



Federal Office  
for Information Security

# Automated Border Control (EasyPASS): Monitoring the system performance

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Section D 13 – Inspection Infrastructures

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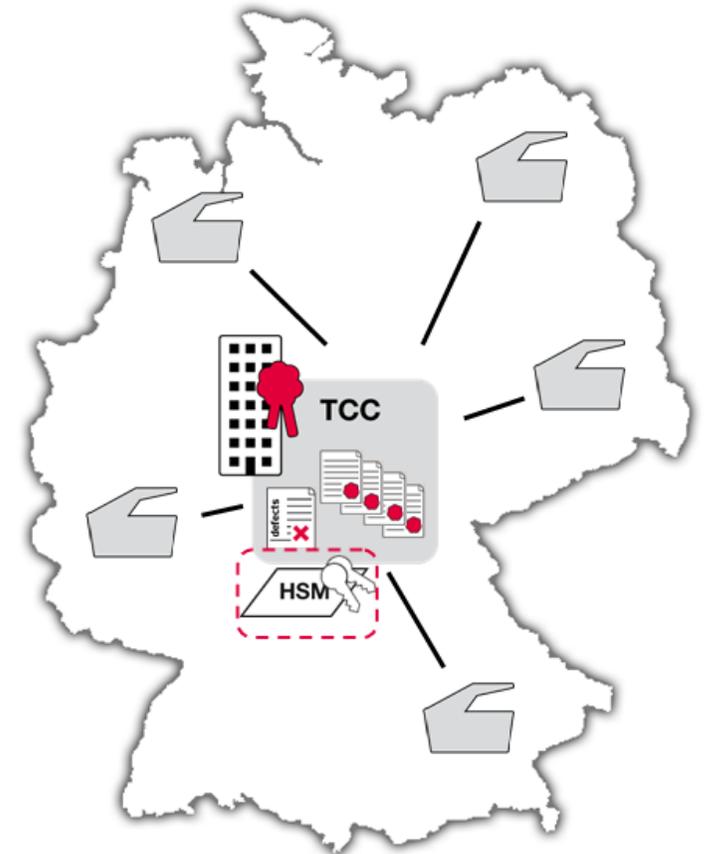
# Outline

- eMRTD operational tasks @ BSI
- EasyPASS operational monitoring
  - architecture and components
  - usage/application scenarios
  - shapes of monitoring output
- EasyPASS ABC system
  - system overview
  - facts and figures
  - eMRTD performance reporting



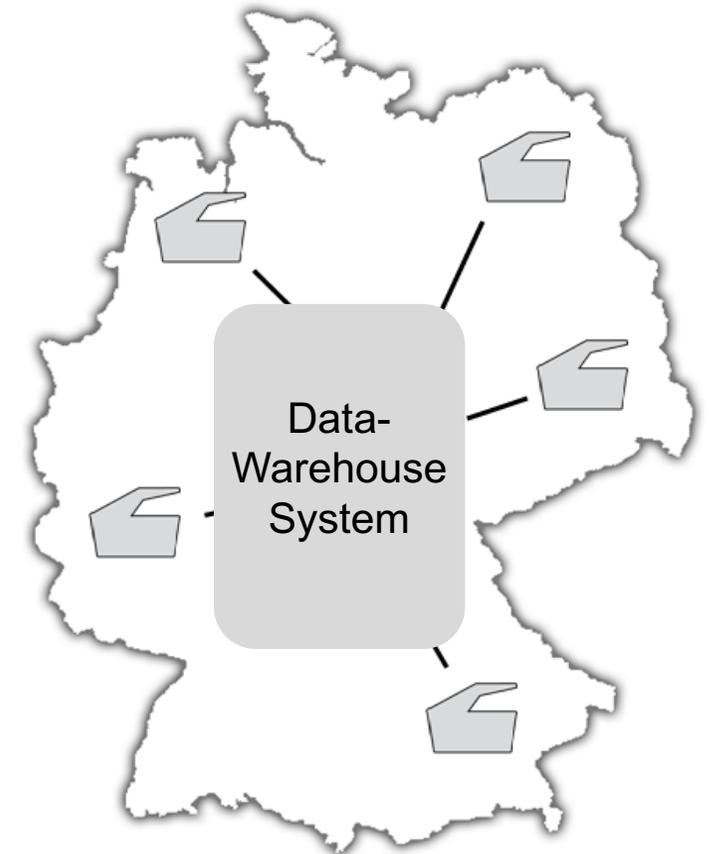
# eMRTD operational tasks @ BSI

- PKI
  - Country Signing Certificate Authority (CSCA)
    - national trust anchor to protect chip data
  - National Public Key Directory (NPKD)
    - trustworthy CSCA certificates for document inspection
  - Country Verifying Certificate Authority (CVCA)
    - access to sensitive chip data (root instance of national EAC-PKI)



