Mühlbauer

High Tech International

MÜHLBAUER TECURITY®

GOVERNMENT SOFTWARE SOLUTIONS

CONTENTS

MÜHLBAUER GROUP AT A GLANCE

MÜHLBAUER'S BUSINESS UNITS AND SITES

Founded in 1981 in the heart of Bavaria, the Mühlbauer Group has ever since grown to a leading global player in the fields of Parts & Systems, Semiconductor Related Products, Document Solution Related Products and TECURITY® Solutions. With around 3,500 employees, technology centers in Germany, Malaysia, Slovakia, the U.S. and Serbia, and 35 sales and service locations worldwide, Mühlbauer created a strong competence network around the globe.

We continuously invest in the latest technologies and innovative processes to enhance our competences and to provide you with optimized solutions. Our in-house precision part production – MPS – Mühlbauer Precision Parts – guarantees unlimited flexibility and highest customer satisfaction.

Our business unit AUTOMATION does not only develop and assemble individually customized production systems, but also provides matching software solutions for the production process of Document and Solution Related Products. Vision inspection technologies as well as semiconductor and RFID applications complete our comprehensive portfolio.

Our business unit TECURITY® is established as a competent partner for the implementation of security systems for identifying and verifying both documents and individuals. Our clients benefit from more than three decades experiential value which we have gained during the realization of over 300 ID projects worldwide.

Service Hub Russia
HQ Germany
Production Center Germany
Production Center Slovakia
Production Center Bosnia-Herzegovina
Production Center Serbia
Service Hub South Korea
Service Hub Japan
Production Center USA
Service Hub Spain
Service Hub Turkey
Service Hub Georgia
Service Hub Iraq
Production Center China
Service Hub United Arab Emirates
Service Hub Taiwan
Service Hub Mexico
Service Hub India
Service Hub El-Salvador
Production Center Malaysia
Service Hub Uganda
Service Hub Brazil
Service Hub South Africa
Service Hub Australia

Mühlbauer
Bosnia and Herzegovina

Mühlbauer
China

Mühlbauer
Germany

Mühlbauer
Malaysia

Mühlbauer
Serbia

Mühlbauer
Slovakia

Mühlbauer
USA

MPS
Precision Parts & Surface Engineering

AUTOMATION
Production Equipments & Systems

World of TECURITY®
Government & Technology Solutions

OVERVIEW

SPECIALIST FOR ALL PROCESS STEPS – FROM RAW MATERIAL TO COMPLETE SYSTEMS

ENROLLMENT
- Online/Offline
- Web-based
- Image Enhancement
- Mobile/stationery

DATA MANAGEMENT
- Life-Cycle Management
- eGovernment Services
- ABIS

PRODUCTION
- Production Management
- Material Management
- Production Monitoring
- PKI
- SmartCard Applets
- Apps

PERSONALIZATION
- Data Management
- Pre-Personalization
- Machine Management

VERIFICATION
- Stationary Document Verfication
- Mobile Document Verification
- Quality Assurance

CONCEPTION
- Consulting
- Solution architecture
- Document design

MB eG-PORT

eGOVERNMENT SOLUTION

Based on web technology, MB eG-PORT has been developed to provide information and interaction to citizens (G2C), to the private sector (G2B) and to governmental institutions (G2G). It enables the public authorities to establish an eGovernment solution which provides a better user experience for all parties involved. MB eG-PORT does not require any client software, as it is based on web applications running in a standard browser (Safari, Firefox, Internet Explorer, Chrome) and on standard operating systems (Windows, Linux, macOS, Android, iOS), respectively on desktop PCs and mobile devices.

Customs Portal

Fine Portal

(external) Services

MB eG-PORT

Law Enforcement Portal

Applicant Portal

Tax Portal

Public Transportation Portal
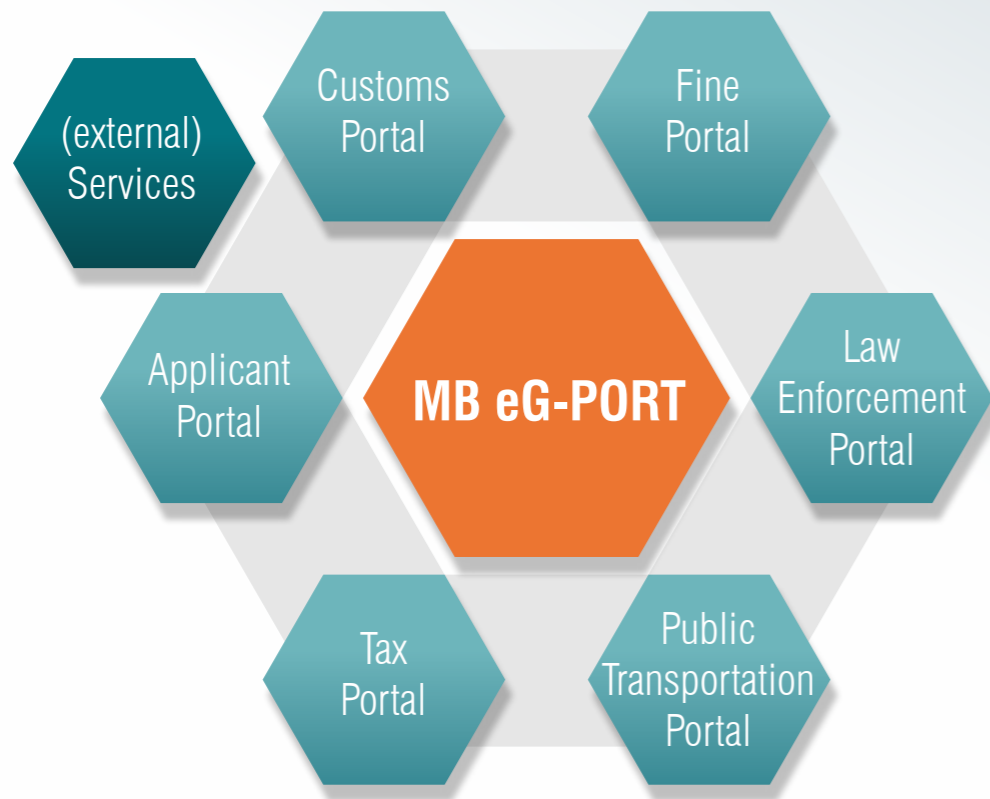
FEATURES & ADVANTAGES

Efficient handling of different application processes for documents (ID card, Driver's License, etc.)

