

The calibrate
Prepress Coach

Radix Project

Requirements for networking



RADIX
Print 4.0 made easy

PART 1
Radix Map

PART 2
Radix Project

PART 3
Radix Preflight

PART 4
Radix Translate

PART 5
Radix Prepare

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As a service provider, calibrate Workflow-Consulting GmbH implements the automated process for the production of printed and electronic media worldwide. Radix is calibrate's modular product package consisting of services and software. The focus is on the automation of processes. Here, the focus is on security in the reconciliation of production data with the metadata for production. The goal is digitization – Print 4.0 made easy.

The calibrate Prepress Coach consists of five parts. In Part 2, „Radix Project – Requirements for networking“, we look at the prerequisites you need to create for networking.

Management Summary

Digitalisation has drastically changed many operational processes. Within the various processes, digitization enables a significant increase in efficiency and therefore there is no doubt that an improvement in profitability is possible.

Now that digitalisation is a part of daily life for each of us, we consider communication between systems to be a foregone conclusion. Digital networking improves collaboration and creates transparency across company borders. The value chain can thus start with the customer and firmly anchor one's own company in the purchasing or marketing department by means of a web store or upload portal. Digitalization can achieve a lot, but it cannot be taken for granted.

With all the technical and social factors, communication is one of the major issues and a consistent choice of words is essential. Every company has its „own language“ that evolves over time. Effective communication can be very difficult if a common agreement on terms used cannot be reached. This situation is exacerbated when multiple languages are spoken within the company.

What data are we talking about? Which systems are involved in the networking between customer and production? What are the differences between an open production database and a standard production workflow? How do you go about integrating it into existing software in your company? We will answer these questions and will not leave you to network on your own.



Fig. 1: If the value chain starts with the customer, one's own company can be firmly established in the purchasing or marketing department by means of a web store or upload portal.

Introduction

There is virtually no company in the printing industry that is not considering or has not considered networking or is looking at improvements to the first generations of web stores or upload portals. The goal of high automation cannot be achieved with standard solutions alone.

In this white paper, you will learn about the prerequisites that play a role in the production of print media. What is the required metadata? Which systems need

to communicate with each other, and for which companies is it worth the effort?

It is important for any kind of communication to have a language that is as consistent as possible and – if necessary – a good translation. The calibrate Prepress Coach provides a basis. The first part of the white paper deals with terminology and is the basis for further discussions.

What data do we need for networking?

Strictly speaking, data is merely information that is processed by a computer. This can occur in varying ways (receiving, copying, editing, saving, sending). In the case of print production, the initial creation of the data is usually the responsibility of different people. Whether they are media designers, clerks, or employees in the computer-to-plate (CtP) department and at the printing presses, they each understand something different when they „expect“ data. Thus, let's first clarify these terms.

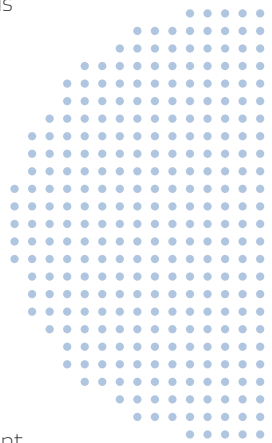
Metadata

Metadata is the term used to describe additional, structured information pertaining to a file. In this sense, the information in a print job is metadata. This information is used, for example, to print a running bag or to make an electronic running bag available. In order to process print data automatically, the print data and the associated metadata (= data of a specific job item) must be consolidated as early as possible. The aim of automation is to process the print data according to the requirements defined in the metadata.

Validated metadata is therefore a basic requirement for automated processing. To ensure that metadata is understood by the systems involved, it is essential to agree on a common standard such as xJDF (Exchange Job Definition Format).

Print data (PDF)

Print data refers to the designed pages or layouts of a product that must meet the requirements of the print job before they are delivered. PDF has become the standard for print data. If print data is not supplied as a PDF or if the PDFs do not meet the requirements (based on the metadata), they must be converted to the appropriate form beforehand. For PDF, there are other standards in addition to the common ISO standards PDF/X-1a (true colour reproduction in the CMYK colour space) and PDF/X-4 (media-neutral colour definition and use of modern PDF functions such as transparency functions or layers).