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    - access to sensitive chip data (root instance of national EAC-PKI)
- Monitoring infrastructure
  - **centralized monitoring** regarding **operational aspects** of **key components** of the **national inspection infrastructure**
  - **statistics** and **performance assessment**
    - to allow for system optimization, to ensure reliability, quality,...



# EasyPASS operational monitoring – architecture and components



- Distributed Data-Warehouse system operated by BSI and Federal Police
- In-house development based on open source software
  - MySQL, Pentaho, Saiku,...
- Receives and processes XML log files from EasyPASS systems and also from manual border control
  - XML logging schemes according to BSI Technical Guidelines
    - BSI TR-03121 (Biometrics)
    - BSI TR-03135 (MRTD authentication)
    - Both guidelines available on <https://www.bsi.de>
- Independent from e-Gate and/or inspection system vendors



# EasyPASS operational monitoring – what is it applied for?



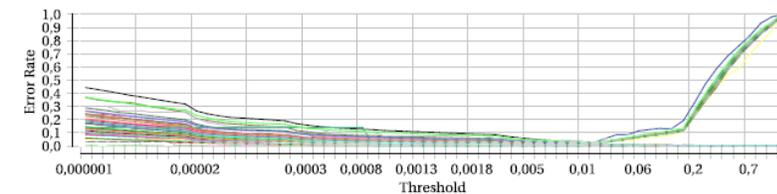
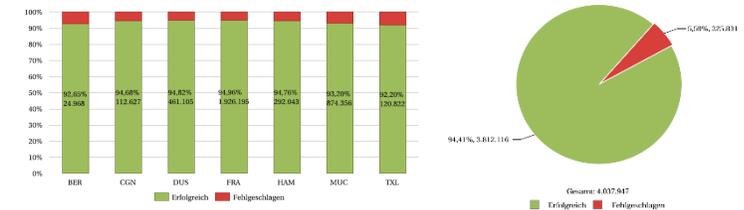
- Acceptance tests
  - first time installation on each site
  - system improvements (revised hard- and/or software components)
- Monitoring of day-to-day operations
  - usage statistics
  - performance evaluations
    - processing times/speed
    - document authentication
    - biometric verification
  - system failure detection
- Detection and characterization of system optimization potential, e.g.
  - country or document type specific error rates



# EasyPASS operational monitoring – shapes of monitoring output



- Ad-hoc analysis
  - flexible views on Data-Warehouse content
- Dashboards
  - workload and usage
  - rejects and errors
  - unknown certificates
- Reports (periodically)
  - usage statistics
  - performance evaluations
    - high level summary
    - detailed performance reports on
      - eMRTD authentication
      - biometric verification