Standard services offered:
- Application Management System
- Appointment Management System
- Queue Management System

Full transparency to administrative procedures such as:
- Payment
- Application status
- Issuing status of documents

Secure communication between browser and background system

Client-site authentication for registered users

Role-based access to eG-PORT features

Immediate services availabe - regardless of day, time and location

Seamless digital experience without media breaks between phone/verbal communication and paper work

TECURITY® OVERVIEW

ENROLLMENT/ ISSUANCE

DATA MANAGEMENT

PRODUCTION MANAGEMENT

DOCUMENT PRODUCTION

PERSONALIZATION

VERIFICATION
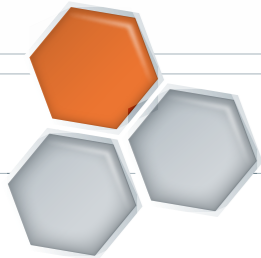
MB getID LIVE

LIVE DATA ENROLLMENT

Mühlbauer getID LIVE - the live data enrollment solution for real-time and applicant-specific data capturing - is designed for comfortable and secure communication between data capturing units and related data management. The applicant's biometric data (e.g. face image, fingerprints, signature or iris) are directly enrolled on site. Demographic data (e.g. name, address or date of birth) can either be pre-fetched from the civil register or be determined via live enrollment. MB getID LIVE is based on newest algorithms for biometric and demographic data processing and complies with international standards such as ICAO.

FEATURES & ADVANTAGES

MB getID LIVE enables the automatic and manual enhancement of images
- Correction of image's angle
- Removal of inappropriate backgrounds
- Optimization of image's color
- Embedding of image in various pre-defined backgrounds
- Final assessment of image according to ICAO standards

Live-capturing of demographic and biometric data

Processing of different document applications within one single unit

Online and offline data processing

Centralized and decentralized use

Use on desktop, mobile devices and tablets

Adaption to any use case

Easy integration into MB solution cycle

MB IMAGE ENHANCEMENT

IMAGE ENHANCEMENT SOFTWARE

MB Image Enhancement is the most advanced feature in the market which - according to international standards - allows the fully-automated and/or manual enhancement and correction of digitally captured images. This is necessary to ensure compliance with international standards such as ICAO.

Typically, a biometric facial image and the printed information of the document are to be stored on a contactless high-security microchip inside an identity document. The compliance with the ICAO Doc. 9303 standard ensures that facial portraits can be used for biometric face identification and verification.

FEATURES & ADVANTAGES

The MB IMAGE ENHANCEMENT software provides all the necessary features for the automated and/or manual processing of live-captured or scanned portraits:

Face recognition and extraction

Image Cropping according to defined settings

Position correction (horizontally and vertically)

Color Correction: Adjusting color palette and white balance

Optimizing image appearance with lighting and shadow correction

Extracting the face from the background and inserting a new background

Checking and evaluating image quality according to ICAO recommendations

Easy to integrate into any software solution

MB getID FORM

FORM DATA ENROLLMENT

Mühlbauer's getID FORM is the most advanced data enrollment package available on the market today. Mühlbauer getID FORM with its incorporated picture enhancement, OCR/ICR, barcode recognition, signature enhancement and fingerprint processing allows configurations for multiple of predefined documents.

FEATURES & ADVANTAGES

PRINCIPLE COMPONENTS

- Batch capturing unit
- Import of batch data from a variety of external sources
- Combinability with various demographic and biometric input sources
- Quality managment and manual correction units
- Assurance of conformity to current ICAO standards
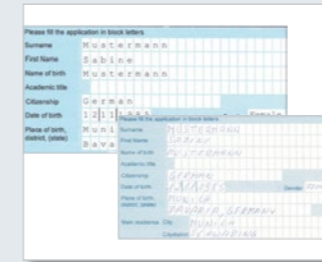
PICTURE CORRECTION

- Automatic or manual enhancement of images to meet ICAO standards
- Correction of incoming image's orientation
- Removal of various backgrounds
- Embedding of image in various backgrounds
- Final adjustment of image
- Full configurablity of ICAO checker