Who are the players in the networking process?

Based on structured metadata (xJDF), it is possible to set up interfaces between management software and applications in the production workflow. Regardless of whether the data comes from a web store or upload portal, originates from an MIS/ERP system, or starts from a PIM, MAM, or DAM system: Before the data arrives at the recipient, the production workflow, it must be checked and, if necessary, corrected. Since circumstances can change at any time, the processes must be flexible and individually adaptable. Communication between systems is usually either synchronous or asynchronous.

Synchronous Communication

Here, the communication partners always synchronize when sending or receiving data, i.e., they wait (block) until the communication is complete.

Advantages of synchronous communication

- The sender assumes that processing is in progress until the receiver sends its response. If the receiver system is blocked, then a timeout takes effect. In principle, synchronous programming is easier to implement than asynchronous programming.
- Only one message has to be buffered.
- By waiting, the reconciliation of different speeds of the transmitter and receiver is possible

Disadvantages of synchronous communication

- This is referred to as tight coupling, since the sender and receiver must run simultaneously.
- The transmitter is blocked.
- Concurrency is lower, or complex multi-threading occurs.
- There is a risk of so-called deadlocks, i.e. the standstill in the processing of at least two mutually dependent processes or transactions. The dependency occurs when the transactions are waiting for exclusively locked data objects to be released.

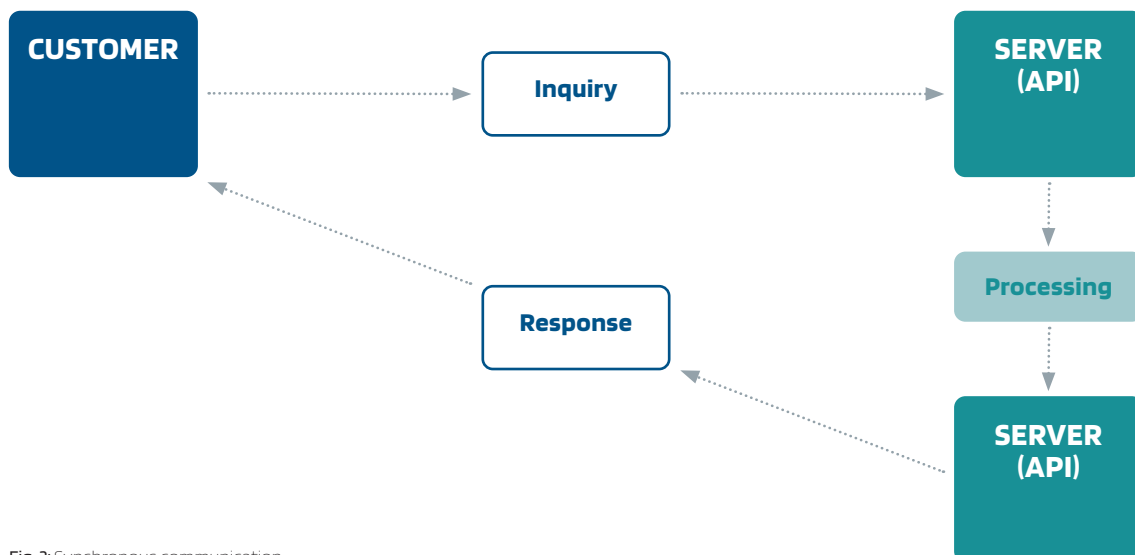


Fig. 2: Synchronous communication

Asynchronous communication

In asynchronous communication, data is sent and received at different times and without blocking the process. With this type of communication, the sender receives an immediate confirmation with a „confirmation ID“. Once the processing is done, the sender is notified (via technologies such as callback or websocket). The other option is to query the sender about the status of the processing via the received confirmation ID.

Advantages of asynchronous communication

- The sender and receiver do not have to run simultaneously (looser coupling).
- A higher degree of concurrency is possible.

