Mühlbauer
High Tech International

DATA PREPARATION

For Visual & Electronic Personalization of ID Documents

WHITE PAPER

1 Requirements

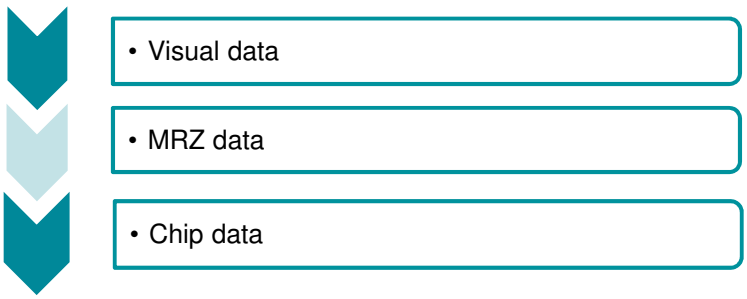
ID documents

Identification documents such as ePassports, eID cards and driver's license cards have to meet certain requirements regarding visual and electronic personalization. Many elements are internationally standardized in order to ensure full readability and interoperability, for example:

- Machine Readable Zone (MRZ)
- ICAO-compliant holder image
- Data encryption
- Digital signature

Data Preparation

The data for document personalization can be taken from different sources, but must be transformed into a consistent machine-readable format.



Specific data formats have to be observed depending on the document type to be personalized. These requirements can be due to international standards (notably ICAO 9303 and ISO/IEC 18013-2) or individual project needs. Inconsistent data must be harmonized and transformed for further use in in the personalization workflow. This requires Data Preparation.

2 Key Elements

Configuration

Functionality for defining and setting up Data Preparation processes, notably

- the required data transformation
- information exchange with other systems

Visual and MRZ Data Preparation

Preparation of the data for visual document personalization, including

- concatenation, truncation, formatting
- value mapping, country codes
- image processing
- generation of time-depending data
- generation of unique document ID
- barcode generation
- MRZ generation

Electronic Data Preparation

Preparation of the data for electronic document personalization, including

- creation of data groups
- chip encoding
- mag-stripe encoding
- digital signature

3 Solution Basics

Functional Principle

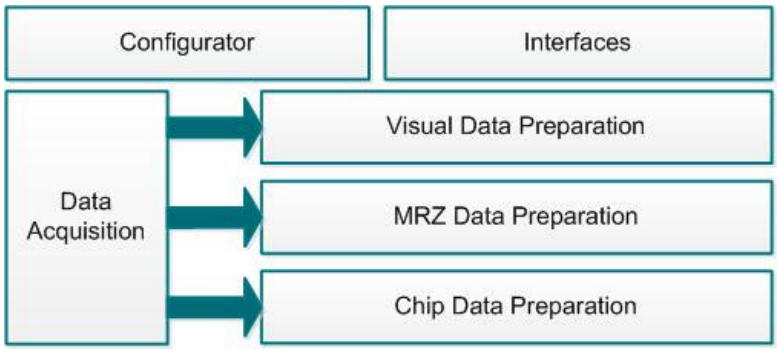
An appropriate software solution provides customizable functions for automatically preparing data according to the document type to be personalized. Such a software tool can be integrated into the data flow of a personalization management system.

In a standard setup there are two Data Preparation modules in the data flow:

- One module for visual Data Preparation,
  e.g. truncation or a barcode
- One module for electronic Data Preparation,
  e.g. chip encoding and signing

Deployment

The Data Preparation deployment must be adapted to project requirements and system design. It is usually based on a server environment, but it can also be deployed on a standalone workstation or even in a mobile environment.



Configuration

Trained operators can set up the required functionality for the Data Preparation system. They configure the details of data transformation and the information connection to other systems.

4 Visual and Electronic Data Preparation

Plain-Text Data

Arbitrary textual information, such as surname, given name, address and place of birth, must be handled according to a consistent processing pattern. A variety of operations can be configured for visual data preparation, for example:

Concatenation

Arbitrary strings can be joined together, using any character string as a delimiter. Concatenation is commonly used for identifiers such as family name and given name.

Splitting

Character strings can be split into smaller chunks, with one or more delimiter characters, by regular expression or by length.

Insertion

Concatenation and splitting can be combined in order to insert characters or character strings at arbitrary positions into existing values.

Truncation

Values which are longer than the available space can be truncated based on the number of characters or the actual length in millimeters, in consideration of the font type used.

Predefined Data

Country codes

All country codes, as defined by ICAO 9303 or ISO 3166, can be “translated” to either the country name or the nationality term in various languages.

Value mapping

Any value can be mapped to any value based on a definition file or mapping file, e.g.