FEATURES

- OCR/ICR - Machine and hand-written text recognition
- Signature enhancement - extracts, defines and enhances signatures
- Barcode recognition - supports 1D and 2D barcodes
- OCR - reads checks and crosses within predetermined areas
- Fingerprint capturing - possible combined with background removal
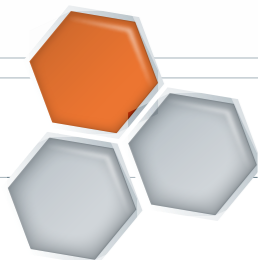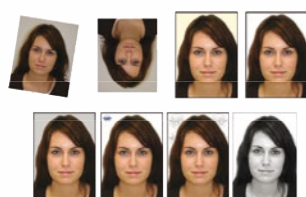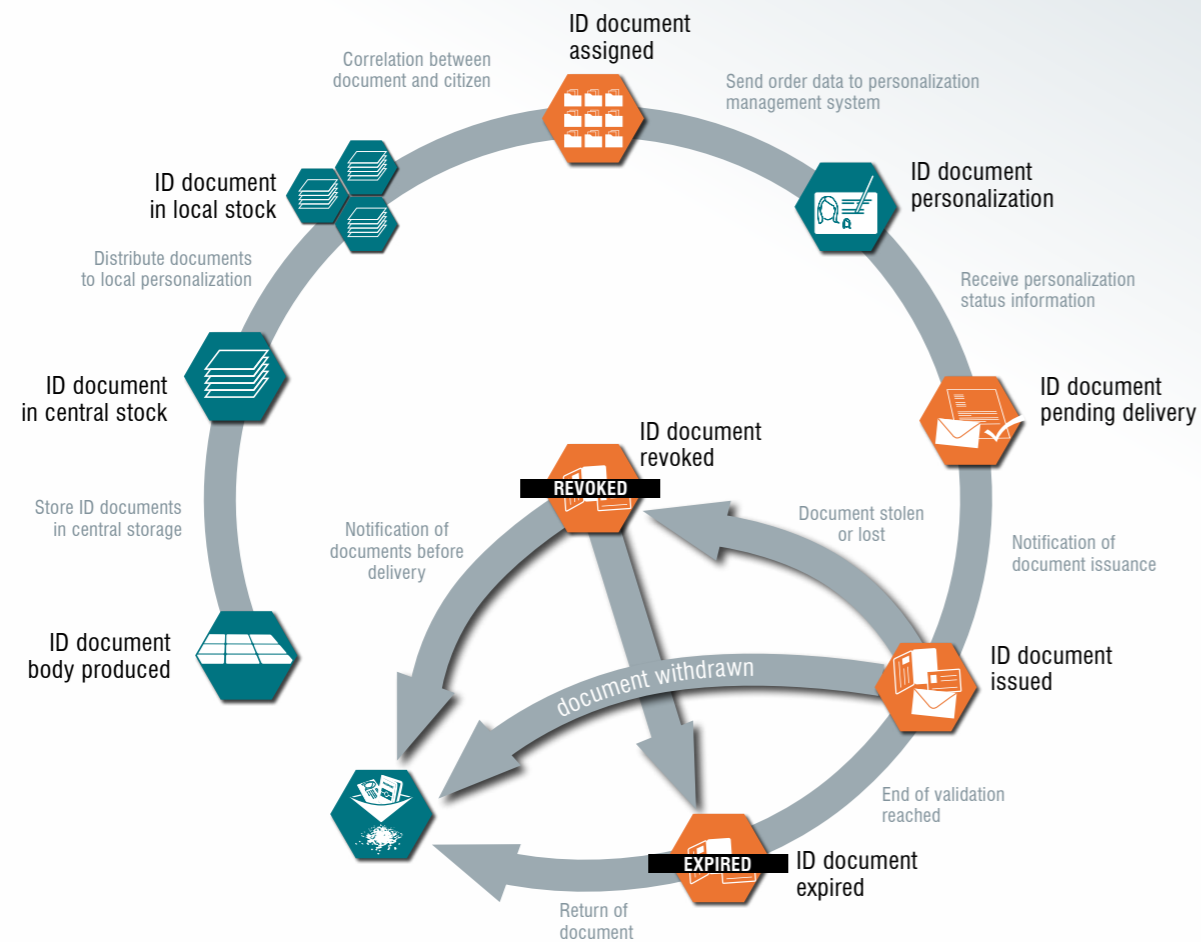
MB SDM

SECURE DOCUMENT MANAGEMENT

MB SDM stores and allows the management of multiple documents such as National e-ID cards, Driver's Licenses, Vehicle Registration Licenses, e-Visas or e-Health cards at the same time. Starting from the "application for document" phase and ending with document expiry and document destruction, MB SDM assures and manages all life cycle phases of these documents and all applications and persons involved.

DOCUMENT LIFECYCLE MANAGEMENT

Correlation between document and citizen

ID document assigned

Send order data to personalization management system

ID document in local stock

ID document personalization

Distribute documents to local personalization

Receive personalization status information

ID document in central stock

ID document pending delivery

Store ID documents in central storage

ID document revoked

REVOKED

Document stolen or lost

Notification of documents before delivery

Notification of document issuance

ID document body produced

document withdrawn

ID document issued

End of validation reached

EXPIRED ID document expired

Return of document

FEATURES & ADVANTAGES

Highly secure management of citizen data and documents

Management of multiple types of applications and documents in only ONE system

J2EE J2EE architecture is fully scalable according to the customer

Flawless integration into all Governmental Legacy Systems

Complete lifecycle management for required document types and application types

Interface to
- Manage requests from external systems
- Data capturing systems
- Automated biometric identification system (ABIS) based on face, fingerprint and/or iris
- Personalization management systems

Automatic registration of alteration of data and data processes

Post-issuance process

MB ABIS

AUTOMATED BIOMETRIC IDENTIFICATION SYSTEM

MB ABIS supports all biometric identification and verification processes, for example automatic face, iris, fingerprint and palm recognition.

