MIS ICS 2.1
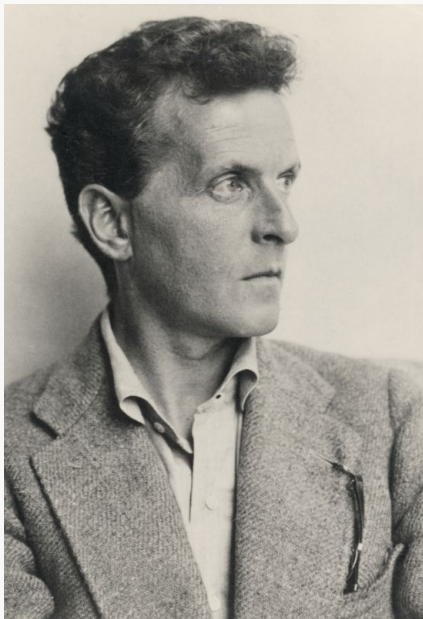
Management Information System ICS 2.1

Towards universal interfaces for productivity and print quality

"The limits of my language means the limits of my world."

(Ludwig Wittgenstein)

Ludwig Josef Johann Wittgenstein (1889 – 1951) was an Austrian-British philosopher who worked primarily in logic, the philosophy of mathematics, the philosophy of mind, and the philosophy of language. He is considered by some to be the greatest philosopher of the 20th century. *(wikipedia.org)*

What is the MIS ICS ?

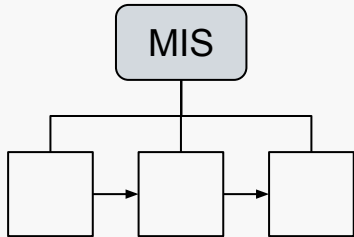Why the MIS ICS is fundamental for the printing industry?

MIS ICS 2.1

What is an MIS ICS 2.1?

The **M**anagement **I**nformation **S**ystem **I**nteroperability **C**onformance **S**pecification (MIS ICS) standardizes the base communication between production devices and the MIS.
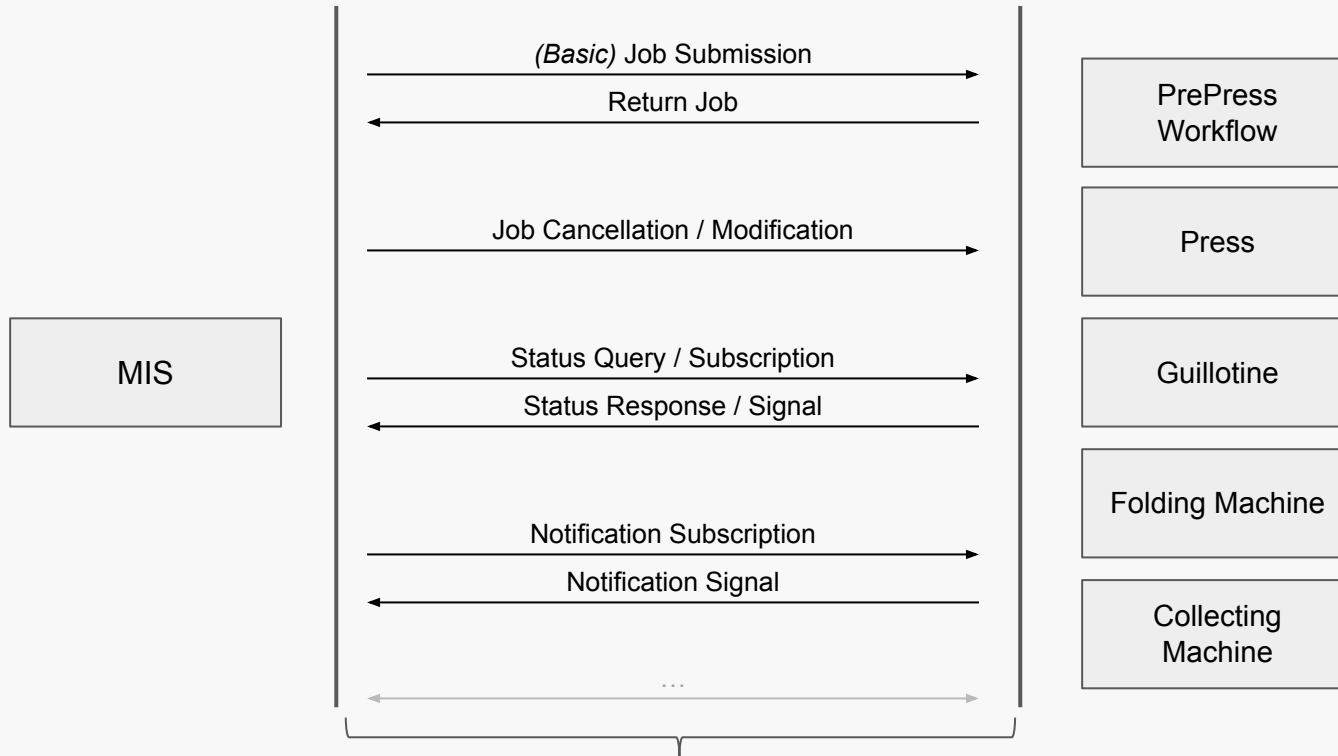
The version number '2.1' relates to the version of the XJDF Specification the ICS Document applies to.

