

NFIQ 2 in the Context of the EES

EAB Conference in fingerprint quality image (NFIQ 2.1), 15 June 2021



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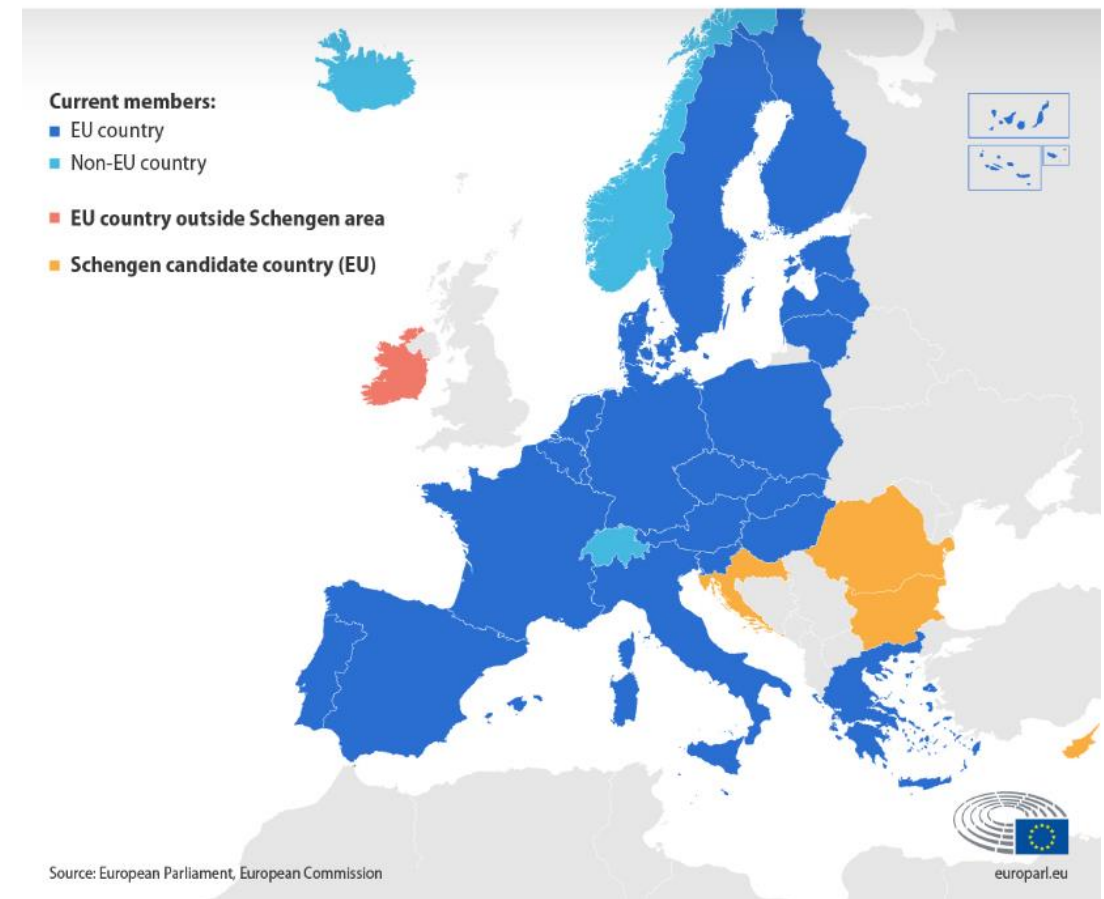
Agenda

- Europe's Schengen area
- eu-LISA (history, portfolio)
- The European Entry-Exit System (EES)
- The shared Biometric Matching Service (sBMS)
- Fingerprint quality challenges and next steps

Europe's Schengen Area – free movement of people

- Schengen Agreement **signed on 14 June 1985** by five of the ten member states of the then European Economic Community
- The Schengen Area covers **26 countries** with a population of **~420 million people**
- Core part of EU law, and all EU member states which have not already joined the Schengen Area are legally obliged to do so when technical requirements have been met.
- Lifting internal but strengthening external border control