IRIS
FACE
FINGERPRINT

FEATURES & ADVANTAGES

Multi-biometric identification possible

Versatile multi-platform products with unique features

AFIS FRS IRS — Support of AFIS, FRS and IRS

Configurable decision matrix

Supporting solutions from different core suppliers
- NEUROtechnology (standard)
- Cognitec
- Innovatrix
- NEC

COMPLIANT WITH INTERNATIONAL STANDARDS AND IMAGE FORMATS

- BioAPI 2.0 (ISO/IEC 19784-1:2006) Framework and Biometric Service Provider (BSP)
- ISO/IEC 19794-2 Information technology – Biometric data interchange formats – Part 2: Fingerprint
- ISO/IEC 19794-4 Information technology – Biometric data interchange formats – Part 4: Finger image
- ISO/IEC 19794-5 / 6 Information technology – Biometric data interchange formats – Face image data
- ANSI/INCITS 378-2004 Finger Minutiae Format for Data Interchange(ANSI378)
- ANSI/INCITS 381-2004 American National Standard for Information Technology – Finger Image-Based
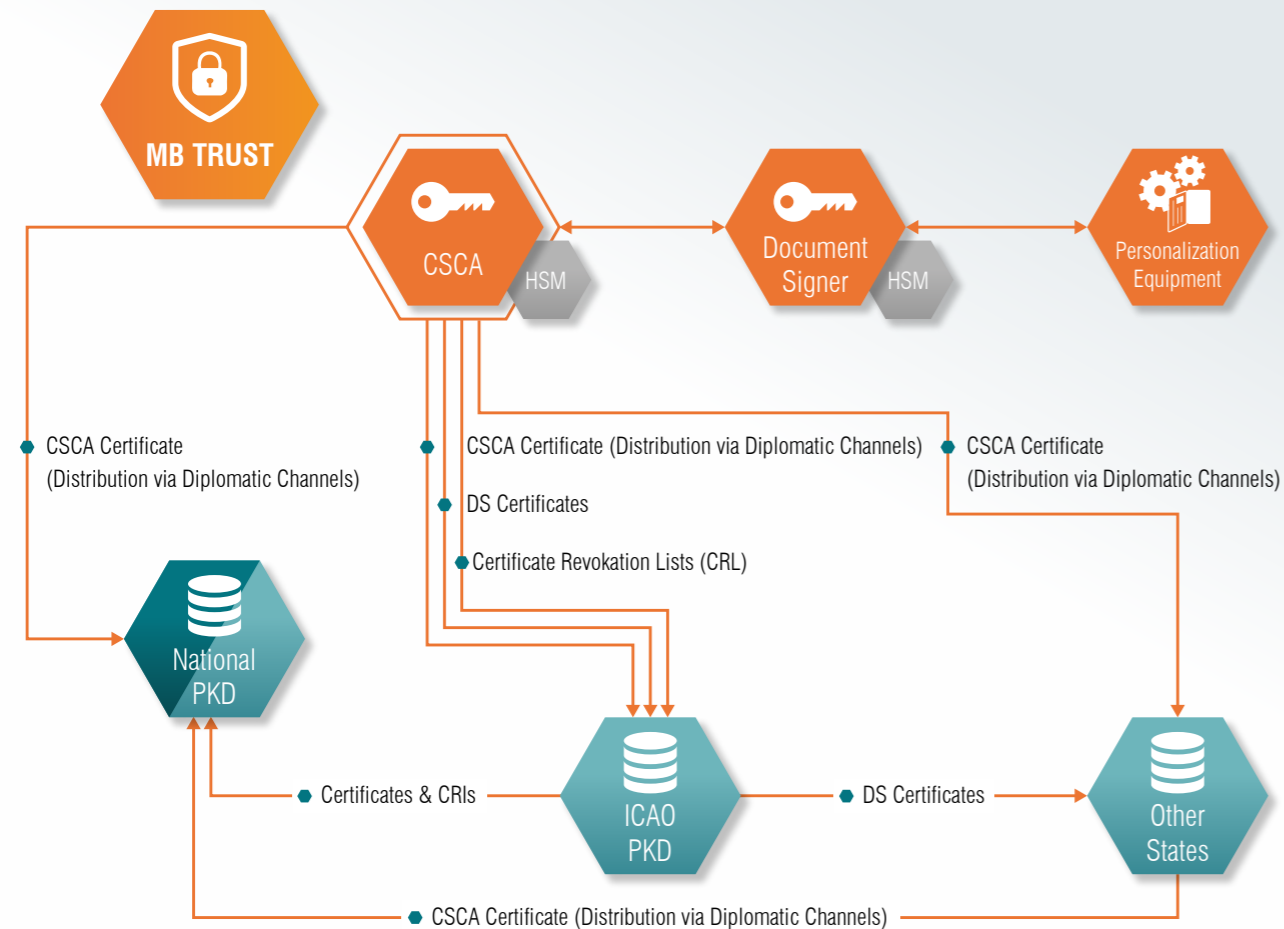- Image formats: WSQ, NIST (iHead), JPG, JPEG 2000, PNG, TIF

MB TRUST

PUBLIC KEY INFRASTRUCTURE

ICAO has elaborated how documents can be securely created and used for reliable identification and secure transmission, handling and storage of personal data including biometrics. MB TRUST follows this ICAO recommendation in order to crytographically secure the information in documents as well as the trusted identification and verification of such information and of the related documents.

MB TRUST

CSCA — HSM
Document Signer — HSM
Personalization Equipment

CSCA Certificate (Distribution via Diplomatic Channels)

CSCA Certificate (Distribution via Diplomatic Channels)

CSCA Certificate (Distribution via Diplomatic Channels)

DS Certificates

Certificate Revokation Lists (CRL)

National PKD

Certificates & CRIs

ICAO PKD

DS Certificates

Other States

CSCA Certificate (Distribution via Diplomatic Channels)

NATIONAL PUBLIC KEY DIRECTORY (PKD)
The main purpose of a PKD is to store and provide national access to all public keys and certificates which are cryptographically related to the private keys.