⇒ **The MIS ICS specifies the common denominator of the prepress, press, and postpress devices integration.**

MIS ICS - Interactions

What are the interactions covered by the MIS ICS?

MIS

(Basic) Job Submission →

Return Job ←

Job Cancellation / Modification →

Status Query / Subscription →

Status Response / Signal ←

Notification Subscription →

Notification Signal ←

…

PrePress Workflow

Press

Guillotine

Folding Machine

Collecting Machine

CIP4 Standard-Interfaces
*(definiert im **MIS ICS**)*

Our Goal:

⇒ We want ONE approach to connect to
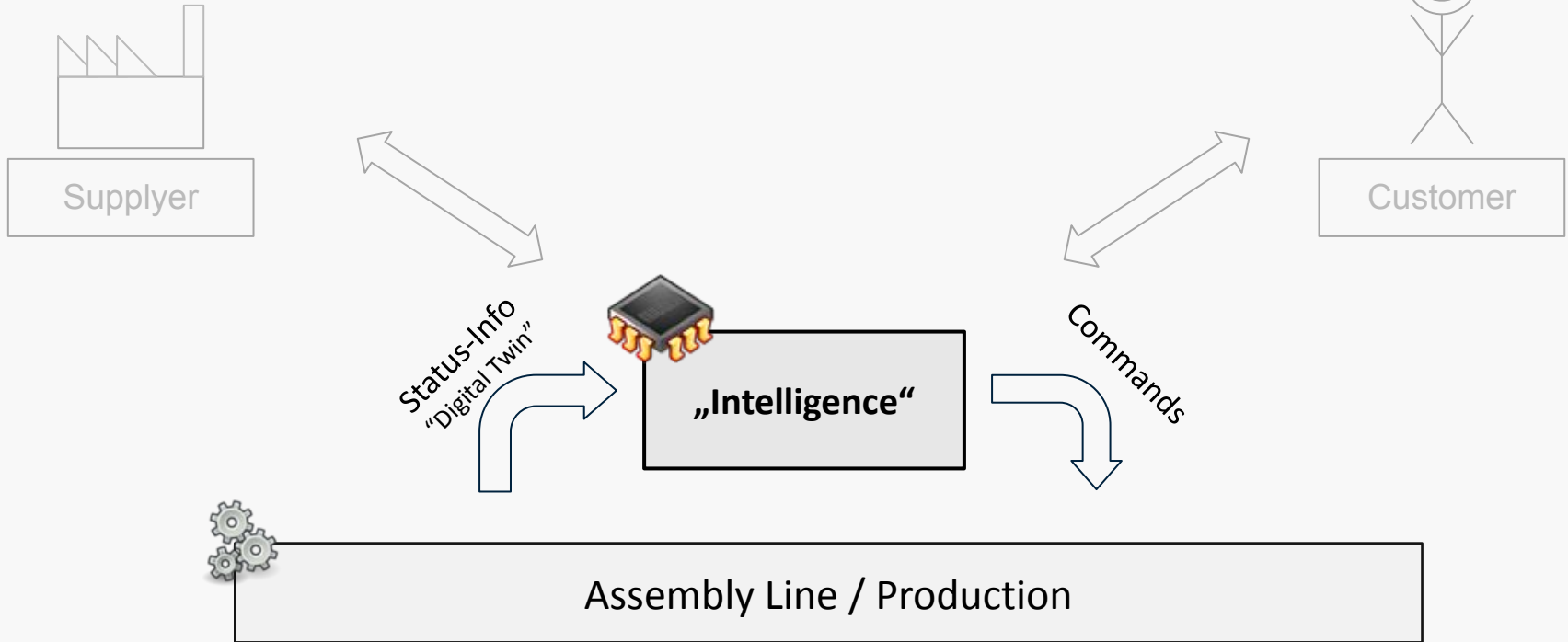
ALL types of Devices

