



NFIQ 2.0 – Use cases

Some Examples from Germany, EU, US

Oliver Bausinger

Section S13 – Inspection Infrastructures and Architectures

Federal Office for Information Security (BSI)

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 > 10⁹, but not only fingerprint)

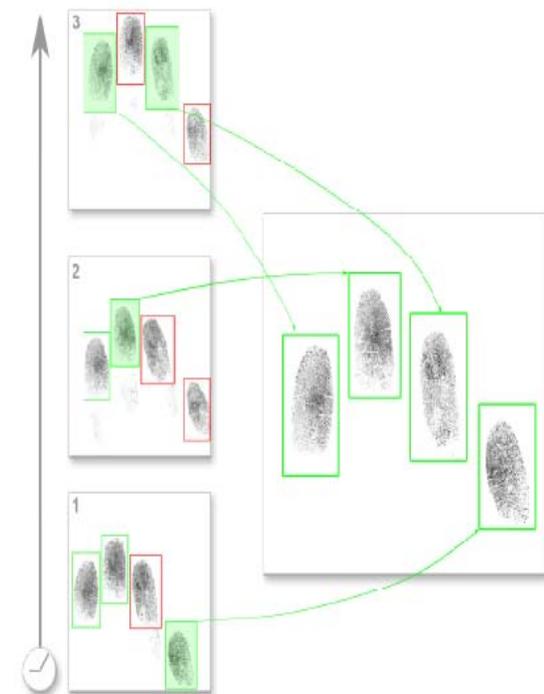
Why do I like it ... - The NFIQ promise

- 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)