SCHENGEN AREA



- European Union Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice
- Established in 2011, started operations on 01/12/2012
- Agency's mandate was reinforced with Regulation (EU) 2018/1726
- Headquarters: Tallinn, Estonia
- Operations: Strasbourg, France
- Backup site: Sankt-Johann im Pongau (Austria)
- Liaison office: Brussels, Belgium
- 289 statutory staff today, 370 posts planned by 2022



- **Core mission:**
 - be dedicated to continuously add value to Member States, supporting through technology their efforts for a safer Europe.
- **Overall vision:**
 - to provide high-quality efficient services and solutions
 - to build trust amongst all stakeholders and continuously align the capabilities of technology with the evolving needs of the Member States
 - to grow as a centre of excellence



eu-LISA – System portfolio




European Union Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice (eu-LISA)



Visa Information System (VIS)

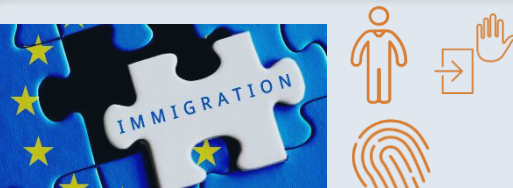
~80 M visa applications
~70 M FP sets

All time high peak: 139 K operations/hour




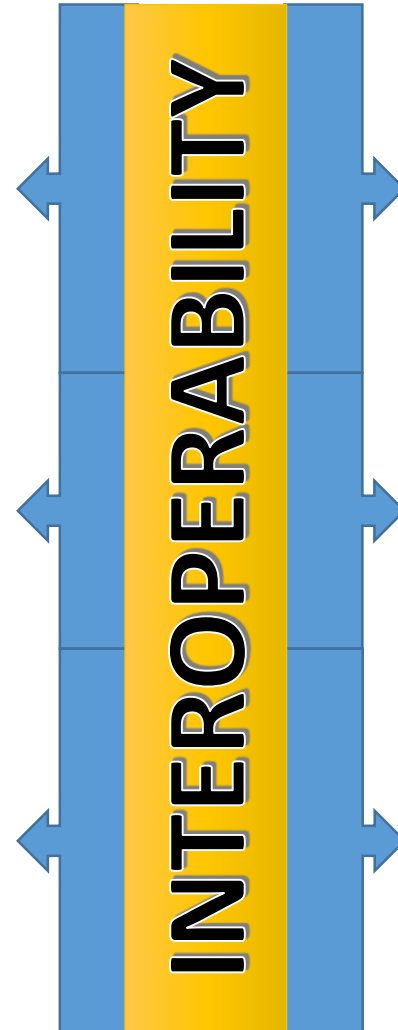
Schengen Information System (SIS II)

~93 M alerts
>14K queries/day
~ 800 hits/day
~ 400 K FP sets



European Dactyloscopy Database (EURODAC)

~5.6 M asylum applications
~ 145K irregular border crossings
~5.6 M FP sets



Entry-Exit System (EES)



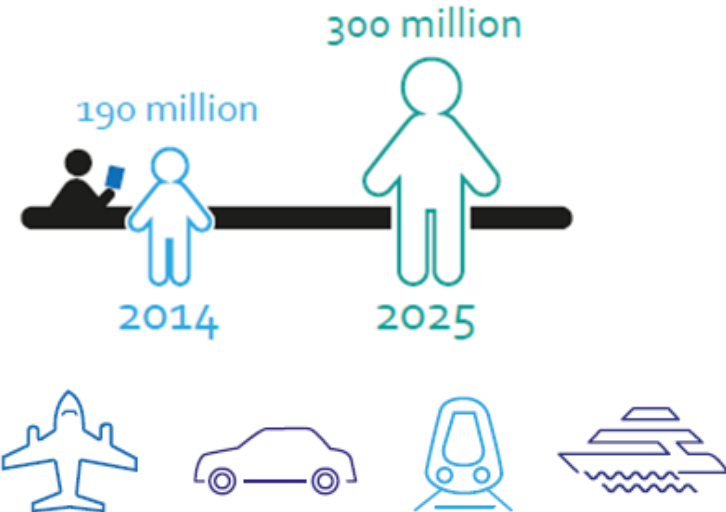
European Criminal Records Information System (ECRIS-TCN)




