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NFIQ 2.0 – Use cases

Some Examples from Germany, EU, US

Oliver Bausinger

Section S13 – Inspection Infrastructures and Architectures

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Why do I care …
- Challenges in fingerprint quality

- Which quality is required by the system?
  - How much time (on average) do I need to reach the desired level?
  - Not: How do I achieve maximal quality?
- Timing considerations
  - Timing constraints are the biggest driver in the design of an enrolment and verification process
  - For many instances, quality correlates directly with time
- System design
  - At enrolment stage, the verification or identification system is unknown
  - Large scale identification scenarios (AFIS) have high quality requirements
    - Hundreds of million records or more! (UID > 10^9, but not only fingerprint)

Why do I like it …
- The NFIQ promise

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- Free / Open Source fingerprint quality algorithm
- Long-term supported by NIST
  - Expected refreshments based on progress of capture devices and comparison algorithms
- Accepted by the biometric industry
- Standardized by ISO
  - Core principles will be established in ISO/IEC 29794-4:20XX
  - NFIQ as a reference implementation
- Key to interoperability
  - Not only syntactic interoperability (ITL-1, WSQ, JPEG 2000, ISO/IEC 19794…)
  - Also semantic interoperability (calibration, QA values that can be interpreted)
- A common language to establish an interoperable definition of **fingerprint of sufficient quality** for a specific application scenario

Use case #1: Enrolment for official documents (Germany)

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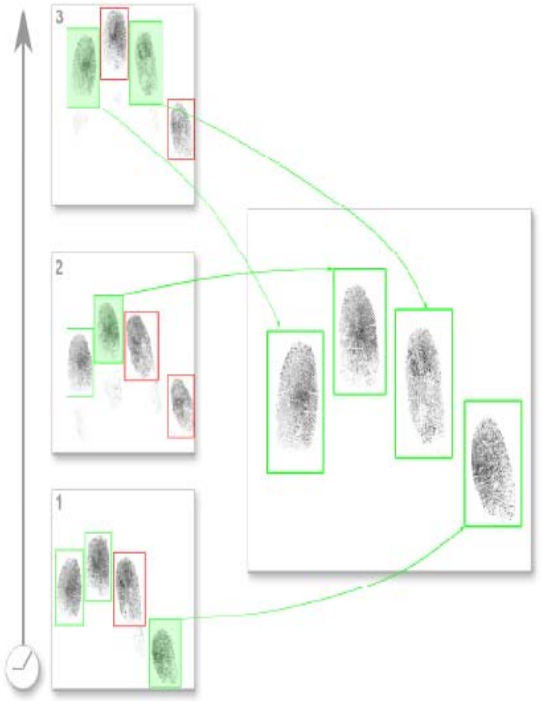
- Two enrolled fingerprints (index preferred) in the document's chip
  - ePassport, German National Identity Card, EU Residence Permit
- Current solution
  - Sophisticated cross-matching approach with three imprints from the same finger
  - There was no usable quality metric available for this in 2006
- Goal
  - Replace this workflow with a single imprint workflow
  - Determine repetition rates and NFIQ 2 thresholds



Use case #2: Heterogenous workflows in EU-VIS

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- European Visa Information System (EU-VIS)
  - Tenprints from all Schengen (short-time) Visa applicants
    - Data stored for 5 years
  - Mandatory biometric verifications at Schengen borders
  - 2nd line identification with tenprints
  - Planned FTE=0: every record should be searchable in the AFIS