COUNTRY SIGNING CERTIFICATE AUTHORITY (CSCA)
Mühlbauer TRUST CSCA is a non-hierarchical root authority and the highest trust point in the country that generates.
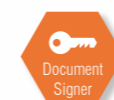
DOCUMENT SIGNER (DS)
The MB TRUST Document Signer module digitally signs all data stored in MRTDs. It also uses an HSM as protected environment for generation and storing of DS key pair and performs cryptographic function with secure asymmetric keys.

HARDWARE SECURITY MODULE (HSM)
The HSM represents a safe environment for the cryptographic keys which never leave it in unencrypted form.

FEATURES & ADVANTAGES

PKI Highly secure ICAO-compliant PKI solution for BAC and EAC

CSCA Nonhierarchical CSCA

Signature Digitally signed data by Document Signature (analog)

User management with with n-factor authentication

Certificate management according to ICAO standard

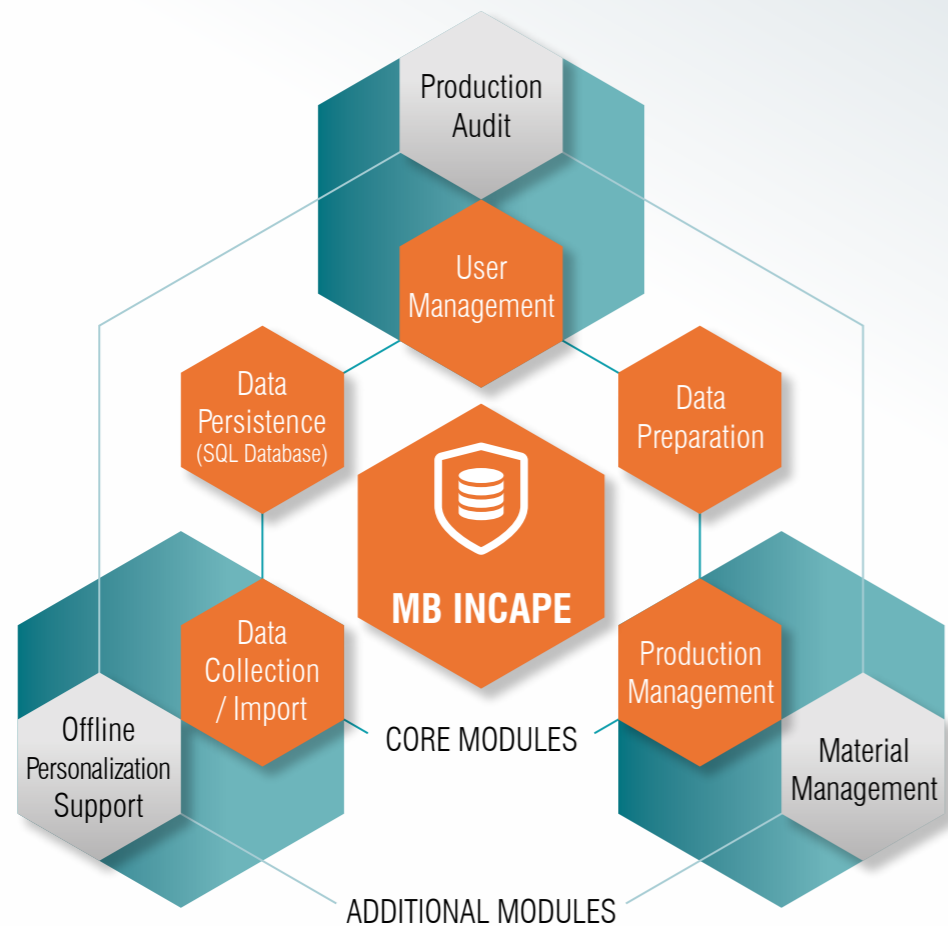**HSM** Support of various HSM platforms

MB INCAPE

INTEGRATED PRODUCTION MANAGEMENT SOFTWARE

MB INCAPE is Mühlbauer's Production Management Software for the production and personalization of electronic cards and documents (e.g. ID cards, ePassports, Driver's Licenses, EMV or GSM cards). Combining data management, production control and material management, the system allows for highly automated processes. MB INCAPE's architecture consists of a modular concept to fulfil the needed scalability in all kinds of document body production steps, as well as in all types of personalization characteristics, for example centralized and decentralized processes, various types of personalization machines or application-specific data preparation scenarios). It allows to process customer and application specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.

Core and Additional Modules

- Production Audit
- User Management
- Data Persistence (SQL Database)
- Data Preparation
- **MB INCAPE**
- Data Collection / Import
- Production Management
- Offline Personalization Support
- Material Management

CORE MODULES

ADDITIONAL MODULES

FEATURES & ADVANTAGES

- Configurable workflow steps regarding personalization, quality assurance and issuance
- Fully-automated processing and production management
- Simplified administration due to web-based operator clients
- Custumizable UI regarding localization, internationalization and branding
- Scalability regarding different documents, machines and personalization locations
- Seamless tracking of documents from point of production to issuance
- Flawless integration of Mühlbauer material management (MB WAREHOUSE)
- Connection to card/document management systems via web service, database, file-based interface
- Standard interface to personalization machines with integration of third-party machines possible
- Integration of MB User Management
- Full coverage of production control requirements (security industry and EMV standards)
- Seamless connection to MB PalaMax® and MB Data Preparation

MB WAREHOUSE

WAREHOUSE MATERIAL MANAGEMENT

MB WAREHOUSE covers the logical administration of materials which are stored in the central warehouse, as well as at the interim storages in the personalization environment. Incoming and outgoing blank or personalized documents must be managed, tracked and sorted. The material management system also provides information about the quantities and additional attributes such as serial numbers and storage locations. Additionally, MB WAREHOUSE notifies about materials which reached a critical quantity and should be reordered. With regard to the interim storages, this warehouse material management system is connected to MB INCAPE to automatically track the material flow during production.