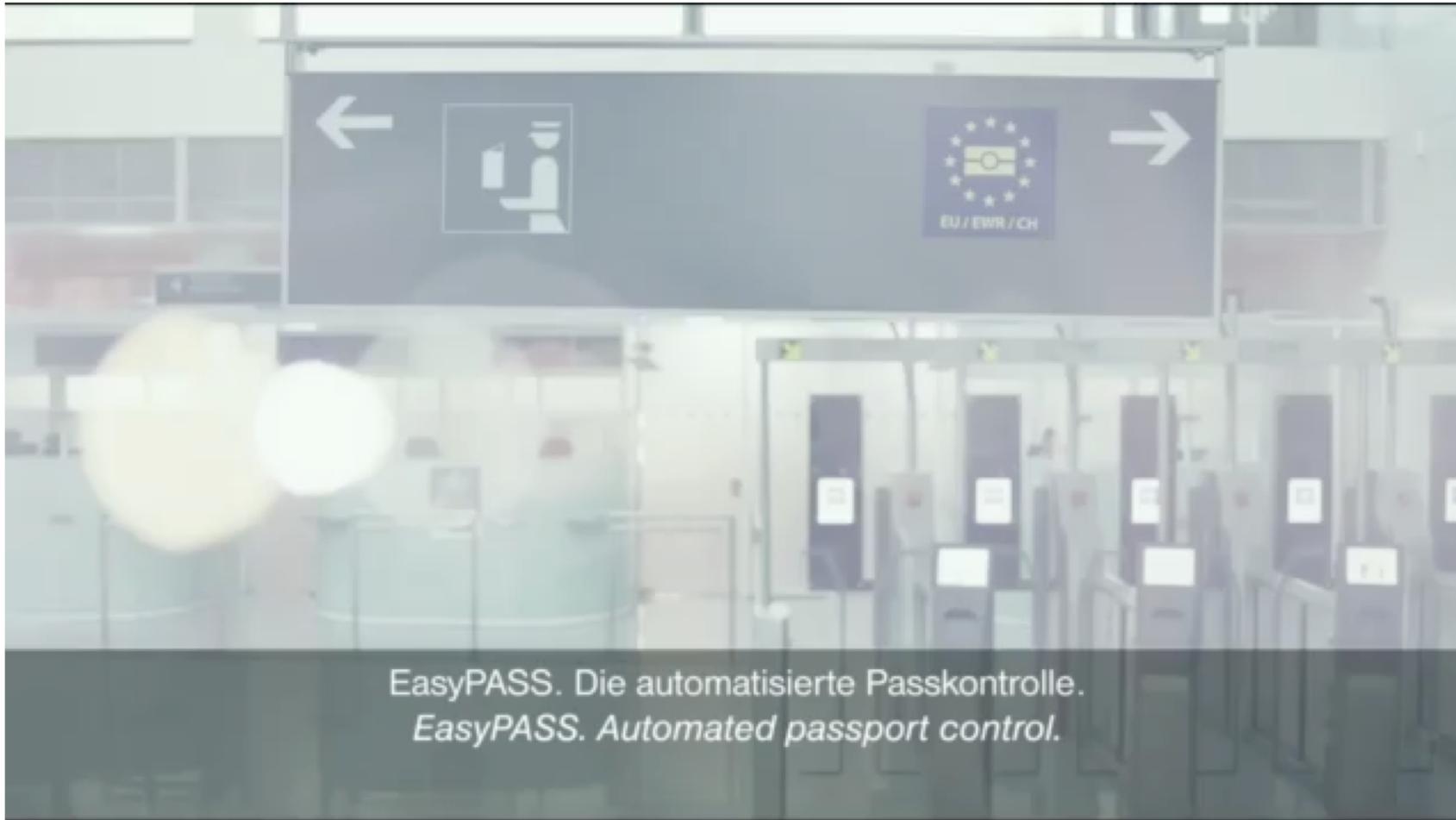
# EasyPASS at a glance



- EasyPASS := German Automated Border Control (ABC) system
  - e-Gate setting := Integrated 2-Step
    - Step 1: eMRTD authentication
    - Step 2: biometric face verification
- Open for citizens of EU + SAC (32 European countries; 18+ years old)
  - in addition: registered travelers from USA, Hong Kong and (from 2018-12-01 on) South Korea
  - in addition: travelers from selected third countries (on exit only)
    - ARE, AUS, BRA, CAN, CHL, ISR, JPN, KOR, NZL, SGP, TWN, USA
- Supported eMRTDs:
  - ePassport
  - German electronic ID card



# EasyPASS guidance video



# EasyPASS history



- 2009 – 2011: pilot project of German Federal Police and BSI
  - 4 e-Gates at FRA airport
  - development, setup and connection to background systems
- 2012 – 2013:
  - cost-benefit analysis
  - requirements specification (Technical Guidelines)
  - tender process
  - contract awarded to the consortium Bundesdruckerei GmbH / secunet Security Networks AG
- Since 2014:
  - roll-out and live operation