EU-VIS Workflow

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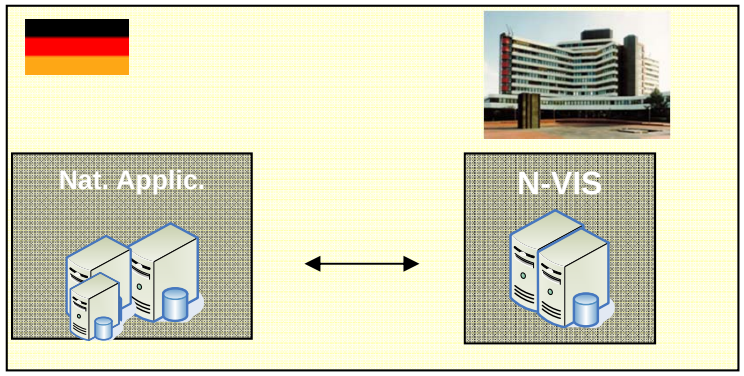
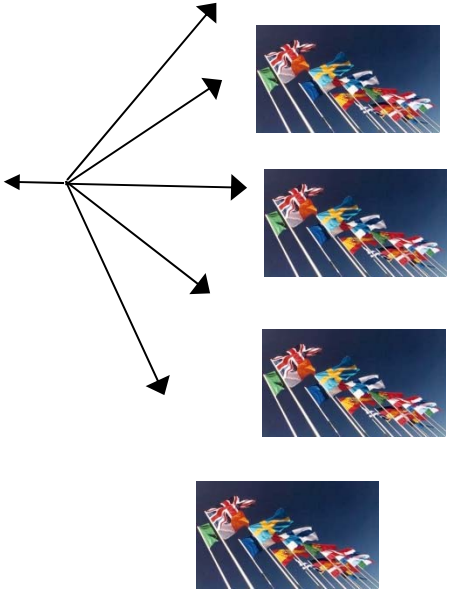


EU VIS

- Visa Application
- Border Control
- Territory Control
- …

C-VIS

BMS



VIS usage

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- Region based rollout
  - Approx. 25% of total VIS volume deployed
- Over 3 million visa applications in 2013
- Over 25 million operations at borders in 2013
  - Germany already checks every visa traveler with fingerprints at the border
  - Full visa border checks throughout Schengen area from October 2014

EU-VIS: Making data acquisition interoperable

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- Current situation
  - Heterogenous set of enrolment solutions throughout Europe
  - No common interoperable definition of required quality for AFIS
    - Vendor defined quality (black box)
- Goal
  - Establish NFIQ 2.0 as a secondary mandatory metric for quality control in EU-VIS

Use case #3: Criminal AFIS

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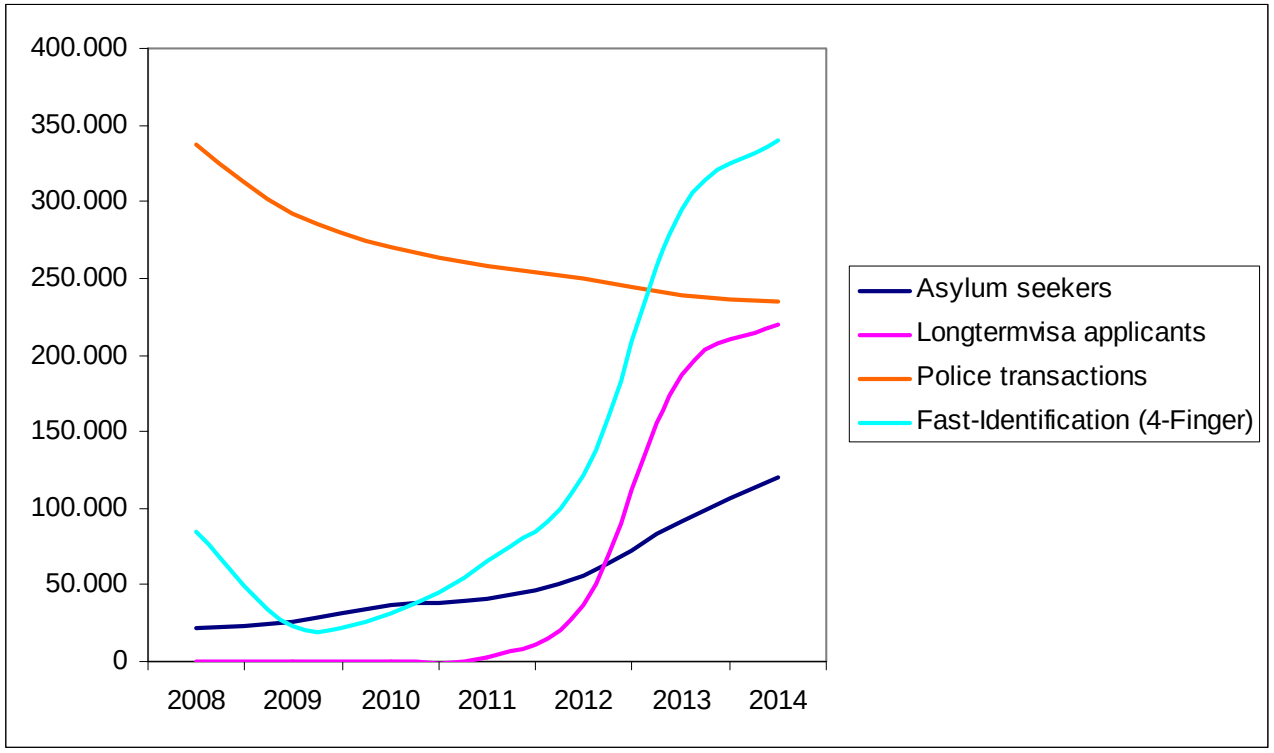
- Current situation in Germany
  - Mandatory dactyloscopic review of any incoming tenprint set
  - Incoming traffic increases steadily whereas staff is being reduced



