

MIS Workgroup

MIS Base ICS - Application Notes

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1 Introduction

This document is a companion to the MIS Base ICS document. The ICS document only contains information that is normative for the interface between the MIS and the Device. This document provides additional information that is NOT normative but illustrative and explanatory.

1.1 The position of the MIS

The MIS play 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). This results in two major interfaces with the MIS. Firstly the interface between the print shop's customers and the MIS and secondly the interface between the MIS and the print shop's production facilities. In both interfaces JDF plays a major role. The first interface consist primarily JDF product Intent, the second interface consists primarily JDF Process definitions.

The MIS ICSes describe the second interface, the first interface is subject of the separate "Product Description" (e-commerce) ICS. This is why in this document there where Product Intent nodes are defined, only the values for the "Actual" attribute are described.

The MIS Base ICS document defines the generic parts of the interface between MIS and production Controllers and Devices. The MIS base ICS includes the definitions of JDF elements that are not specific to either Pre-Press, Press or Post-Press; AuditPool elements for job costing and the definition of the use of JMF messages for Job Tracking and Device utilization statistics. Definitions that are specific to either Pre-Press, Press and Post-Press are described in separate sector specific Domain ICS documents.

The MIS base ICS describes the data flow in a print shop in a MIS-managed environment. This data flow does not necessarily also applies to non-MIS-managed environments.

1.2 Reference Model

Figure 1 shows a complete reference model of the interfaces between Customer, Print shop and Production facilities. It is considered to be complete as it shows the communication of Product Intent from the customer to the print shop by means of JDF. As stated before, the MIS Base ICS describes the interfaces to the right hand side of the box labeled "Base MIS".

1.2.1 Explanation of figures used in diagram

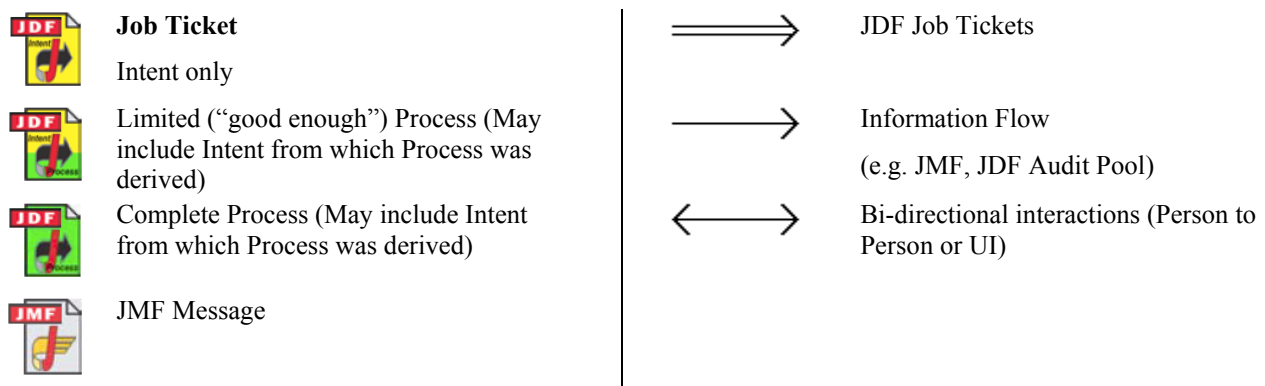
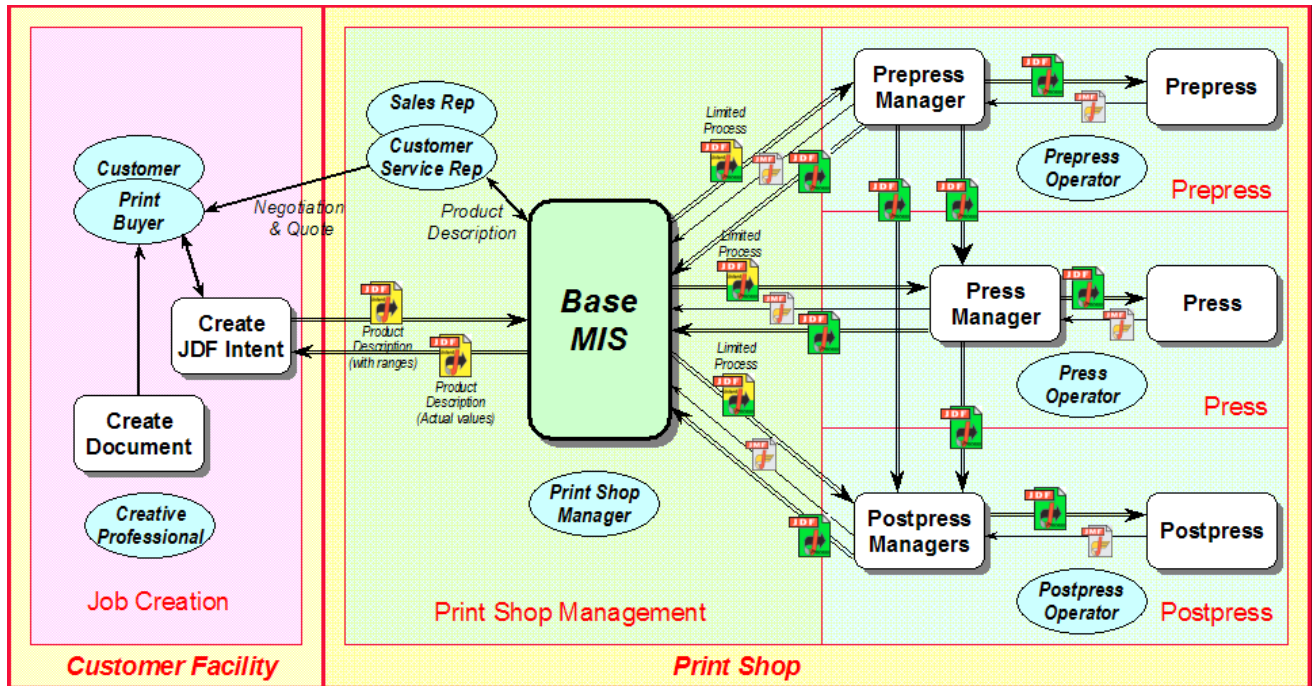