European Travel Information and Authorization System (ETIAS)

Entry-Exit System – overview

Forecast of border crossing number(*)



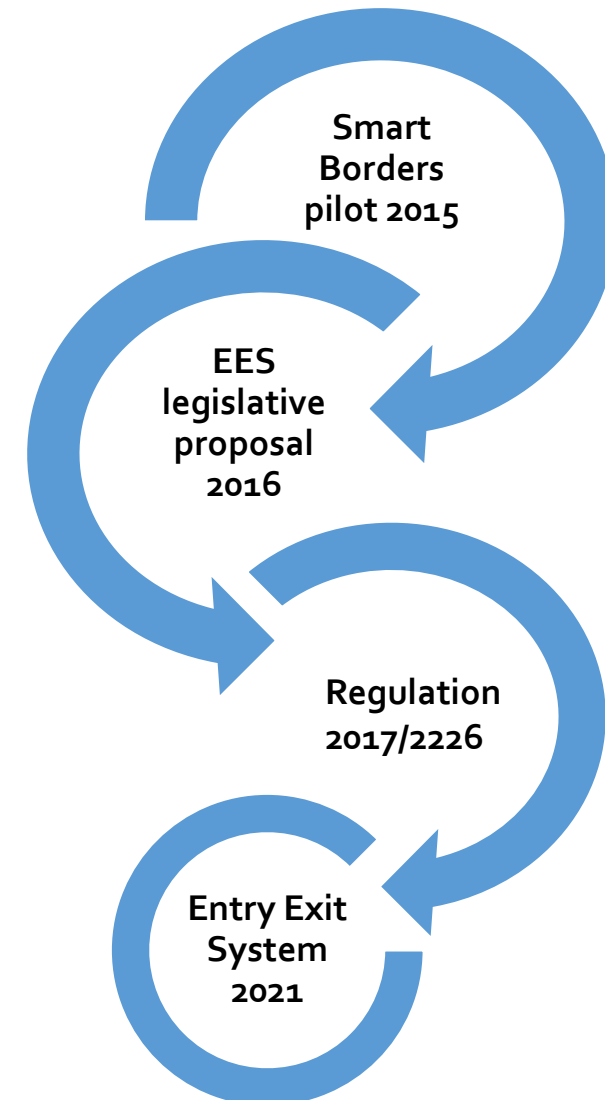
 Introduce **biometrics technology** in all types of borders and **register entry and exit electronically**



[EES Regulation 2017/2226](#) entered into force on 29 December 2017



EES development and operational management entrusted to **eu-LISA**



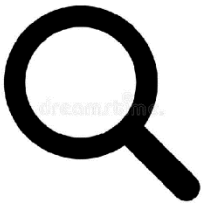
(*) European Commission, Technical Study on Smart Borders, 2014, ISBN 978-92-79-41798-6

Main purposes of EES



Enhance the efficiency of border checks

- Enhance the efficiency of border checks by calculating and monitoring the duration of the authorised stay on the entry and exit of third country nationals admitted for a short stay



Assist in the identification of third country nationals

- Assist in the identification of third country nationals who do not or no longer fulfil the conditions for entry to, or for short stay on, the territory of the Member States



Allow for the identification and detection of overstayers

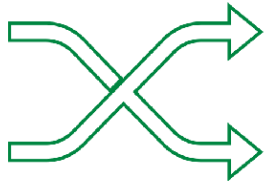
- Allow for the identification and detection of overstayers and enable the competent national authorities of the Member States (MS) to take appropriate measures