- mapping of the gender code (F=female, M=male)
- mapping of a defined code to the name of the enrollment station

Date formatting

Date values can be automatically converted into formats like “DDbMMbYYYY” or other variants, including bilingual combinations such as “dd-MMMEN/MMMFR-yyyy”.

Generated Data

Time-depending data

Calendar-based values (date / time) can be automatically calculated, based on an input date or the current date, by adding a time period (e.g. validity), which can be differentiated depending on conditions (e.g. age of applicant, document type etc.).

Unique document ID

Unique document identifiers can be automatically generated, for example as sequential numbers or with a prefix and Luhn-30 document numbers for automatic error detection.

Barcodes

Information can be converted into different types of barcode images to be printed on card documents. 1D barcodes, such as Code128, can be used to encode simple numbers or text fragments (ASCII). 2D barcodes, like PDF417 or QR codes, have a higher capacity and can encode special characters or binary content like fingerprints as well. The content can either be provided or can be compiled individually for each application.

Graphical Data

Signature graphics formats

Both grayscale and vector images of an applicant's signature can be processed and placed into the corresponding signature field.

Holder image processing

Various image processing operations can be performed, if needed, for example

- image resizing
- image cropping
- color scheme mapping (e.g. from color to grayscale)

Visual security features

Personal information of the document holder can be applied in security features such as LetterScreen images and ghost images. Such textual data embedded in a photograph or a ghost image in the background of personalized text help to protect the document against alteration and counterfeiting.

MRZ Data Preparation

The MRZ (machine readable zone) must be automatically generated and formatted according to the ICAO 9303 standard.

Chip Data Preparation

Data is automatically prepared, signed and encrypted for electronic personalization of chips or magnetic stripes of ICC-equipped documents, notably

- ePassports and eID cards according to ICAO 9303 standard
- driver's licenses according to ISO/IEC 18013-2 standard

Biometric information such as fingerprint data must be transformed according to ICAO rules.

5 Connection to other systems

Interfaces

For data acquisition, processing and output, the Data Preparation system must provide interfaces to various other components of the personalization solution, e.g.

- the chip-coding module of the personalization machine
- the Document Signer of the Public Key Infrastructure (PKI)
- the data management and user management systems

File-based data interface

This interface processes XML files. Binary data should be included in the XML as base64-encoded elements. The structure of the XML is defined in XSD. Per Data preparation process one dedicated input and output directory is required.

Web-service data interface

A web-service interface allows to send multiple requests to the Data Preparation application. The web request contains an XML according to the XSD. The binary data is included in the XML as base64-encoded elements.

Document Signer

Interaction with the Document Signer (part of PKI) allows to sign data for electronic personalization.

User Management

The Data Preparation system can be integrated into a User Management solution in order to protect, encrypt, decrypt and electronically sign data.

CONTACTS WORLDWIDE

Mühlbauer Germany

Mühlbauer Group

Josef-Mühlbauer-Platz 1
93426 Roding, Germany

Phone: +49 9461 952 0
Fax: +49 9461 952 1101

Mail: info@muehlbauer.de
Web: www.muehlbauer.de

Mühlbauer USA

Mühlbauer Inc.

226 Pickett`s Line
Newport News, VA 23603-1366, USA

Phone: +1 757 947 2820
Fax: +1 757 947 2930

Mail: info@muhlbauer.com
Web: www.muhlbauer.com

Mühlbauer China

Muehlbauer Technologies (Wuxi) Co., Ltd.

No 23. Huayi Road
Wuxi New District
214135 Wuxi, Jiangsu, China

Phone: +86 510 8190 0100
Fax: +86 510 8190 0101

Mail: info@muehlbauer.cn
Web: www.muehlbauer.cn

Mühlbauer Malaysia

Mühlbauer Technologies Sdn. Bhd.

3 Jalan TU 62
Taman Tasik Utama,
75450 Melaka, Malaysia

Phone: +60 6 2517 100
Fax: +60 6 2517 101

Mail: info@muehlbauer.com.my
Web: www.muehlbauer.com.my

Mühlbauer Serbia

Mühlbauer Technologies d.o.o.

Evropska 17
22300 Stara Pazova, Serbia

Phone: +381 22 215 5100
Fax: +381 22 215 5130

Mail: serbia@muehlbauer.de
Web: www.muehlbauer.de

Mühlbauer Slovakia

Mühlbauer Technologies s.r.o.

Novozámocká 233
94905 Nitra, Slovakia

Phone: +421 37 6946 000
Fax: +421 37 6946 501

Mail: info@muehlbauer.sk
Web: www.muhlbauer.com

BRAZIL | EL SALVADOR | GEORGIA | INDIA | IRAQ | ITALY | RUSSIA
SOUTH AFRICA | SOUTH SUDAN | TAIWAN | TURKEY | UGANDA | UNITED ARAB EMIRATES