Use case #3: Criminal AFIS

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- Diverse client landscape (processing of police transactions, asylum seekers, long term visa applicants and international requests)
- BKA‘s AFIS is Germany‘s central AFIS (no other) with appprox. 3 million persons (tenprints) in the database and 450.000 latent fingerprints.
- Currently only manual / user decision based „rejections“ in 1,21 % of all tenprint processings (in 2013)
- Decision criteria:
  - Overall quality
  - Number of present searchable fingers (thumb, index, middle)
  - Capture errors (e.g. upper/lower palm problems, blurring)

Use case #3: Criminal AFIS

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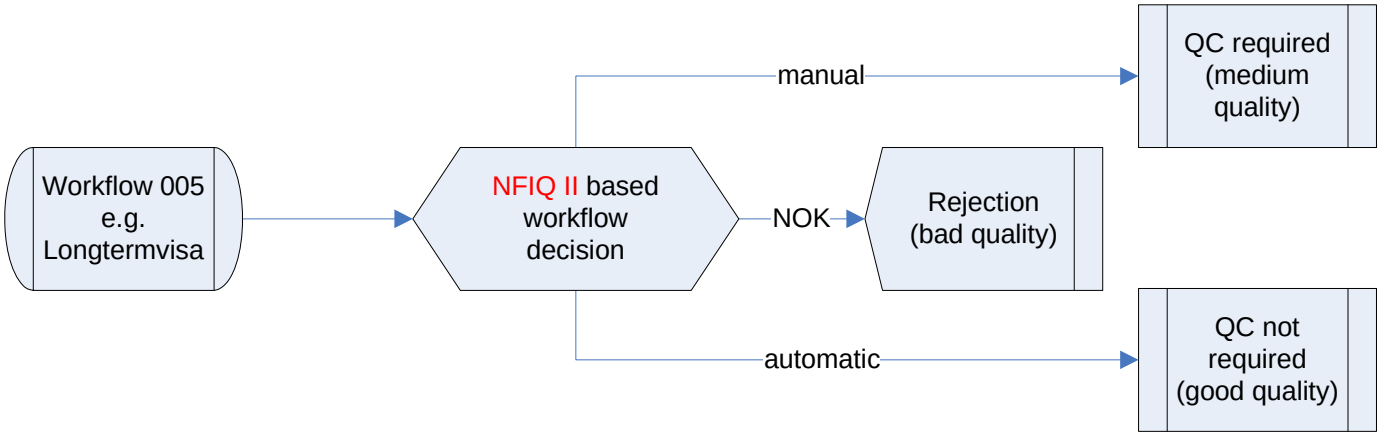
- Goal
  - Establish NFIQ 2.0 as a mandatory metric in the incoming queue including automatic rejection and quality based workflow decision
  - Establish NFIQ 2.0 as metric on booking station level