Main purposes of EES



Effective management of authorised short-stays

- Allow for the effective management of authorised short-stays (entries, exits and refusals)



Automation of border checks

- Enable automation of border checks and improve detection of document and identity fraud



Information about authorized stay

- Inform third country nationals about the duration of their authorised stay

Main purposes of EES



Support migration policy making

- Gather statistics to improve assessment of risk and support migration policy making



Reinforce internal security

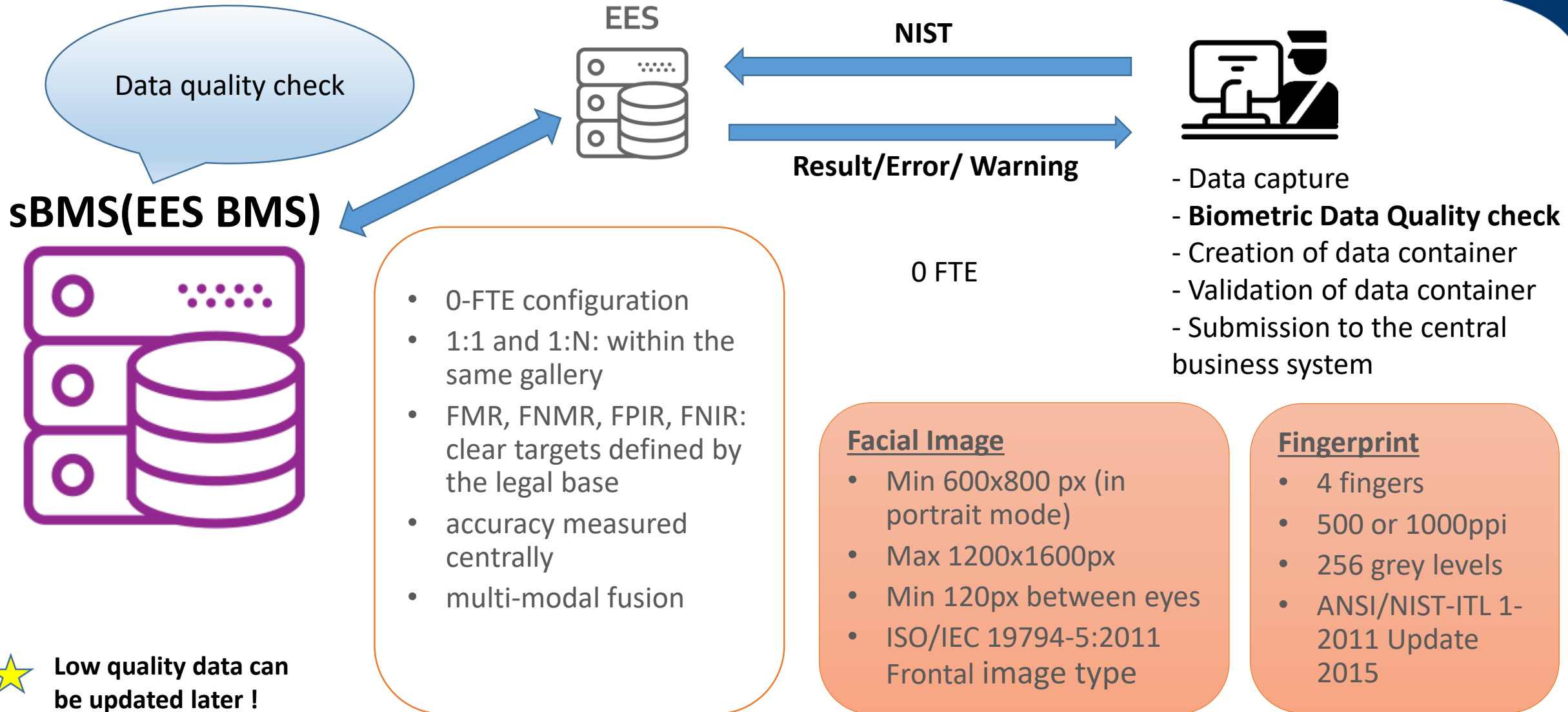
- Reinforce internal security and the fight against terrorism and serious crime by identifying perpetrators, suspects and victims of those offences (Law Enforcement)