FEATURES & ADVANTAGES

Fully-automated monitoring of complete process flow

Quality control of all incoming and outgoing materials and consumables

Bookkeeping of stored materials

Material preparation for personalization jobs

Tracking of blank documents, consumables and personalized documents

Inititation of ordering processes

Scalability regarding different documents, machines and personalization locations

Identification of documents by document number and storage location

Seamless integration with MB INCAPE

Custody transfer

Handling of responsibilities / operators
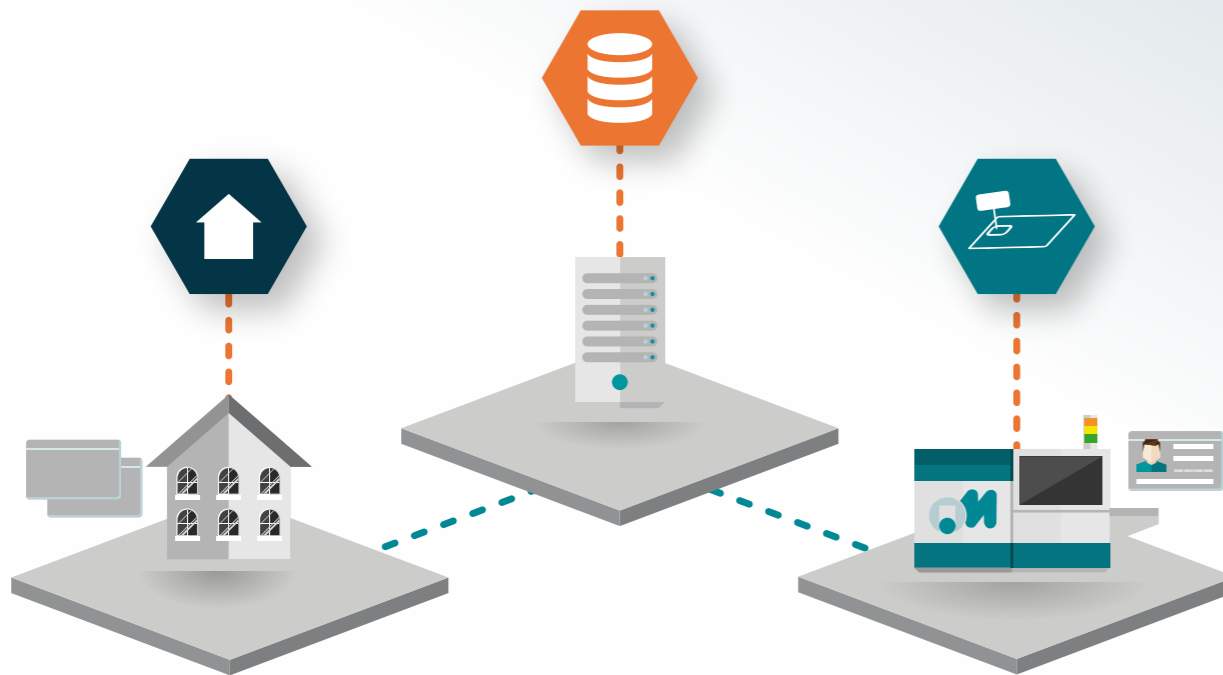
MB PALAMAX ®

TOTAL PROCESS TRANSPARENCY

MB PalaMax®, Mühlbauer's Smart Factory solution, is developed for card, tag or booklet productions, personalization factories and semiconductor backend shop floors. Consisting of an NOSQL database, it is designed to set and collect process data to monitor and improve the efficiency of production and personalization. The collected process data is stored in big data sets for later processing, visualization and statistical analysis.

SMART FACTORY
INDUSTRY 4.0 ENABLED

FEATURES & ADVANTAGES

PALAMAX.MONITOR
Monitors the real-time performance of the production

PALAMAX.STATS
Statistical tool which analyzes collected data and delivers customized statistics on OEE

PALAMAX.REMOTE
Enables the remote operation of machines on the shop floor from a control centre

PALAMAX.TRACE
Allows for the auditing of single manufacturing runs

PALAMAX.MAINTAIN
Enables the implementation of maintenance on demand

PALAMAX.COST
Increases effectiveness and efficiency so that production becomes more profitable

PALAMAX.RECIPE
Enables production engineering to prepare and test a repeatable factory set-up. Factories can switch between products within minutes.

MB APPLET SUITE

EMRTD ACTIVATION SOFTWARE

The MB eMRTD Applet enables smart cards based on JavaCard standard to perform all the functions required for an ICAO Doc. 9303 compliant electronic machine-readable travel document (eMRTD).