Figure 1 Complete Reference Model



Note that although the lines between the Customer and the MIS boxes carry the JDF icons, the JDF is actually the payload inside a Printtalk transaction, see [JDF] 4.1.2

1.2.2 JDF flow via MIS versus direct between Devices

In most cases the initial JDF ticket is created and submitted by the MIS. In each step of production Devices generate information that is required by subsequent Processes. This applies, for example, to Cutting and Folding information generated by Pre-Press systems, but also to Preview information generated by Pre-Press that is required by Printing Processes.

This information can flow in two ways: 1) From the generating Device back to the MIS, from where it is transmitted to the receiving Device; or 2) Direct from the generating Device to the receiving Device. The lines between the various production managers in the diagram above shows this direct Device to Device interaction.

2 Device initiated job creation

In a MIS managed environment only the MIS can assign JobIDs and JobPartIDs. If a Device requires a new JobId and/or JobPartID, the Device needs to ask the MIS for a new JobID and/or JobPartID. Figure 2 shows the sequence of messages between the Device and the MIS in order to create a new JDF with a new JobID.

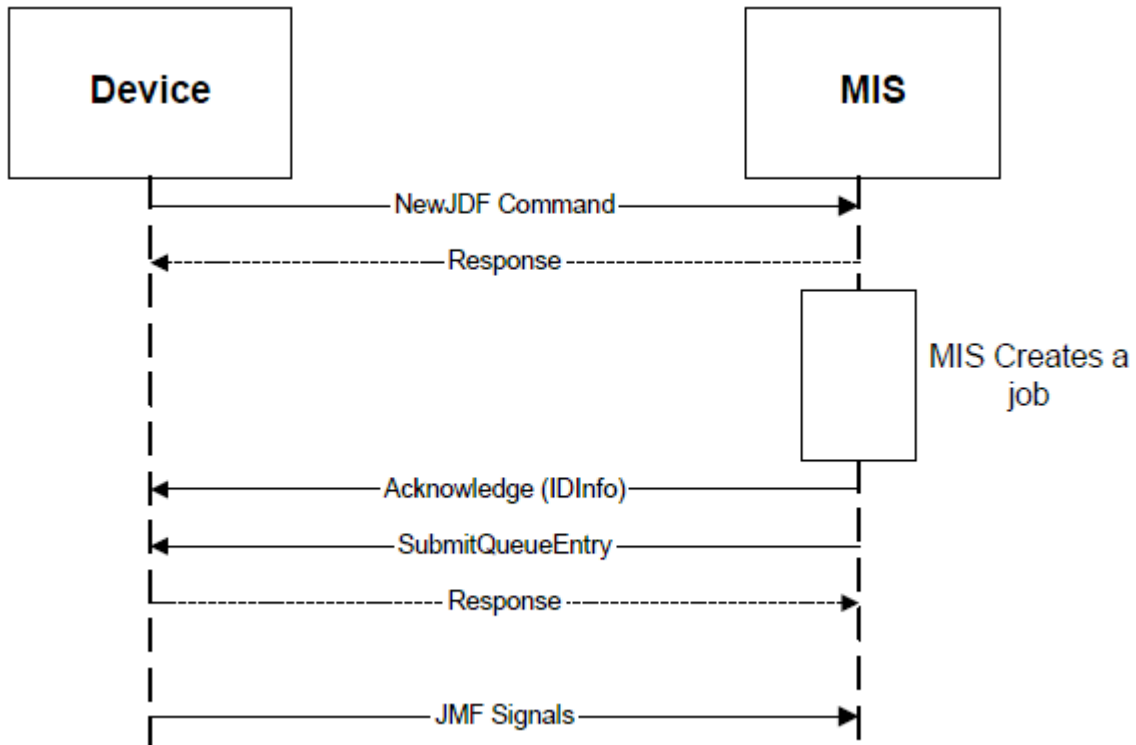


Figure 2 Sequence of events to request a new Job(Part)ID

3 JMF Messages

3.1 Goals

JMF messages can be used to achieve many different 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

These goals are complementary. The information required for job tracking and costing is a sub-set of the information required for Device monitoring and analysis. For Job tracking and costing only messages related to production jobs are of interest. This is commonly referred to as “productive time” and can also be retrieved from JDF AuditPool information. For Device monitoring and analysis messages about all state transitions of a Device are important. This includes messages about production jobs, but also messages about periods of time a Device is not working on production jobs. This time is commonly referred to as “non-productive time” and cannot be retrieved from JDF AuditPool information. From the MIS perspective information about productive time and non-productive time are equally important.

4 Subscriptions

From [JDF] Section 5.2.1.3: *Controllers can get signal messages in one of three ways. The first way is to subscribe for them with an initiating query transmitted via a message channel that includes a Subscription element. The second way is to subscribe for them with an initiating query defined in the NodeInfo element of a JDF node that also includes a Subscription element. The first query is transmitted separately via HTTP, whereas the second is read together with the corresponding JDF node. Once the subscription has been established, signals are sent to the subscribing controllers via persistent channels. In both cases, however, the Signal message contains a refID attribute that refers to the persistent channel. The value of the refID attribute identifies the persistent channel that initiated the Signal.*

The third way in which a controller may receive a signal is to have the signal channels hard-wired, for example, by a tool such as a list of controller-URLs read from an initialization file. Hard-wired signals, however, must not have a refID attribute. If no refID is specified, the corresponding query parameters must be specified instead.

The default behavior of Level 2 Devices is the “third way” described above, and hard-wire the one or more URLs of the MIS. These hard-wired Subscriptions are to be interpreted as 3 Subscriptions with the Attributes set at shown in Table 1, Table 2 and Table 3. If a Device does not consume and Resources of type Consumable the third Subscription can be ignored. Hard-wired Subscriptions cannot be stopped by the MIS by sending a StopPersistentChannel message, as the MIS does not know the ID of the persistent channel (it may not be returned in the refID attribute of the Signal).