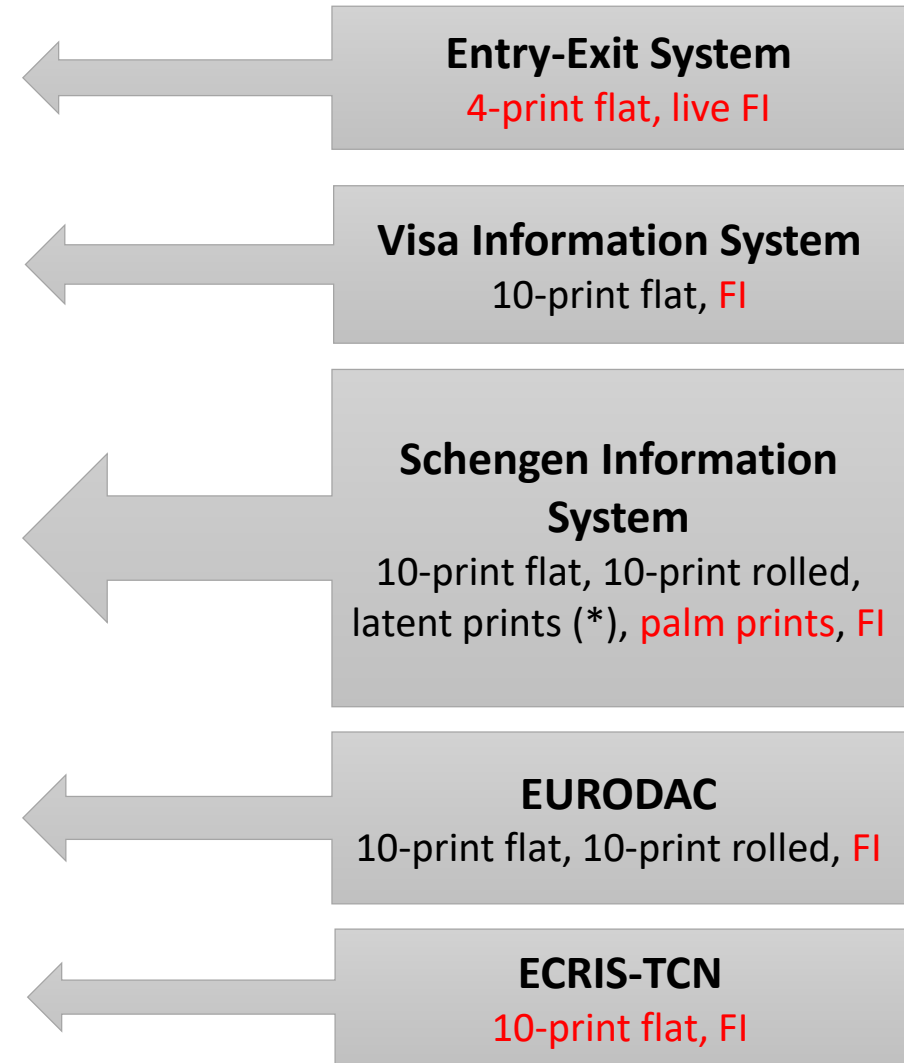
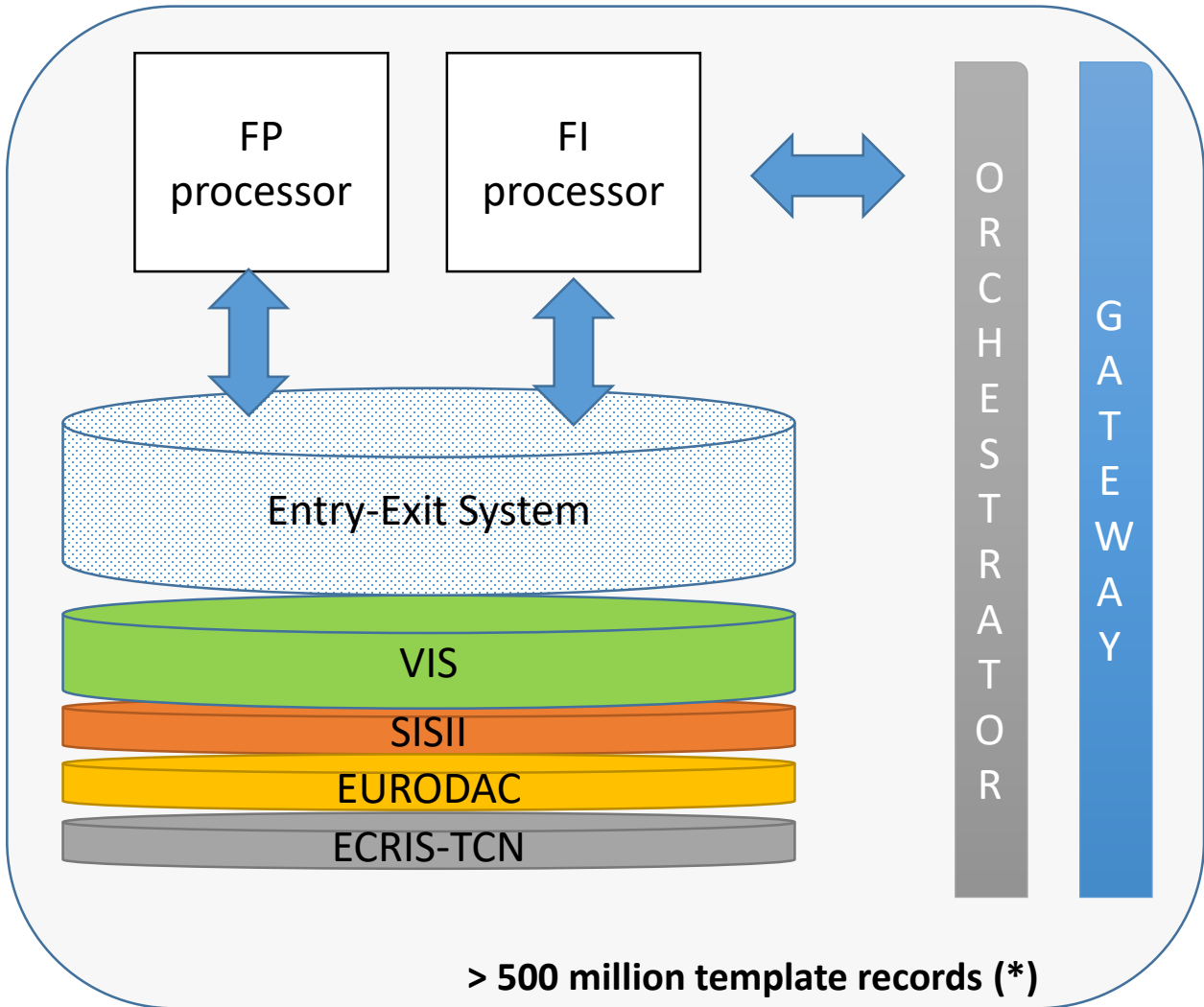
Support increased load at the Schengen borders