  - Enhance the performance of criminal identification

Use case #4: Background evaluation service

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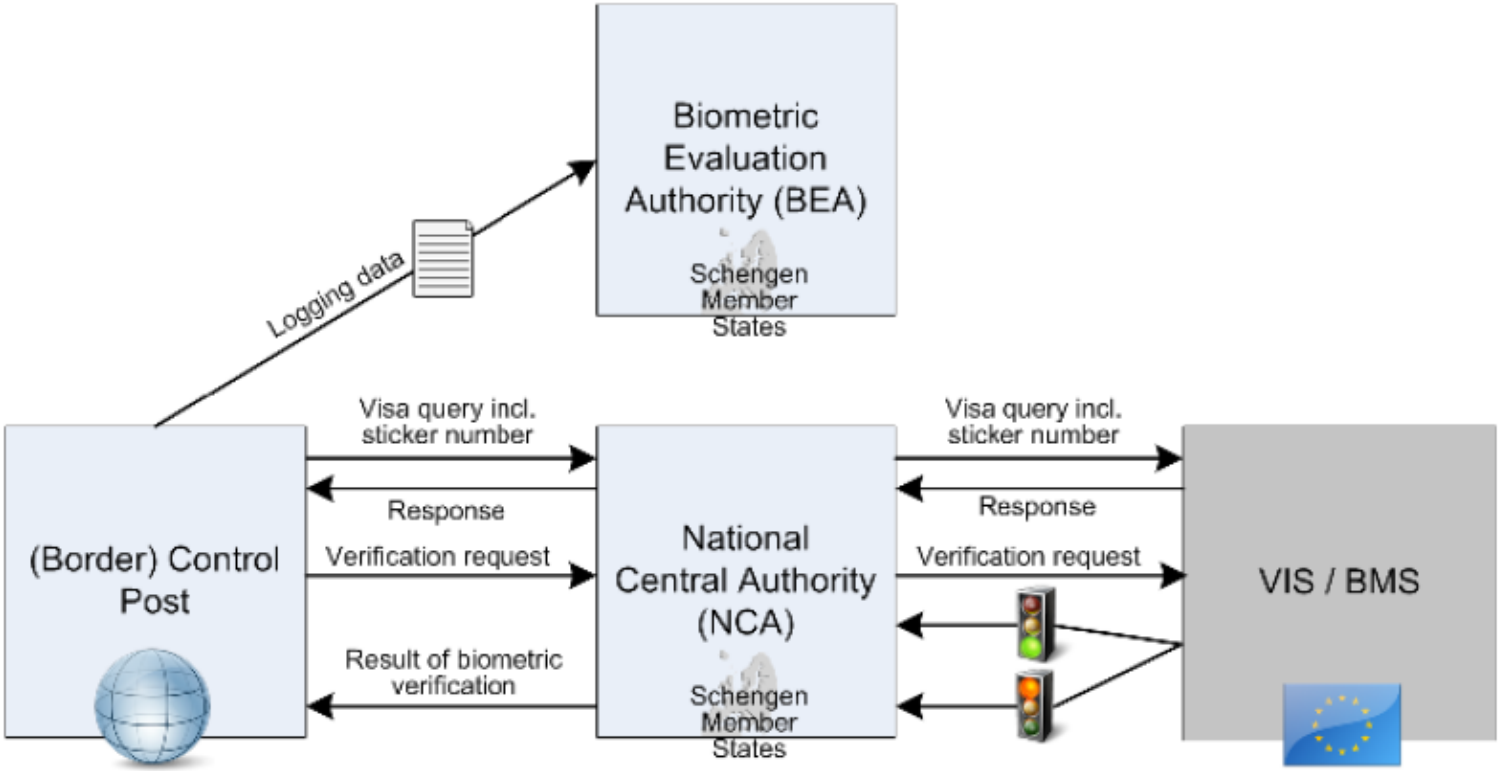
- On-the-fly evaluations on biometric samples and performance in several application scenarios



Background evaluation service

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- Current plans
  - Assessing overall fingerprint quality
  - Correlating enrolment fingerprint quality to verification and identification performance (i.e. in-field calibration)
  - Allow for a feedback loop
    - Detect bad devices
    - Learn and change processes
- Evaluation workflow in eGate scenarios

Adoption plans for USG

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- Standards – Incorporation of NFIQ into
  - ANSI/NIST and
  - PIV standards
- Operational usage
  - Replace current use of NFIQ 1.0 in the DHS + FBI CJIS applications
- Work with U.S. industry to incorporate quality assessment in mobile capture devices

Thank you!

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- Federal Office for Information Security (BSI)
  - https://www.bsi.de
- Oliver Bausinger
  - oliver.bausinger@bsi.bund.de