- vendor and version independent.

Why XJDF ?

The advantage of open industry standards

Smart Factory

A simplified, abstract IT system architecture

Supplyer

Customer

Status-Info
"Digital Twin"

Commands

"Intelligence"

Assembly Line / Production

8

Interfaces

Interfaces are the backbone of a Smart Factory

- Acquisition of Production Data *(Monitoring)*
  (product data, quality data, process data => digital twin)

- Integration of Assembly Lines *(Automation)*
  (Process integration and -automation)

- Integration of Suppliers
  (Continuous replenishment)

- Integration of Customers
  (Status update, quality reports, etc.)

⇒ **Interfaces play a fundamental role in a Smart Factory**

Interface Interior

What are the core components of an **<u>INTERFACE</u>**?

Medium

Protocol
http, https, ftp,
REST, SOAP, RPC,
XML, JSON, etc.

+

Information

Data Model
(Structured Data / Data Container)

⇒ The Medium can be changed easily (*using converters)*
⇒ **The Data Model is the KEY**

Author: Stefan Meissner
Version: 2022-07-06

Requirements to a Data Model

What are the design criteria to define a sustainable data model?

Information

Data Model

(Structured Data / Data Container)

- High Stability

  (all changes/updates SHALL be backward compatible)

- Unambiguity

  (exactly one method to define the same 'thing')

- Extensibility

  (The possibility to introduce new features without breaking the upper both requirements)

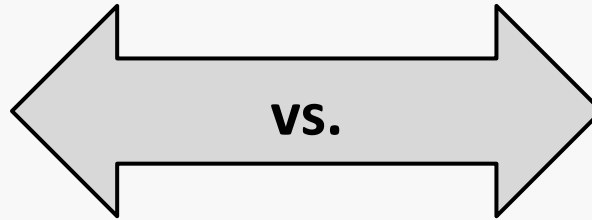⇒ **A sustainable data model is the basis for a long-term interface**

Development of sustainable data models?

How do we develop a sustainable data model for interfaces?

Agility

vs.

Stability

Scope: Max 6 months

Team Level

Scope: 10 Years and more

Enterprise Level

⇒ **PROBLEM: How to develop a long-term data model in an agile environment?**

Solution: Open Standards

Open Standards bring Agility and Stability together.

Open Standards...

- are developed upon long-term and cross-industrial expert discussions

- define a broad area of detail in the correct level of granularity

- are highly stable and extensible, as the data model has existed for a long time

⇒ **Keep the data structure and remove everything not (yet) needed**

⇒ **Re-introduced removed parts when required**

Side-Benefit: Unified Domain Language

XJDF is the Open Standard for the Printing Industry

⇒ **more details on https://cip4.org**

CIP4 Organization

What is the CIP4 Organization?

The CIP4 Organization is a not-for-profit standards association whose mission is to foster the adoption of process automation in the printing industry.

- Founded in 2000 (as the successor of CIP3)

- Over 300 member companies from 31 countries

- Members are Printers, Prepress Companies, Publisher, Consultants, Universities, Vendors of Hard- and Software.

