring and Analysis

The MIS must generate the Device monitoring and analysis information from a combination of the Attribute values in the DeviceInfo and JobPhase Elements. The companion [MIS-AN] describes how to generate this information when a Device is executing a job and when a Device is not executing a job (i.e., non-productive mode).

Because non-productive time is not related any particular production job, non-productive time will not appear in the AuditPool information of any JDF Instances returned to the MIS. Therefore the MIS has to rely solely of the information retrieved from JMF Messages to create complete Device monitoring and analysis information.

5.1.4   Resource Consumption

A Device that, during the execution of a Node, consumes Resources of Class *Consumable* MUST notify the MIS by sending a JMF Signal Resource Message. See Table 38: Signal – Resource5.3.1 Persistent Channels).

5.2   When to send a Status Signal

A Device MUST send a JMF Status Signal to the MIS each time one of the Attributes of the previous Signal has changed, (see section 5.3.1 Persistent Channels).. These changes include (but are not limited to) a change in the:

- Status of a job,
- Part of the job that is being produced (either identified by *JobPartID* or potentially by Partition Key),
- Employee(s) operating the Device,
- Shift of the Employee(s) operating the Device,

If a Device sends Status Signals in response to a Subscription, the Device MUST honor the *RepeatTime* Attribute. See section 5.3.1 of this ICS for details for Subscriptions. It is up to the MIS to decide how to handle Status Signals that do not indicate a change in Status and/or Job. The MIS MAY merge the data from the intermediate Signals or ignore them all together.

The Status Signal indicates to the MIS the moment in time when a transition takes place, like the indication of the start of a new status. Please note that the JobPhase/@PhaseAmount and JobPhase/@PhaseWaste Attributes indicate the amount produced since the start of the Phase. Special attention is required for the transition between a JobPhase with production Amounts to a JobPhase without productions Amounts, such as from "Running" to "Stopped". For these transitions the Device MUST generate two Status Signals. The first one is a copy of the previous Signal, except for the values of JobPhase/@PhaseAmount and JobPhase/@PhaseWaste. In the second one, the Attributes are updated to show the new status of the Device. This will give MIS immediate feedback about the produced amounts in the closed Phase. See the companion [MIS-AN] for an example of a sequence of events.

5.2.1.1   Financial Period Costing / Analysis

The MIS cannot solely rely on the JMF Status Signals to produce complete and accurate costing of a job, but it has the requirement to provide (nearly) real-time costing and work-in-progress (WIP) information. Therefore, a Device MUST send, via a Status Signal, a "snapshot" JDF Instance with a AuditPool, at least once every 3 hour (for jobs that run for more than 3 hour). The AuditPool MUST be complete up to and including the current PhaseTime, however the current PhaseTime NEED NOT be complete and MAY continue after the snapshot. In other words, the PhaseTime/@End in the node's final AuditPool MAY be different from the PhaseTime/@*End* in the snapshot. See section 5.3.1 of this ICS for details. See Table 14 for details of the required AuditPool Element.

5.3   Subscriptions

5.3.1   Persistent Channels

To be compliant to Level 2 of this ICS Manager and Worker MUST be able to create a Persistent Channel via JMF Query Messages placed in the JDF Instance's /JDF/NodeInfo/JMF. To be compliant to Level 3 of this ICS, the Manager and Worker MUST be able to create a Persistent Channel via stand-alone JMF Query Messages via HTTP. A Level 3 Worker MUST support the StopPersistentChannel Message.

If a Level 2 Device does not implement an HTTP-server, the MIS MUST interpret repeated connection failures to indicate that the Device does not support JMF Messages via HTTP. If the Device implements an HTTP-server, but does not support JMF Messages, the Device MUST return a Response with @*ReturnCode* = 111 (Subscription request denied).

To be conformant to Level 3 of this ICS, the MIS MUST be able to send JMF Messages via HTTP and MAY be able to send Query Messages with Subscriptions via the JDF/NodeInfo/JMF Element. A Level 3 Device MUST be able to accept JMF Messages via HTTP and MUST be able to accept Query Messages with Subscriptions via the JDF/NodeInfo/JMF Element.

5.4 Transmission Protocol

Although the JDF 1.2 Specification allows the use of Hot Folders for JMF messaging, this ICS does not. HTTP MUST be used as the transmission protocol for JMF messages.

6 Returning JDF for completed Jobs

In a complete JDF workflow, the Manager that submits a JDF Instance to a queue will get back the JDF Instance when the processing of the JDF Instance on the Device has completed. The returned JDF Instance MUST contain information generated by the production Device. This information consists of

- AuditPool Element about the actual processing at the Device,
- Resource update information (for example quantities produced)
- Information required by subsequent Processes (for example Preview resources).