Table 1 – First hard-wired Subscription

Attribute or Element	Notes	Value
Query	This Subscription requests a Status message without a full JDF snapshot at least every ten minutes	
@ID		ChannelID001
@Type		Status
@xsi:type		QueryStatus
Query/ StatusQuParams		
@DeviceDetails		Details
@EmployeeInfo		true
@JobDetails		Brief
@QueueInfo		false
Query/ Subscription		
@RepeatTime		600
@URL		http://mis/jmf

Table 2 – Second hard-wired Subscription

Attribute or Element	Notes	Value
Query	This Subscription requests a full JDF snapshot to be included in the JobPhase element of the Status message at least every hour (if the job runs for more than one hour and is not completed)	
@ID		ChannelID002
@Type		Status
@xsi:type		QueryStatus
Query/ StatusQuParams		

Attribute or Element	Notes	Value
@DeviceDetails		Details
@EmployeeInfo		true
@JobDetails		Full
@QueueInfo		false
Query/ Subscription		
@RepeatTime		3600
@URL		http://mis/jmf

Table 3 – Third hard-wired Subscription

Attribute or Element	Notes	Value
Query	This Subscription requests Resource messages for the consumption of Consumable Resources.	
@ID		ChannelID003
@Type		Status
@xsi:type		QueryResource
Query/ ResourceQuParams		
@Classes		Consumable
Query/ Subscription		
@URL		http://mis/jmf

4.1.1 Subscriptions in JDF Tickets

The MIS MAY add Subscription messages in the NodeInfo of a JDF ticket, for itself or for other Controllers. The MIS base ICS does not describe this method of Subscription and it is therefore completely optional. Note that sector specific ICS documents MAY require such Subscriptions to facilitate communication between workflow components.

5 Status Transition Table for JMF Signals

The table in this appendix shows how the Status, StatusDetails and DeviceOperationMode Attributes are set on status transitions of a Device. The first column shows the status that is transitioned to.

The DeviceOperationMode is an enumeration with 3 values “Productive”, “NonProductive” and “Maintenance”, the default is “Productive”. The definitions of these values are:

- Productive The Device is processing (with the intention to create good product) and Job or is available to process a job.
- NonProductive The Device is not available to process a job. This can be due to breakdown, repair, waiting for something or somebody, etc. Note that in this mode a Job might be loaded on the device and production might take place, however not with the intention to produce good product, but purely for testing the Device
- Maintenance The Device is not available to process a job due to preventative maintenance taking place.

Changes to the DeviceOperationMode normally require operator input on the device. There is 1 exception, directly after the power on of a Device there might be some period where the Device is not available for production, due to initialization and or warm up. During this time the Devive can automatically set the DeviceOperationMode to “NonProductive”. As soon as the Device becomes available for production (comes on-line) the DeviceOperationMode can automatically change to “Productive”.

Table 4 – Status Transition Table

Action		DeviceInfo		JobPhase	
		Status	StatusDetails	Status	StatusDetails
	Initial Status: Device is switched off	-	-	-	-
1	Power On				
2	Initialisation / Warm Up			-	-
3	On Line / Ready	Stopped		-	-
		Running	Waste		
		SetUp			
		CleanUp			
4	Load Job	Setup	...	SetUp	...
5	First Good Counter ON	Running	Good	InProgress	Good
6	Good OFF	Running	Waste	InProgress	Waste
7	Good ON	Running	Good	InProgress	Good
8	Stop (manual or machine detected)	Stopped → Stop > Timeout X minutes	Reason if machine detected; or Manual reason entry	InProgress Stopped	Good Reason
9	Modus Change: manual selection of DeviceOperationMode	OperationMode		OperationMode	

		P	N	M		P	N	M	
10	Restart CleanUp SetUp	Running CleanUp SetUp	Running CleanUp SetUp	Running CleanUp SetUp		InProgress CleanUp SetUp	Stopped Stopped Stopped	Stopped Stopped Stopped	
11	Manual Change: Back to “Productive” mode	Setup			...	Setup			...
12	WashUp (program)	CleanUp			Blanket	CleanUp			
13	Shift End: Stop manual	Stopped → Stop > Timeout X minutes				InProgress Stopped			Good ...
14	Job Interrupted	Idle				Stopped			
15	“DayShiftEnd” Key	CleanUp Running				Stopped			
16	“ShutDown” key	Down				Stopped			
17	Power On	Idle				Stopped			
18	Restart Job	SetUp Continue at 3				SetUp			
19	Good sheet on	Running			Good	InProgress			Good
20	Job Finished	Idle				Completed			

Notes:

1. Device is powered on. Depending on the type of device it might go into a initialization phase (row 2) or become available immediately (row3)
2. Device is in initialization phase. This can for example be a warm up cycle, during which the Device is not available for production. During this phase the DeviceOperationMode MUST be “NonProductive”. As no Job has been loaded yet, there is on JobPhase associated with this row.
3. Device has become available for production, but no job has been loaded. During this phase any use or movement of the Device is reflected in the DeviceInfo Status(Details) attributes. As no Job has been loaded yet, there is on JobPhase associated with this row.
4. A Job has been loaded for production. This can be a manual action by the operator (selecting a job on the UI of the machine) or an automatic action (Device selects first job from the queue). It is assumed that in many cases there will be a (how ever short) Setup period, this is reflected in the DeviceInfo Status Attribute. As a Job is now loaded a JobPhase element can be associated with this row. During the setup phase different values of the StatusDetails Attribute might become appropriate.
Note: Devices may not have a Setup phase, in that case the Status is set as shown in row 5 immediately
5. On devices that have a good copy counters, the first time this good copy counter is switched on, the Setup phase is deemed to be ended and the Running Phase started.
6. The good copy counter has been switched off but the device is still running
7. The good copy counter has been switched back on.
8. Device stops either for a machine-induced reason or by Operator intervention. The DeviceInfo reflects this change immediately, however the JobPhase will remain unchanged until a (locally configured) timeout has passed. In the Device restarts this is reflected in the DeviceInfo immediately. If the Device restarts within the timeout the stop will not be reflected in the JobPhase. This is to allow a MIS to ignore the many very short production interruptions that occur on some types of production Devices.

9. The Device has stopped, the Operator can now manually select a different DeviceOperationMode. The principal difference between the DeviceOperationMode “Productive” on the one hand and “NonProductive” and “Maintenance” on the other is that in the first case the JobPhase Status(Details) Attributes follow changes in the DeviceInfo Attributes and in the latter case the JobPhase Status(Details) Attributes remain indicating a “Stopped” status for the Job.
10. Machine is operated during in the different DeviceOperationModes.
11. DeviceOperationMode is manually set back to “Productive”, normal operation resumes
12. Production running has stopped and Device is performing a cleaning operation that is considered to be part of the productive time of the Job.
13. The end of shift/working day without the job being completed. The Running phase is stopped and the rules regarding the timeout come into operation as before.
14. The Operator enters manually that the time that needs to be recorded against the job must end.
15. The Operator enters manually that some “end of day” work is being performed (for example cleaning the Device).
16. The Operator enters manually that the Device is about to be powered down (as the Device will be unable to do so itself when there is no power...)
17. At the start of the next shift/working day the machine is powered back on (see 1)
18. The Operator selects a job that has previously been in production.
19. Next Running phase (see 5)
20. The Operator enters manually that the job is completed.

6 Amount handling

The table below shows a sequence of JMF messages that shows how JobPhases should be created.

JMF TimeStamp	StartTime	PhaseStartTime	Amount	Waste	PhaseAmount	PhaseWaste	Status
20:01	20:00	20:00	0	0	0	0	Setup
20:01	20:00	20:00	0	20	0	20	Setup
20:06	20:00	20:05	0	20	0	0	Running
20:11	20:00	20:05	133	33	133	13	Running
20:16	20:00	20:15	133	33	0	0	Cleanup
20:21	20:00	20:20	133	33	0	0	Setup
20:21	20:00	20:20	133	53	0	20	Setup
20:26	20:00	20:25	133	53	0	0	Running
20:31	20:00	20:25	254	65	121	12	Running
20:36	20:00	20:35	254	65	0	0	Cleanup
20:41	20:00	20:40	254	65	0	0	Setup
20:41	20:00	20:40	254	85	0	20	Setup
20:46	20:00	20:45	254	85	0	0	Running
20:51	20:00	20:45	364	96	110	11	Running
20:56	20:00	20:55	364	96	0	0	Cleanup
21:01	20:00	21:00	364	96	0	0	Setup
21:01	20:00	21:00	364	116	0	20	Setup
21:06	20:00	21:05	364	116	0	0	Running
21:11	20:00	21:05	464	126	100	10	Running
21:16	20:00	21:15	464	126	0	0	Cleanup
21:21	20:00	21:20	464	126	0	0	Stopped
					464	126	