- Processes that are very time-consuming can run in the background and thus do not block the sender.
- The risk of deadlocks is lower.
- By using technologies like callback or websocket, the sender is informed of the result of the processing by the receiver.

Disadvantages of asynchronous communication

- If the sender is not reachable, the sender cannot be informed about the completion of the processing. This results in a higher programming effort.
- Messages remain stored in a buffer until they are retrieved. There is a basic danger that the buffers can overflow.

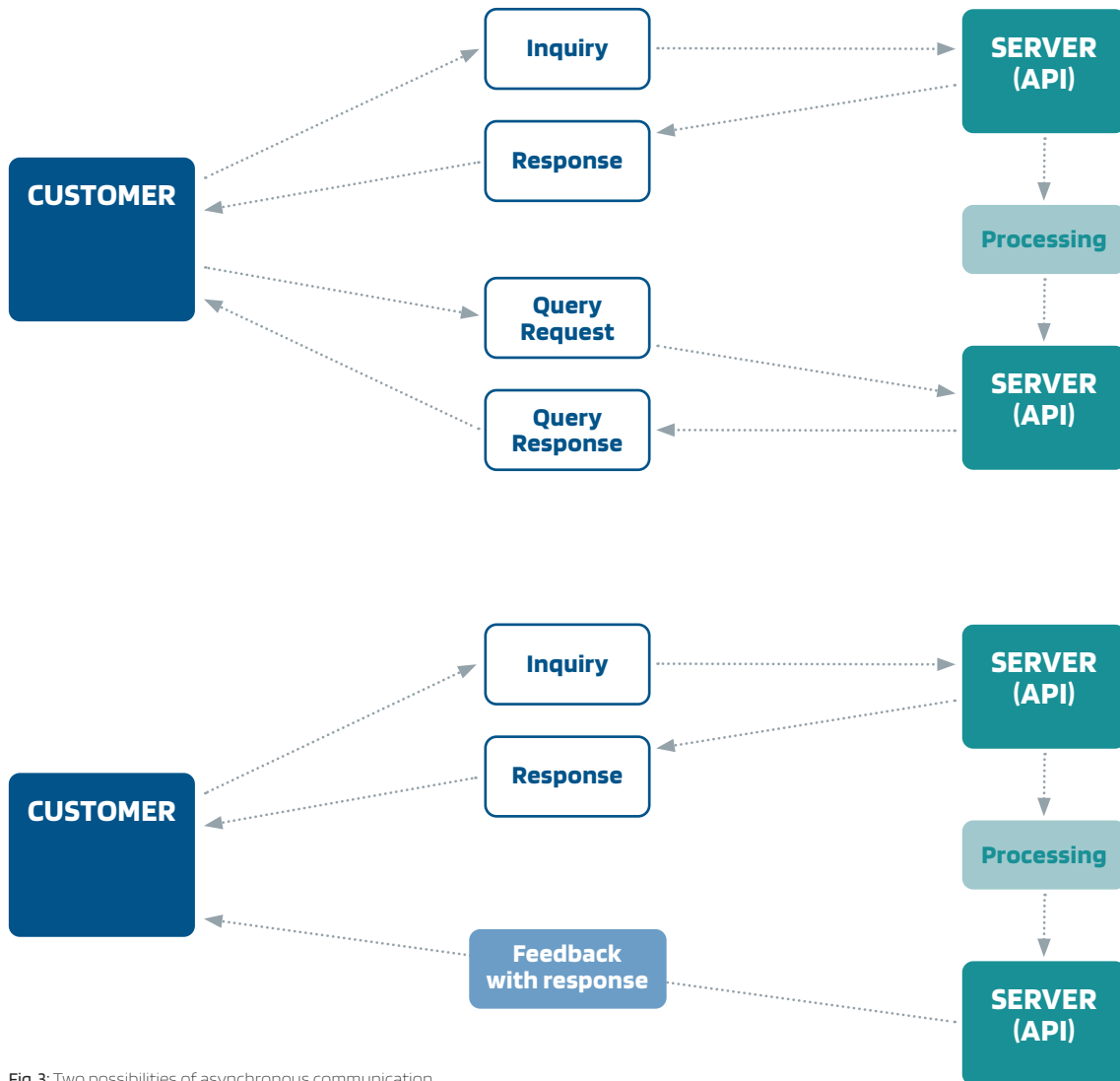


Fig. 3: Two possibilities of asynchronous communication

Management Information System (MIS)

In the printing industry, the term MIS is used when referring to software packages for offer and order management including calculations. In the rest of the IT world, the MIS is one level below a business intelligence system (BI). The MIS provides the company with information from a system, which can be used to manage the company or for controlling.