XJDF - Exchange Job Definition Format

Exchange Job Definition Format (XJDF) is a major update of JDF 1.x (Job Definition Format)

and can also be called JDF 2.0. Here are some (significant) optimizations coming with XJDF:

- Simplification and adaptation to today's MIS implementations
  XJDF is no longer a digital job ticket but a data interchange format

- Streamlining with standard XML tools and- paradigms
  Elimination of JDF-specific XML behavior such as inheritance of content

- Extension of the integration scope
  XJDF is no longer restricted to internal communication. XJDF can also be used for the
  cross-company communication and the integration of online platforms.

XJDF vs PDF

Artwork (PDF)

Example:

Product- / Job metadata (XJDF)

Example:
- Amount- *(1.500 copies)*
- Substrate- *(135 g/m² glossy)*
- Production Time - *(3 days)*
- Delivery Address
- ...

⇒ **The PDF describes the artwork while XJDF specifies the metadata.**

Source PDF Icon: https://commons.wikimedia.org/wiki/File:PDF_icon.svg

ICS Document vs. XJDF Specification

What is the difference between ICS Documents and Specifications?

An ICS Document specifies a set of interfaces (such as MIS to Conventional Printing ICS), while the XJDF Specification focus on the common domain language, the overall data model, its entities, and interrelations.

XJDF Specification

ICS Document

"List of all Ingredients"
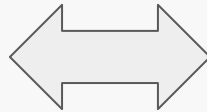
"Recipe for Pizza, Pasta, Antipasti,..."

Author: Stefan Meissner
Version: 2022-07-06

Common misconception:

⇒ A system is NEVER compatible with JDF/XJDF

but to a specific ICS.

* When you buy new JDF/XJDF equipment next time, don't ask for

JDF/XJDF compatibility but ICS compatibility.

Overview JDF ICS Documents

Here is an overview of ICS Documents in the context of JDF

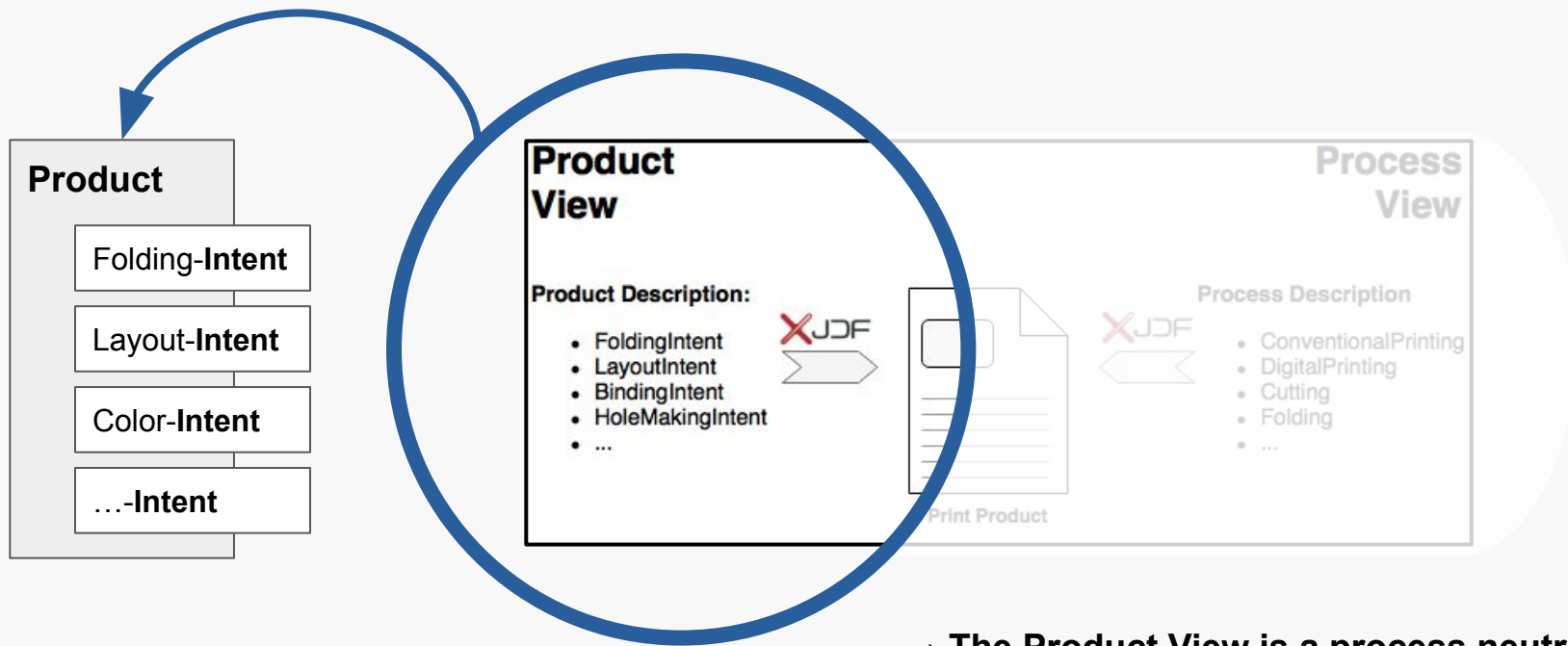| ICS Document Name	Description
Base ICS	First document in a series of ICS documents.
Binding ICS	Requirements for Saddle Stitching, Soft-cover and Hardcover Binding.
Common Metadata for Document Production Workflow ICS	Standardized metadata embedded in structured PDL data.
Customer to MIS ICS	Use of PrintTalk and JDF to convey customers requirements to a print provider
Integrated Digital Printing ICS	Integrated Digital Printing (IDP)
JMF ICS	Communication using JMF
Layout Creator to Imposition ICS	Interface between a layout creation tool and a Consumer
MIS ICS	Interoperability between MIS and production equipment
MIS to Conventional Printing ICS	**Requirements for JDF Sheet-Fed Offset Printing**
MIS to Finishing ICS	Interface between the MIS and a Postpress Controller
MIS to PrePress ICS	Connect an MIS system to a prepress system
MIS to WebPress ICS - Commercial Web	Requirements for JDF Commercial WebPrinting
MIS to WebPress ICS - Newspaper	Requirements for JDF NewsPrinting
Office Digital Printing ICS	Digital Printing
Prepress to Conventional Printing ICS	Interface between a Prepress and Conventional Printing
Wide Format Printing ICS	**Wide Format Printing**