ICAO TRAVEL
APPLICATION

eSIGNATURE

IDENTIFICATION/
AUTHENTICATION

eDRIVER`S
LICENSE
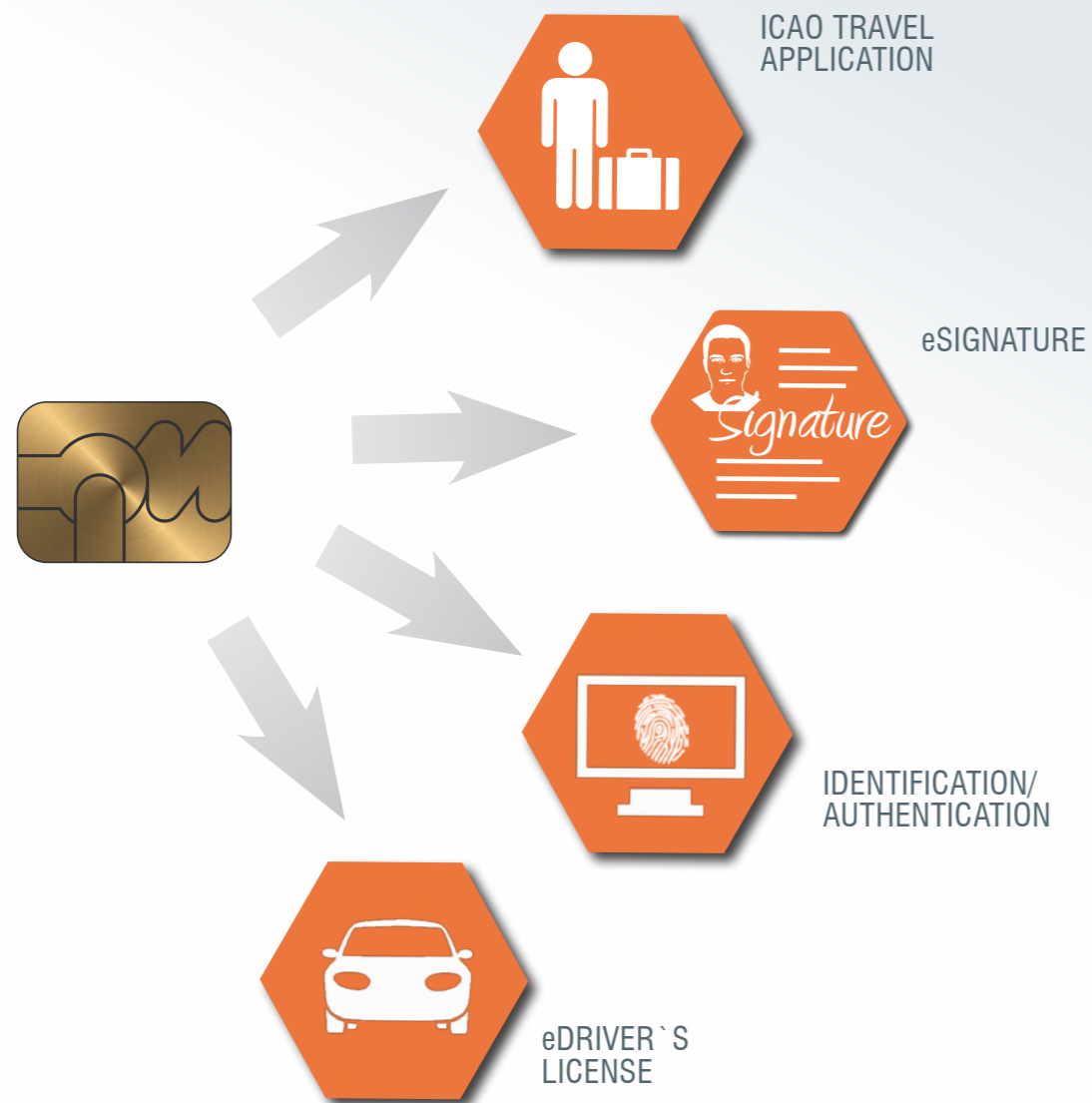
FEATURES & ADVANTAGES

ICAO Doc. 9303 compliant data content & formats

Passive Authentication (PA) to prove data integrity

Active Authentication (AA) to prevent cloning

BAC Basic or Supplemental Access control (BAC or SAC) for data privacy

Extended Access Control (EAC) for enhanced security features

SSCD SSCD according to EU standards

eDL eDL

IEC IEC / ISO 18013

UID Support of random UID to protect document holders from unallowed tracking

Provision of the signature of the chip data of the ICAO LDS (SOD)

PKI Special PKI required, e.g. MB TRUST (see pages 20/21)

MB MOBILE ID

SMART IDENTIFICATION

MB Mobile ID allows users to identify themselves via mobile devices. It follows international ICAO recommendations. Data Acquisition takes place in advance using a safe and trusted procedure. The data will be stored in a secured data container in the user's mobile device. The system uses a highly secured online connection to access an ABIS and fetch the results. The MB Mobile ID App acts complementary to physical identification products which can also be utilized as a stand-alone solution.

FEATURES & ADVANTAGES

- 2D barcode signed via PKI (national or local)
- Support capturing of 2D barcodes
- Online and offline verification possible
- Transfer of identity to verification client via secure interface
- Trusted hardware and infrastructure
- Interface to Mobile ID Service
- Support of identity verification via ABIS against data stored
- Support of age verification
- Support on major mobile platforms (iOS, Android)
- Compatibility with MB Steel Reader Mobile as verification tool (see pages 40/41)

CENTRAL REGISTER
- Database of person-related data
- Trusted hardware and infrastructure

MOBILE ID VERIFIER
- User-friendly mobile application
- Supports use of peripheral devices

MOBILE ID APP
- Verified mobile application
- Personal data, including face image

MOBILE ID SERVICE
- Verification of extracted ID
- Person recognition via ABIS with low FAR

MB DATA PREPARATION

PART OF MB INCAPE

MB Data Preparation provides ICAO-compliant, interchangable and customizable functions to implement personalization data preparation in accord with the document types which shall be personalized. The data are generated and delivered to the production management system in use. Moreover, INCAPE´s MB Data Preparation provides an interface to the PKI system in order to handle activation or encryption keys, as well as certificates for singing and encrypting electronic chip application data.