The MIS can use this information to update the status of the Job and to provide updated resource information to the next production Process for the job.

6.1 AuditPool in JDFs Returned to the MIS

The MIS MAY generate the Job costing information from the combination of the Attribute values in the DeviceInfo and JobPhase Elements of JMF Status Signals. However, there is no guarantee that the Device will provide the MIS with a complete set of Messages. For example, the communication between a Device and the MIS may be down for a period of time, for whatever reason. Therefore, the Device MUST write a complete AuditPool as defined in section 2.5.1of this ICS.

The MIS MAY interpret the AuditPool information in the JDF either to create the costing information or to update/modify the costing information that the MIS gathered from JMF messages

6.1.1 When to Close Audits

The Device MUST close an Audit (PhaseTime and ProcessRun) and start a new one each time one of the Attributes of the previous Audit has changed. These changes include (but are not limited to) a change in the:

- Status of a job,
- Part of the job that is being produced (either identified by *JobPartID* or by Partition Key),
- Employee(s) operating the Device,
- Shift of the Employee(s) operating the Device.

7 Normative References

[Base-ICS]   Base ICS, Version 1.0, draft published February, 2005. Available at: http://www.cip4.org.

[JDF1.2]   Job Definition Format (JDF), Version 1.2, published May 7, 2004, and "Errata", JDF Specification Release 1.2. Available at: http://www.cip4.org.

Appendix A: Additional Supported StatusDetails values

This Appendix contains additional *StatusDetails* values that can be supplied in JobPhase/@StatusDetails and PhaseTime/@StatusDetails. These error codes were not defined in JDF 1.2 but are *StatusDetails* values in ICS compliant applications.

Table 50: Additional Values of StatusDetails

StatusDetails	Description
Interrupted	The job has been lifted to make way for another job. Processing of this job will continue later

Appendix B: Additional Supported Error Codes in JMF and Notification elements

This Appendix contains additional error codes that can be supplied in JMF/Acknowledge/@ReturnCode or JMF/Response/@ReturnCode..

Table 51: Additional return codes for JMF

ReturnCode	Description
204	Could not create new JDF node.

Appendix C: Errata Revision A, 2006-02-09

The following section summarizes normative errata that were found after publication of the MIS ICS 1.0, 2005-1-29:

Location	Description
1. 2.1 Table 1	Added @Activation with w← for a JDF Instance that is a snapshot in a JobPhase.
2. 2.1 Table 1	ICS Tokens moved to corresponding level columns.
3. 2.1 Table 2	Employee Element changed from w to w← and added condition to description
4. 2.1 Table 6	Added "JDF Skeleton" to "Referenced by"
5. 2.1 Table 6	Added @CustomerOrderID
6. 2.1 Table 8	Updated description of @OrganizationName
7. 2.5.1 Table 16	Moved Conformance requirements for PhaseTime and ResourceAudit to Level 3
8. 2.6.1.3 Table 19	Removed @ContentsModified as it was completely optional
9. 3 Table 21	Moved Conformance for NewJDF Signal to level 2
10. 3.1.1 Table 24	Updated reference to table 24 for IDInfo element
11. 3.1.1 Table 24	Removed ParentJobID
12. 3.1.1 Table 24	Change title to reflect that IDInfo is in the NewJDF Command
13. 3.1.1 Table 25	Change title to reflect that IDInfo is in the NewJDF Command
14. 3.1.2 Table 26	Updated description for IDInfo elemement
15. 3.1.2 Table 27	Updated title to reflect that IDInfo in in NewJDF Response
16. 3.1.2 Table 27	Removed @ParentJobID
17. 3.1.2 Table 27	Added @ParentJobPartID
18. 3.1.2 Table 27	Updated description for JDF Element
19. 3.2.1 Table 28	Changed Table 28 to become NewJDF Signal
20. 3.2.1 Table 28a	Added Table 28a for IDInfo – NewJDF Signal
21. 3.2.2 Table 30	Updated description for JobPhase element
22. 3.2.2 Table 33	Updated description for JDF element
23. 3.3	Updated last paragraph to reflect information that was moved to Base ICS
24. 3.3.1 Table 40	Updated description for IDInfo element
25. 3.4.1 Table 41	Moved conformance to level 3
26. 3.4.2 Table 44	Moved @JobDetails="Full" to level 3
27. 4.2	Last paragraph "can" changed to "MUST" and "Level 3" to "Level 2"

Location	Description
28. 5.1.4	Changed "type" to "Class"
29. 5.2	Changed "needs to" to "MUST". Added "Status" before "Signal". Removed "hard wired"