- 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

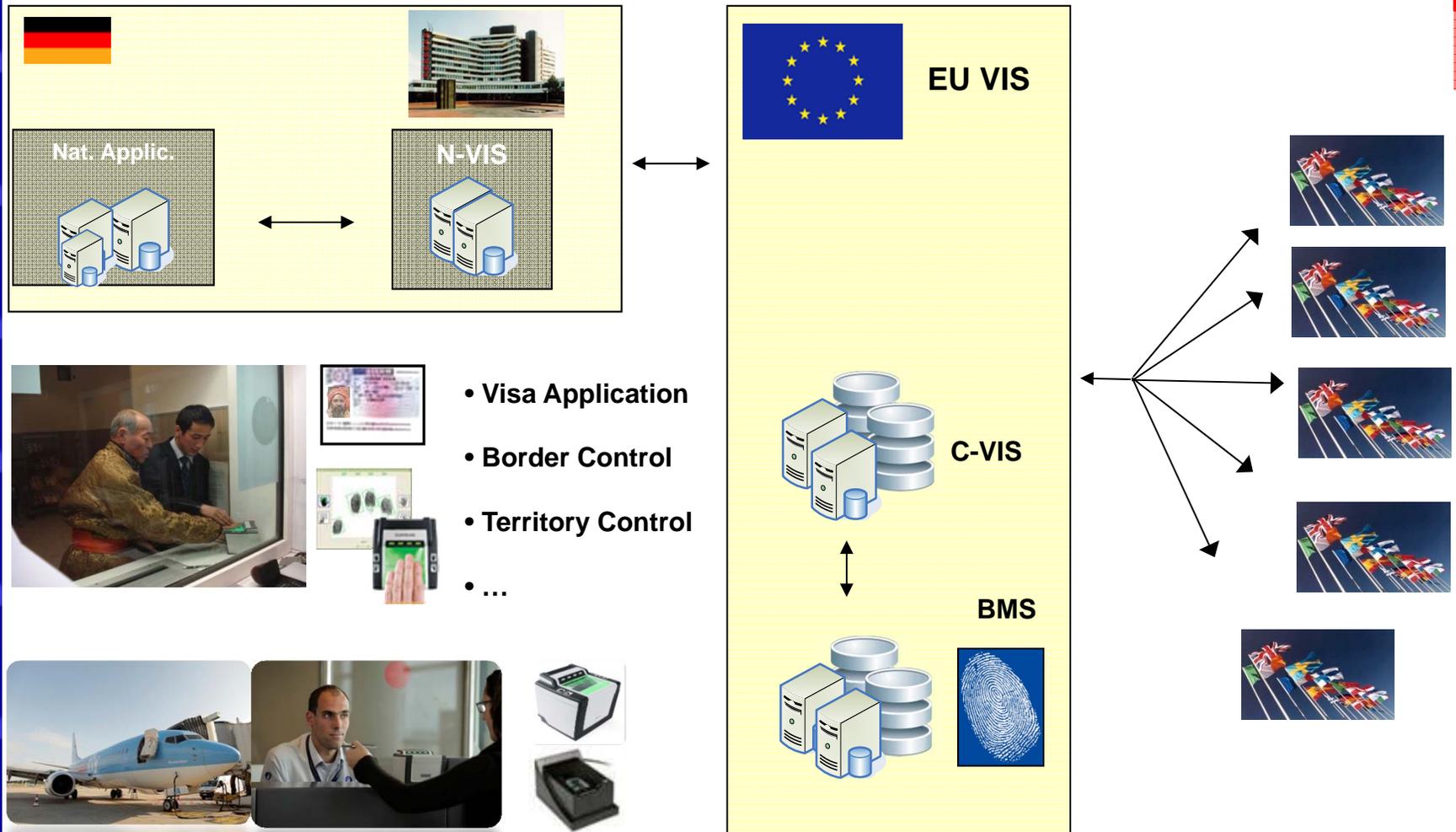


Use case #2: Heterogenous workflows in EU-VIS

- 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



VIS usage

- 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



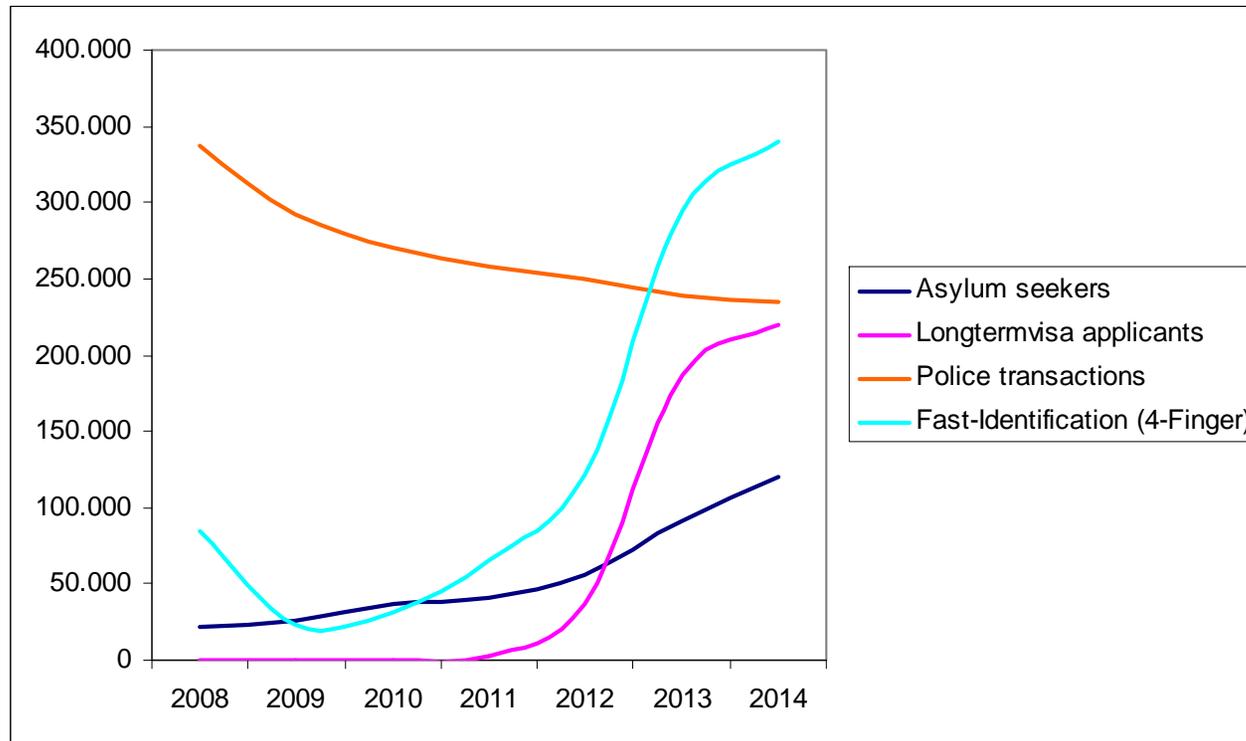


EU-VIS: Making data acquisition interoperable

- 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

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



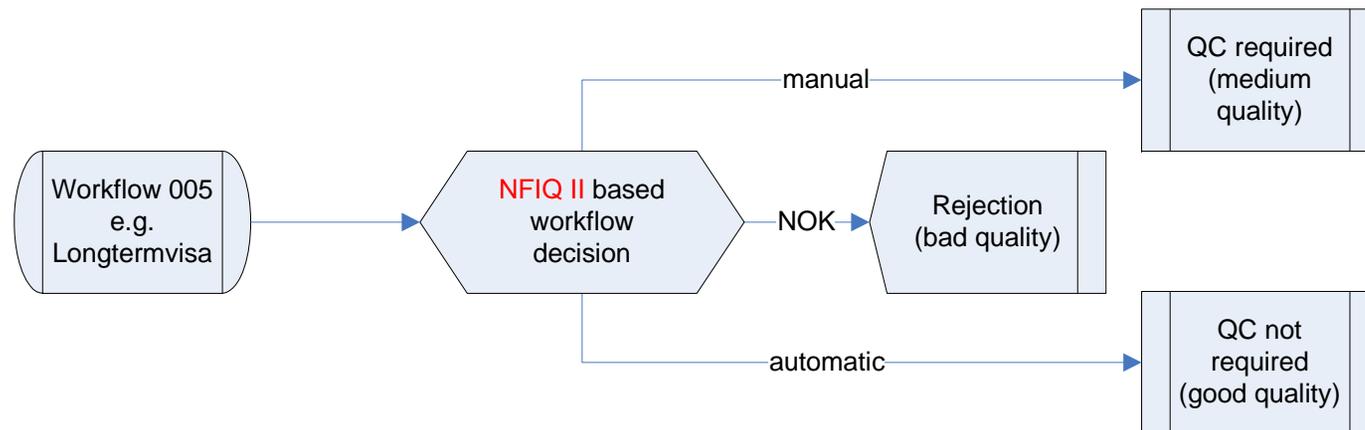
Use case #3: Criminal AFIS

- 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 approx. 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