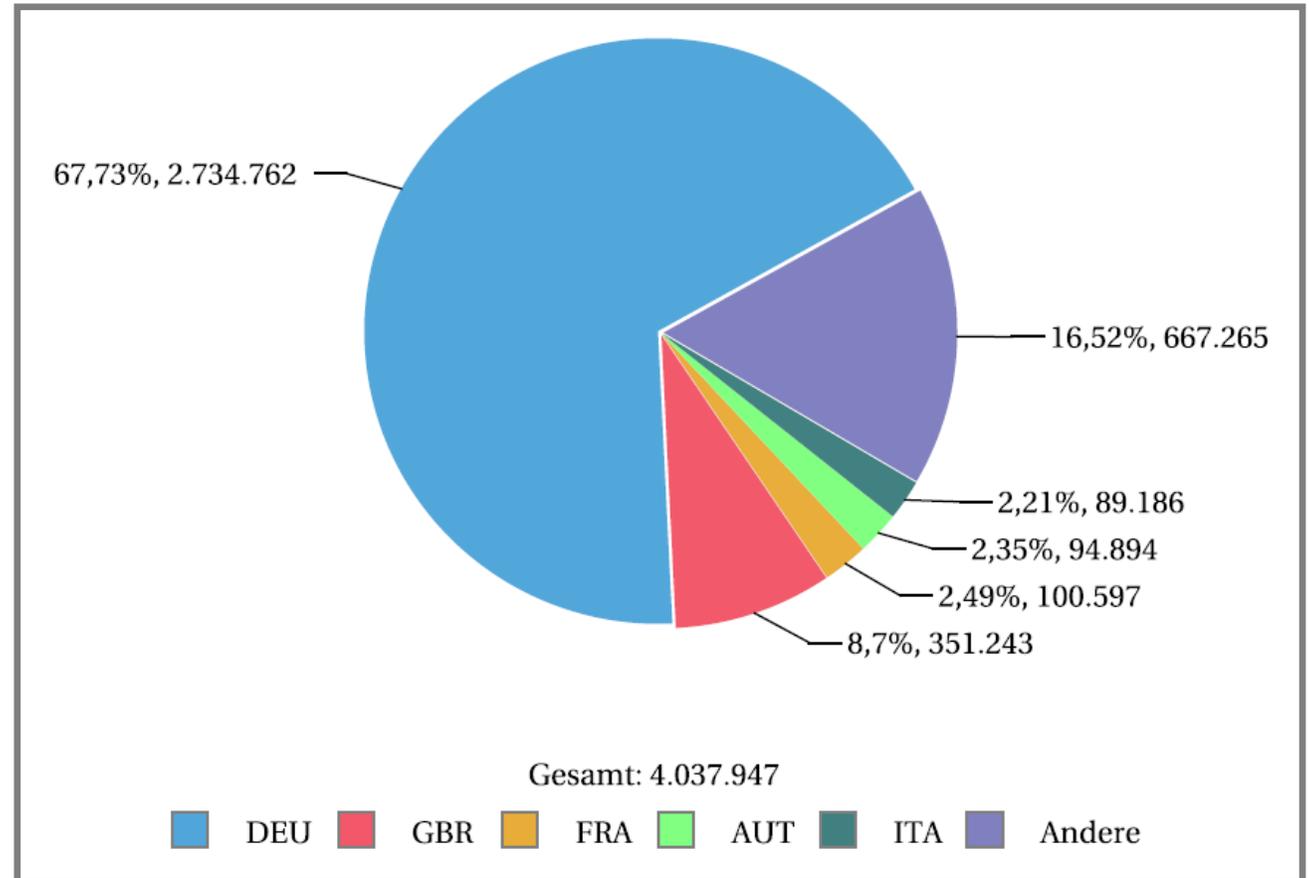


# EasyPASS facts and figures (10 weeks, since 09/2018)

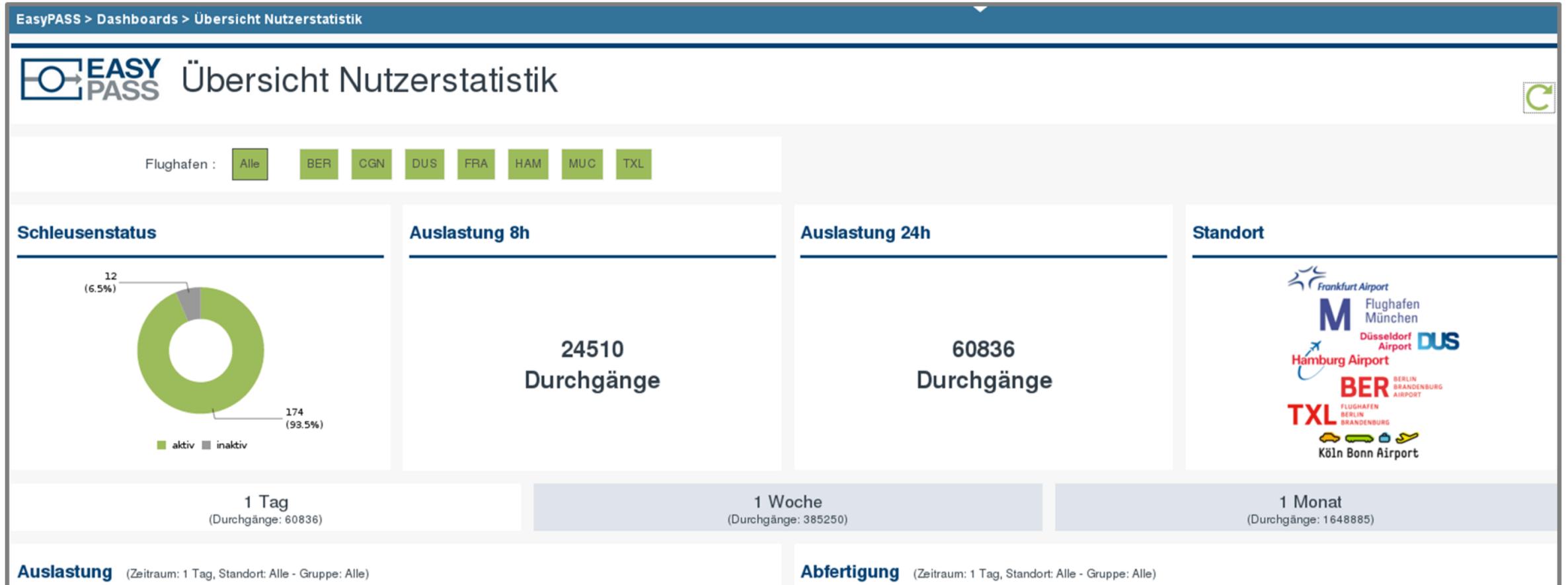


- **190 e-Gates** in operation at **7 airports**
  - FRA, MUC, DUS, HAM, CGN, TXL, SXF/BER
- **400.000** travelers per week
  1. German eMRTDs (DEU): **67%**
  2. UK ePassports (GBR): **9%**
  3. other nationality ePassports: **24%**