A BI system, in turn, includes a variety of tools, applications and methods. These systems enable the company to collect data from internal systems and external sources. On this basis, analyses can be prepared, and queries executed. The result is reports and dashboards for visualization by the decision-makers in the company.

Enterprise Resource Planning (ERP)

With the help of an ERP system, business tasks and resources such as capital, personnel, operating resources, materials and information and communication technology can be planned, controlled and managed in a timely manner and in line with the company's purpose. The aim is to ensure an efficient, operational value-added process and continuously optimised management of business and operational processes.

Although software systems in the printing industry do not generally include the areas of accounting (payroll, accounts payable, accounts receivable, fixed asset accounting, balance sheet accounting and financial accounting), these can be described as ERP systems. A system must be measured by whether it supports materials management, production planning and management with production data acquisition, internal logistics and shipping.



Fig. 4: Enterprise resource planning (ERP) is a business task. It is about planning, controlling and managing resources in a timely manner and in line with requirements.

Upload Portals

So-called upload portals have been widespread in the printing industry for a very long time and to this day have lost none of their importance. As a rule, this involves long-term relationships between companies and the manufacturer of the various print products. These business-to-business concepts often leave out

the commercial processes for the individual order, so a modern web store is often over-equipped in terms of functionality. The portals of established prepress workflow providers are often too complex. In principle, the aim is to standardize individual data transmission by e-mail, FTP client or WeTransfer.

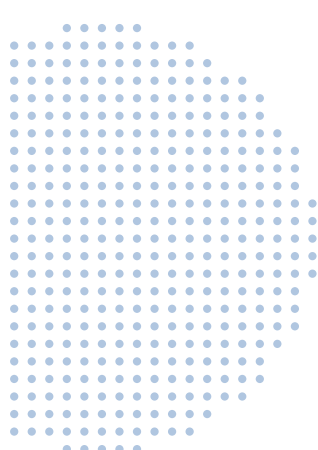
Webshop

A web store is also used in the business-to-business sector, but the focus is usually on consumers and users with little experience in printing technology. Here, the classic components of a web store are used, such as a payment system, as well as the integration of product configurators and editors for design. It is the product configurators and editors that turn an XY webshop into a solution for the printing industry. Ultimately, a simplified classification can be made between solutions for uploading and products with editors.

The editors can be further differentiated, depending on the design options. This starts with the simple adaptation of the contents of business cards on the

basis of forms, extends to the upload of images or logos in partially modifiable templates and goes all the way to the complex design tool similar to Adobe InDesign.

Editors can be further differentiated into solutions with real design based on defined templates or the possibility to upload PDF data into the system. These upload options can be divided into uploading a PDF file that represents parts of a product (images or logos) or a PDF file that contains the entire designed product (contents of a brochure).



Production database

The essential task of the production database involves permanently storing the large volumes of data used in the printing industry in an efficient and consistent manner. The aim is to make the required data (database) available to users as well as to the application programs in different, process-oriented forms. Database management software is used to manage the database. This software organizes the structured storage of the data and controls all read and write accesses to the database. The user accesses

the database via the GUI (Graphical User Interface) of their front end (nowadays mostly browser-based) and can specifically request data.

The production database is the counterpart to the ERP system, to which the progress of the prepared print data is communicated via an interface. Output from the production database can be automated, on the basis of rules, interactively by an employee, or externally triggered by the ERP system.