XJDF Data Model

One approach to fit most products

XJDF Product View

The XJDF Product View specifies the final product from customers perspective - What can be distinguished on the final product.

Product

- Folding-**Intent**
- Layout-**Intent**
- Color-**Intent**
- …-**Intent**

Product View

Product Description:
- FoldingIntent
- LayoutIntent
- BindingIntent
- HoleMakingIntent
- …

Print Product

Process View

Process Description
- ConventionalPrinting
- DigitalPrinting
- Cutting
- Folding
- …

→ **The Product View is a process neutral description of the final print products.**

Example: Flyer

Flyer Klassiker

Menge:
1.000 Stk.

Produktdetails
4/4-farbig (beidseitiger Druck, CMYK)

Format
DIN A6 (10,5 x 14,8 cm)

Material
135g Bilderdruck glänzend

```xml
<xjdf:Product Amount="1000">
    <xjdf:Intent Name="ColorIntent">
        <xjdf:ColorIntent>
            <xjdf:SurfaceColor ColorsUsed="Cyan Magenta Yellow Black"
                Surface="Front" PrintStandard="FOGRA51"/>
            <xjdf:SurfaceColor ColorsUsed="Cyan Magenta Yellow Black"
                Surface="Back" PrintStandard="FOGRA51"/>
        </xjdf:ColorIntent>
    </xjdf:Intent>
    <xjdf:Intent Name="LayoutIntent">
        <xjdf:LayoutIntent Dimensions="297.64 419.53"
            Sides="TwoSidedHeadToHead" Pages="2" />
    </xjdf:Intent>
    <xjdf:Intent Name="MediaIntent">
        <xjdf:MediaIntent MediaQuality="135_GLOSSY"/>
    </xjdf:Intent>
</xjdf:Product>
```
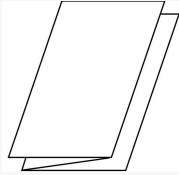
Example: Folded Leaflet