FEATURES & ADVANTAGES

VISUAL AND CHIP DATA PREPARATION (ICAO-COMPLIANT)
- Truncation, concatenation, formatting
- Value mapping, country codes transformation
- Image processing, resize, enhancement, converting
- Data calculation (date of expiry)
- Barcode generation
- IPI, MLI picture generation
- Letter-screen support

MRZ DATA PREPARATION (ICAO-COMPLIANT)
- Data formatting, replacing, mapping
- MRTD-dependent support for first, second and third line MRZ

INTERFACES
- SOAP web service
- Document Signer
- Support of third-party plugins
- File interface
- Chip-coding DLL

MB TRUST
MB INCAPE
MCES
Seamless integration with standard interfaces to MB TRUST, MCES and MB INCAPE

MB MCES

PERSONALIZATION MANAGEMENT

MB MCES is a personalization management software, which integrates incoming data with product definitions and controls the associated physical and electrical personalization processes. MB MCES handles personalization data from a variety of different input methods and formats and applies them to the cards, regardless whether magnetic stripe, chip encoding, or one of the various optical personalization processes such as thermo-transfer printing, laser engraving, embossing or indent printing. MB MCES manages all personalization processes within only one software system.

FEATURES & ADVANTAGES

Product Designer: layout and product design for different products

In-line card data testing data pre-test, sample post-test and full test

Flexible reporting

Vendor-independent position through powerful SDK

System simulator

Multiple data input formats

Chip OS specific coding applications

Configurable payment application scripts

High-secure document and data processing

User configuration

Messenger page displays all production data and incidents

MB ID CHIP CODING

CHIP CODING APPLICATION FOR SECURE DOCUMENTS

Mühlbauer's customized Chip Coding Application for secure documents guarantees the successful personalization of ICAO-compliant ID chip applications with BAC and SAC or EAC functionality. According to the individual project requirements, MB ID Chip Coding takes the document holder's personalization information and securely encodes it to the integrated chip in the security document, for example an ePassport or an ID card.

FEATURES & ADVANTAGES

High-secure personalization of BAC and SAC or EAC ePassports and ID cards

SAC and EAC strengthen the chip access control mechanism and allow the usage of the CAN

PACE Increased security by means of PACE v2 and asymmetrical encryption

Mandatory in Europe since 2014 and recommended by ICAO

BSI Fully compliant with German Federal Office of Information Security and international standards

MB STEEL READER

DOCUMENT VERIFICATION SOFTWARE

MB Steel Reader is a software solution for examining electronic identification documents in combination with a full-page document reader. It is designed to use secure communication channels to read the chip data via BAC/BAP, SAC or EAC. MB Steel Reader supports ICAO Doc. 9303-compliant travel documents, international Driver's Licenses (iDL based on ISO/IEC 18013) and electronic Vehicle Registration Cards (eVRC).

FEATURES & ADVANTAGES

Various fields of application such as production release, quality assurance and verification in the field

Complete verification, including chip authentication

Provision of overview of visual data, MRZ and chip data

Verification of physical security features such as visible image, IR image and UV image

Verification of electronic security features such as PA, AA and CA

Management of CSCA certificates and revocation lists for verification

Comparison of holder-page information (MRZ, photo) and chip data

Optional comparison of document data and corresponding record in a database

Three forms of data representation: interpreted data, hexadecimal, Type-Length-Value

Possibility to store document information for future examination

MB STEEL READER MOBILE

DOCUMENT VERIFICATION SOFTWARE

MB Steel Reader Mobile enables the verification of eMRTD and other high-secure documents with contactless chips (ISO 14443) with standard mobile devices. Additionally, it can be used to inspect production results of eID and eMRTD documents for quality assurance and production clearance. This allows production management to inspect biometric documents at any time at any place with very low effort. MB Steel Reader Mobile is available for NFC-enabled Android 4.4 (and newer) standard devices with camera (to optically read MRZ).

FEATURES & ADVANTAGES

MRZ — MRZ recognition and verification of the check digits

Secure identification of the card holder

Built-in face matching to compare digital image on chip and live photo

Document verification against external databases

MRZ — Comparison of optical MRZ and MRZ data from chip

BAC EAC SAC PACE — Support of BAC, EAC, SAC, PACE and CAN

Passive Authentication

Active Authentication

CSCA — Server-based verification: CSCA/DS certificates, black lists, white lists and master lists

ICAO ISO

COMPLIANT WITH FOLLOWING STANDARDS

- ICAO Doc 9303   Machine Readable Travel Documents (MRTD)
- ISO/IEC 19785   Common Biometric Exchange Framework Format
- ISO/IEC 19794-4   Fingerprint image
- ISO/IEC 19794-5   Facial image

GLOSSARY

AA	Active Authentication
ABIS	Automated Biometric Identification System
AFIS	Automated Fingerprint Identification System
BAC	Basic Access Control
BAP	Basic Access Protocol
CA	Chip Authentication
CAN	Card Access Number
CSCA	Country Signing Certificate Authority
DL	Driver's License
DLL	Dynamic Link Library
DS	Document Signer
EAC	Extended Access Control
eG-PORT	eGovernment-Portal
EMV	Electronic Money Value
eVRC	Electronic Vehicle Registration Cards
FAR	False Acceptance Rate
FRR	False Rejection Rate
FRS	Face Recognition System
G2B	Government to Private Sector
G2C	Government to Citizen
G2G	Government to Government
GSM	Global System for Mobile (Communications)
HSM	Hardware Security Module

ICAO	International Civil Aviation Organization
IRS	Iris Recognition System
LDS	Logical Data Structure
MCES	Mühlbauer Personalization Software
MRTD	Machine-Readable Travel Document
NFC	Near Filed Communication
OCR	Optical Character Recognition
OEE	Overall Equipment Effectiveness
PA	Passive Authentication
PACE	Password Authenticated Connection Establishment
PKD	Public Key Directory
PKI	Public Key Infrastructure
SAC	Supplemental Access Control
SDK	Software Development Kit
SDM	Secure Document Management
SOAP	Simple Object Access Protocol
SSCD	Secure Signature Creation Device
TA	Terminal Authentication
TLV	Type-Length-Value
UI	User Interface