Production workflow

The production workflow evolved from a file system on a computer to a network with hot folders and the production database. The fact that many solutions are now located in a cloud rather than on their own servers is due to increased performance and lower costs. For a long time, cloud computing was not suitable for the printing industry because of the large volumes of data involved.

When it comes to production workflows, there are the closed systems, which aim to use as many of the manufacturer's modules as possible, and the open systems, where users can put together their own system using components from different suppliers. How the production workflow should be „built“ varies from case to case and must be decided individually.

Year	Prepress	Press	Postpress
2000	FileSystem	Offset	Offline Finish
2010	Hotfolder	Digital	Inline Finish
2020	Cloud	Mass Customization	Mass Customization

Tab. 1: Over the years, the manufacture of print products has seemingly remained the same. The challenge: In principle, all variations occur in practice. In automation, it must be taken into account that there is always a predecessor and a successor to a step in the process.



The IT Pyramid

Strategy

The BI system is the basis for every strategy. This is where the information comes together, and it must be possible to evaluate it.

Organisation

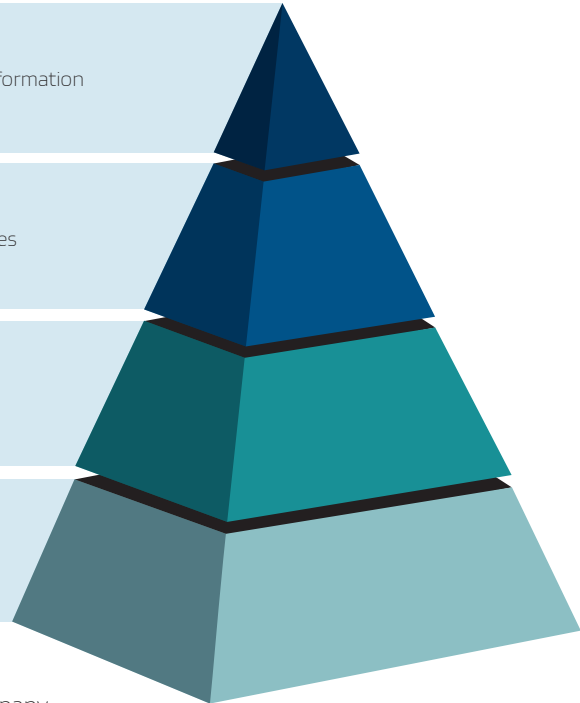
Webshop and portal, MIS and ERP as well as production databases map the organization and must have an understandable GUI.

System Architecture

The system architecture describes the basic components and their interaction within a software system.

Infrastructure

Infrastructure refers to all tangible and intangible assets that enable the operation of application software.



calibrate Radix works in the lower levels of the IT pyramid and thus provides a solid basis for the processes in the company.

How to begin the integration into existing networks?

Every project begins with an inventory. The aim is to make the creation of a print product as fluid as possible and with as few interruptions as possible. The systems involved in the process should communicate directly with each other wherever possible. The goal is to ensure any information that is required repeatedly only has to be entered once. If the data comes from other sources instead of the web store, the most

urgent task is to combine the print data with the order data to enable automation. In practice, it has proven useful to look at new business models from the customer's point of view and then define a process from one's own current starting point. Workflows are scaled by transferring them to the same or at least similar customer requirements.

Benefit

Digitization is disruptive and incorporates business and social situations into technology. It changes the way companies interact with their customers, opens up additional sources of revenue and strengthens customer loyalty in the long term.

Anyone who is involved in digitization for the production of print products will very quickly realize: The earlier an error is detected, the less serious it is. Today's systems are able to match the information from a PDF file with the job data. This makes it possible to match print data with job requirements before the job goes into production.

As a service provider, calibrate implements automated processes for the production of printed and electronic media worldwide. We think simply about Print 4.0.

calibrate Radix is a customized product package consisting of software and service. We automate the processes. The matching of production data with metadata for production must be reliable for digitisation to succeed.

Our goal is the trouble-free, automatic, digital process. We open and connect systems and you focus on the success of your business. calibrate offers a competent network and fills your Radix product package exclusively with forward-looking technologies.



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