Step 2: After a while, the company also decides to sell folded leaflets…

Product Spec:

750 Folded Leaflets (6-Panels)

DIN Long (9.9 cm x 21.0 cm)

Zig-Zag fold

full colored both sides

135 gsm matt paper

```xml
<xjdf:Product Amount="750" DescriptiveName="Folded Leaflet 6-Panels">
    <xjdf:Intent Name="LayoutIntent">
        <xjdf:LayoutIntent Dimensions="841.89 595.28" Sides="TwoSidedHeadToHead"
            FinishedDimensions="280.63 595.28 0.0" Pages="2" />
    </xjdf:Intent>
    <xjdf:Intent Name="FoldingIntent">
        <xjdf:FoldingIntent FoldCatalog="F6-2"/>
    </xjdf:Intent>
    <xjdf:Intent Name="ColorIntent">
        <xjdf:ColorIntent>
            <xjdf:SurfaceColor ColorsUsed="Cyan Magenta Yellow Black"
                Surface="Front" PrintStandard="FOGRA51"/>
            <xjdf:SurfaceColor ColorsUsed="Cyan Magenta Yellow Black"
                Surface="Back"  PrintStandard="FOGRA51"/>
        </xjdf:ColorIntent>
    </xjdf:Intent>
    <xjdf:Intent Name="MediaIntent">
        <xjdf:MediaIntent MediaQuality="135_MATT"/>
    </xjdf:Intent>
</xjdf:Product>
```
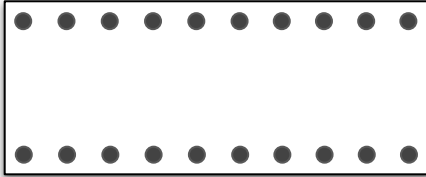
Example: Banner with Grommets

Step 3: Next, the company extends its product portfolio to banners…

Product Spec:

10 Banners with Grommets

200 cm x 100 cm

full colored on front side

2 x 10 Grommets (top and bottom)

PVC Substrate

```xml
<xjdf:Product Amount="10" DescriptiveName="Banner with Grommets">
    <xjdf:Intent Name="LayoutIntent">
        <xjdf:LayoutIntent FinishedDimensions="5669.29 2834.65 0.0"  Pages="2" Sides="OneSided" />
    </xjdf:Intent>
    <xjdf:Intent Name="HoleMakingIntent">
        <xjdf:HoleMakingIntent>
            <xjdf:HolePattern Center="141.73 2692.91" Extent="56.69 0.0" Shape="Round"
                    Pitch="283.46 0.0" HoleCount="10" Reinforcement="Grommet" />
            <xjdf:HolePattern Center="141.73 141.73" Extent="56.69 0.0" Shape="Round"
                    Pitch="283.46 0.0" HoleCount="10" Reinforcement="Grommet" />
        </xjdf:HoleMakingIntent>
    </xjdf:Intent>
    <xjdf:Intent Name="ColorIntent">
        <xjdf:ColorIntent>
            <xjdf:SurfaceColor ColorsUsed="Cyan Magenta Yellow Black"
                    Surface="Front" PrintStandard="FOGRA51"/>
        </xjdf:ColorIntent>
    </xjdf:Intent>
    <xjdf:Intent Name="MediaIntent">
        <xjdf:MediaIntent MediaQuality="500_PVC"/>
    </xjdf:Intent>
</xjdf:Product>
```

The power of XJDF:

⇒ XJDF provides you with a sustainable data model,

enabling you to specify print products

highly accurately.

Ludwig Wittgenstein
(1889 – 1951)

Data model from a philosophical perspective:

⇒ **The limits of my data model means the limits**

of my automation capabilities.

More Information

Here you can find more information about XJDF Product Description

Image: XJDF Specification - Chapter Product Intent

XJDF Specification

https://confluence.cip4.org/display/PUB/XJDF

Chapter 4:
Product Intent

XJDF Book

http://ricebean.net/xjdf

Chapter:
Product Description

Author: Stefan Meissner
Version: 2022-07-06

Thank you.