%/# border crossings per issuing country



# EasyPASS dashboard – overall workload/usage statistics

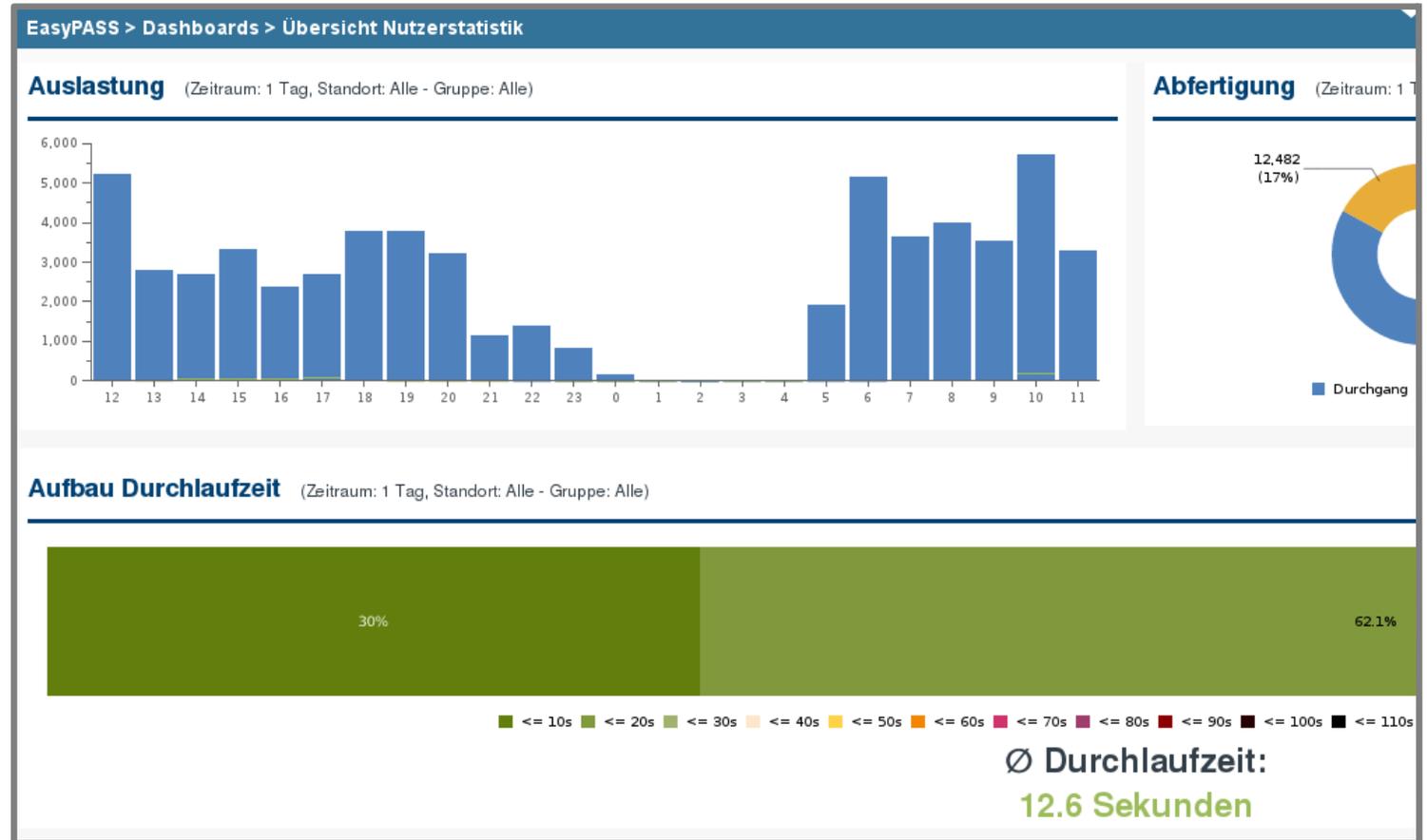


# EasyPASS facts and figures (10 weeks, since 09/2018)



- 190 e-Gates in operation at 7 airports
- 400.000 travelers per week
- **12,6 Sec.** processing time per traveler