- Help member states in dealing with ever increasing number of travellers to the EU without having to increase the number of border guards

Biometric data flow in EES BMS



Shared Biometric Matching Service



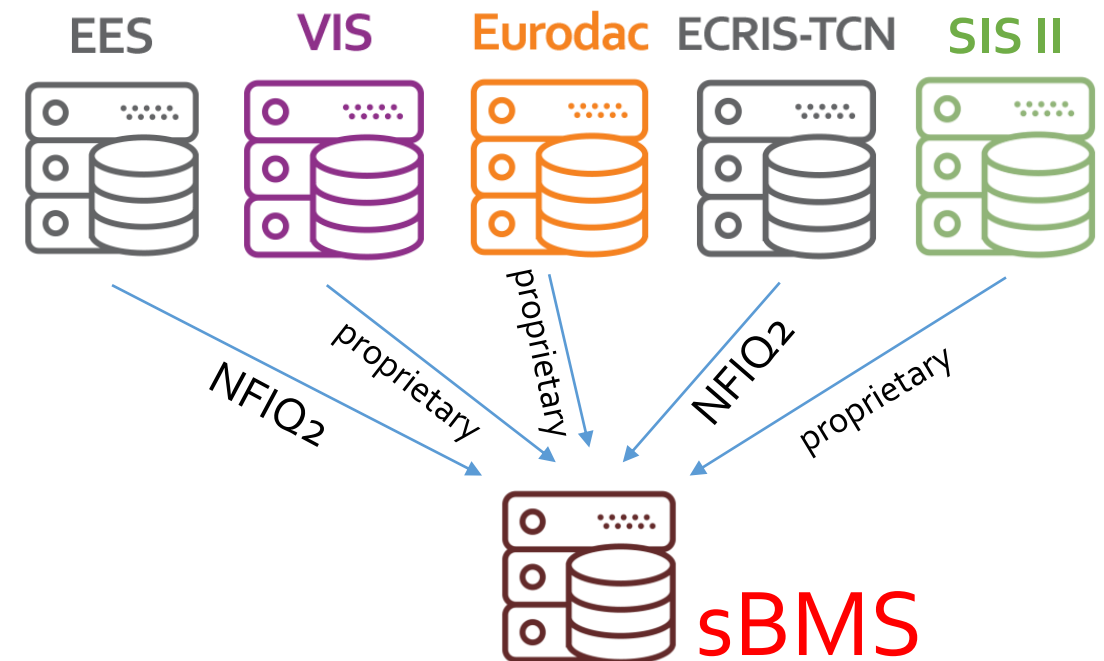
User Software Kit

- Ensure the quality of biometric data at MS level and consistency with the central site
- At the moment only Fingerprint and Face quality assessment
- Fingerprint
 - NFIQ2
 - Proprietary metric
 - Uniqueness control
 - Image segmentation
 - 1 finger and slap quality assessment
- Currently under beta testing

FP quality - Main challenges I

Data quality

- Legacy data from the different Core Business Systems
- Non-harmonized data quality, different thresholds per business domain
- Different metrics per business domain
- Different failure to enrol rates (FTE)
- Biometric quality as:
 - Prediction of the matching algorithm
 - Usefulness for human inspection



FP quality - Main challenges II

- In addition, eu-LISA will deal with different types of fingerprints
 - Different technologies
 - Classical contact sensors
 - Contactless sensors
 - Capacitive, thermal, resistive, ...
 - Different resolutions
 - 500 dpi
 - 1000 dpi
 - Different presentations
 - Flat, slaps
 - Rolled



FP quality - Main challenges III

- Rely on ISO standards
 - Guarantee interoperability
 - Prevent from vendor lock-in
- Shortcomings and non-readiness of NFIQ2 to cover the whole palette of business
 - Rolled fingerprints
 - Touchless fingerprints
 - 500 and 1000 dpi



FP quality – Next steps

- Rely on international standards – Liaison with ISO SC37
- Harmonise quality among systems
- NFIQ2
 - eu-LISA to start applying NFIQ2 when sBMS EiO
 - Previous analysis on the NFIQ2 – proprietary algorithms correlation
 - Previous analysis on the NFIQ2 – sBMS matching algorithms correlation
 - Necessity to analyse quality of different kind of fingerprints
 - Rolled fingerprints
 - Contactless fingerprints
 - Necessity of a future proof algorithm

Thank you for your attention!

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