■ Goal

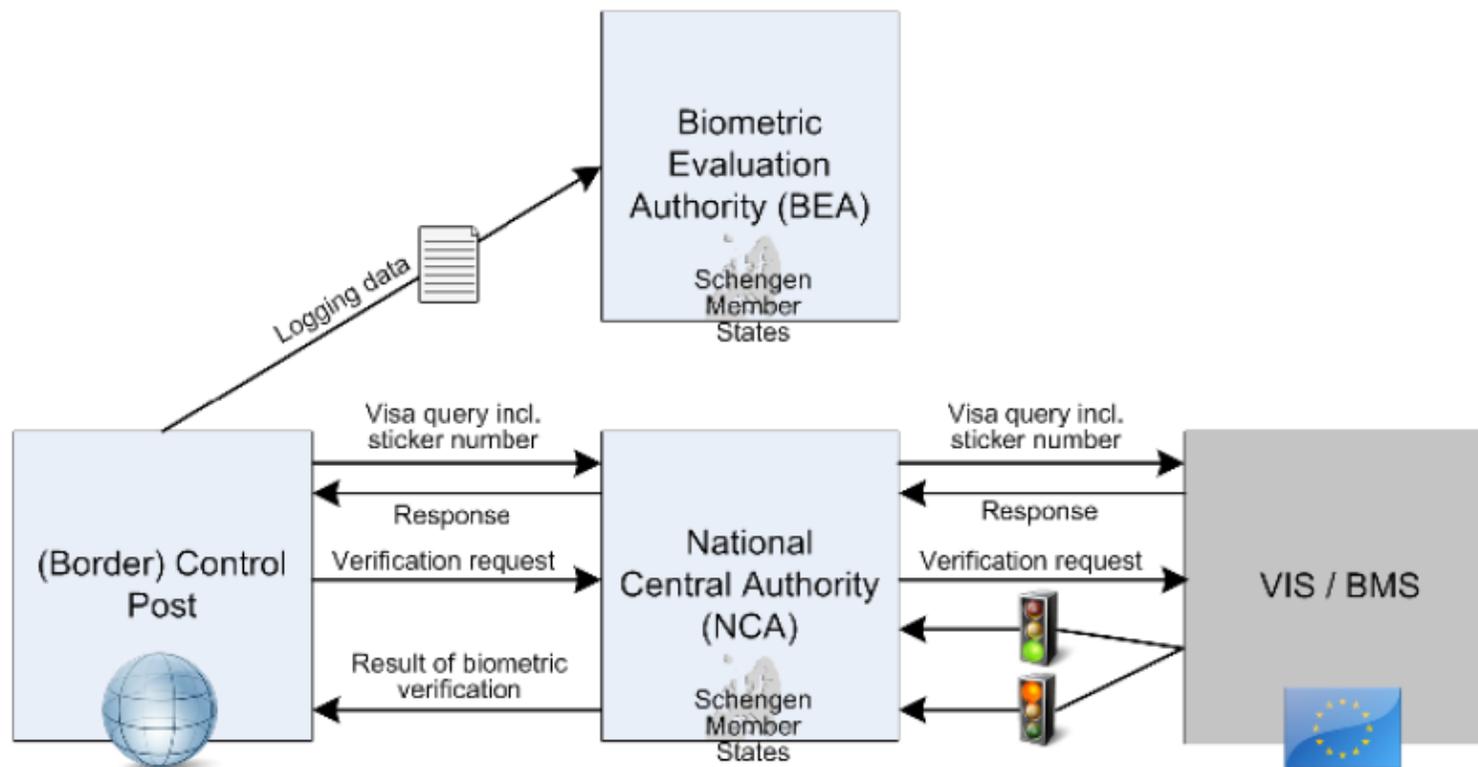
- Establish NFIQ 2.0 as a mandatory metric in the incoming queue including automatic rejection and quality based workflow decision
- Establish NFIQ 2.0 as metric on booking station level



- Enhance the performance of criminal identification

Use case #4: Background evaluation service

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



Background evaluation service

- 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

- 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!

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