## workload/timing statistics

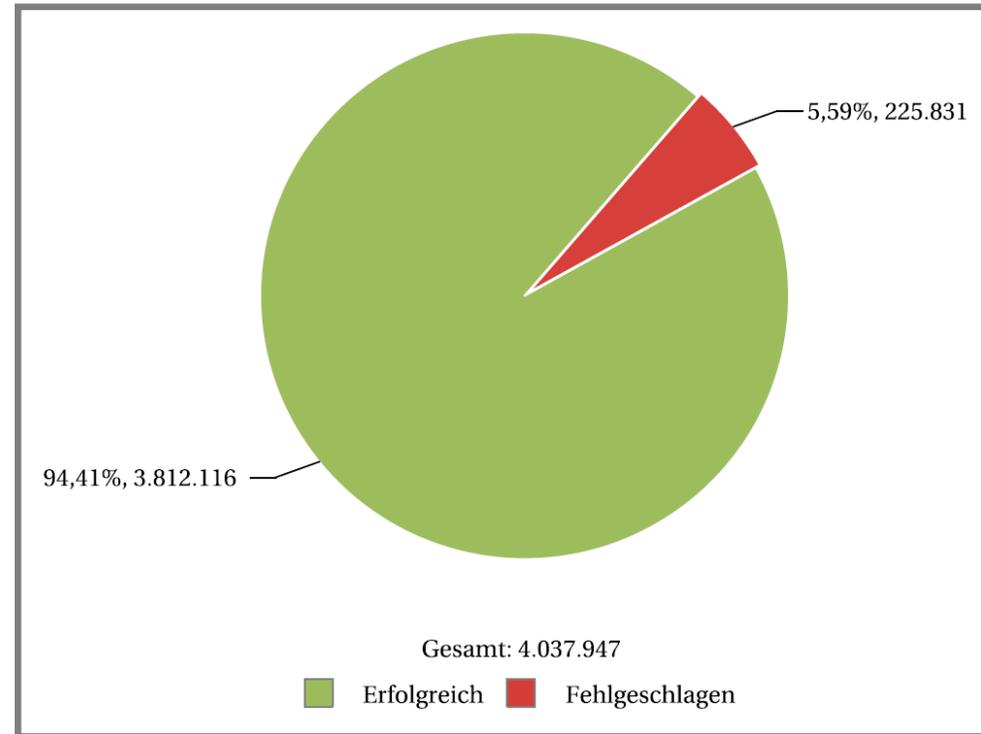


# EasyPASS facts and figures (10 weeks, since 09/2018)



- 190 e-Gates in operation at 7 airports
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- 12,6 Sec. processing time per traveler
- **94,4%** operational success rate
  - **5,6%** operational reject rate

## operational performance



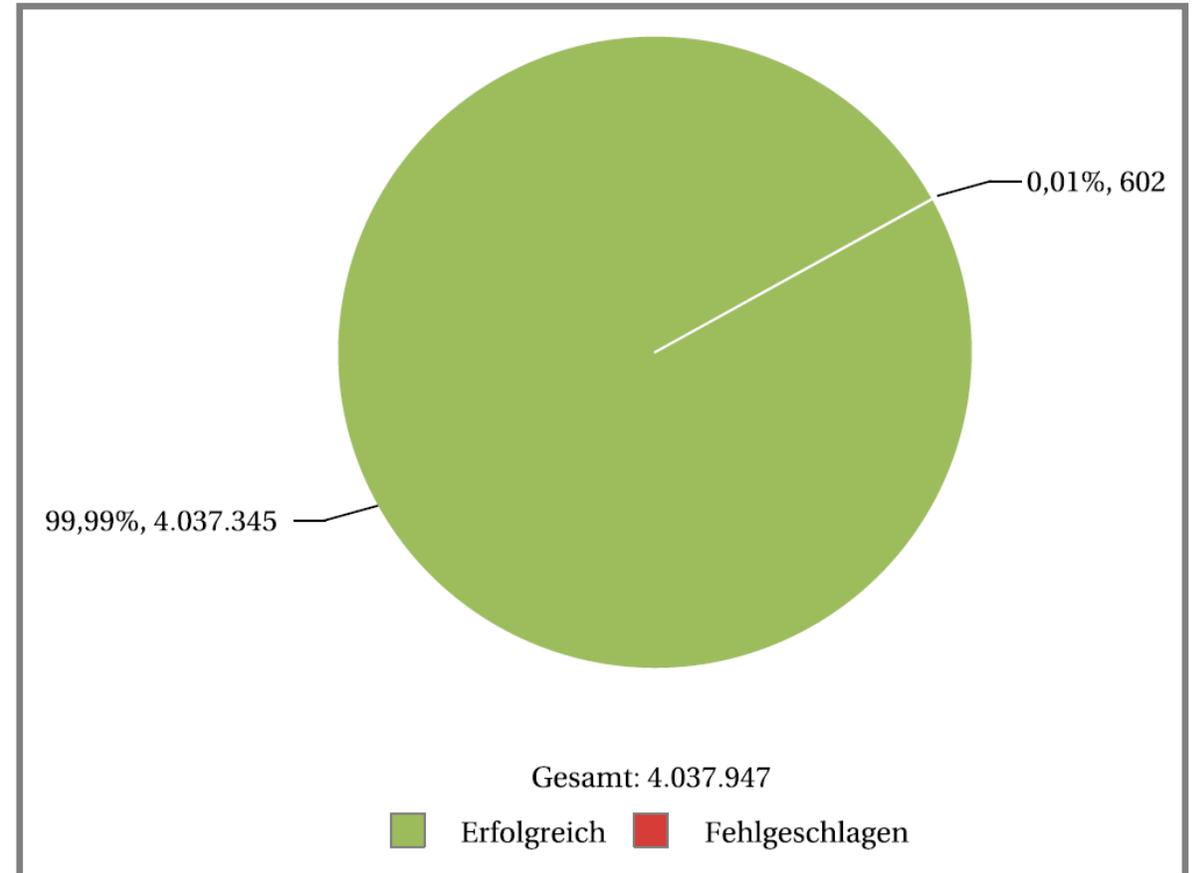
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- 0,01% rejects due to electronic document checks

electronic document check performance



# EasyPASS electronic document checks – detailed results



AA/CA issues

Certificate issues

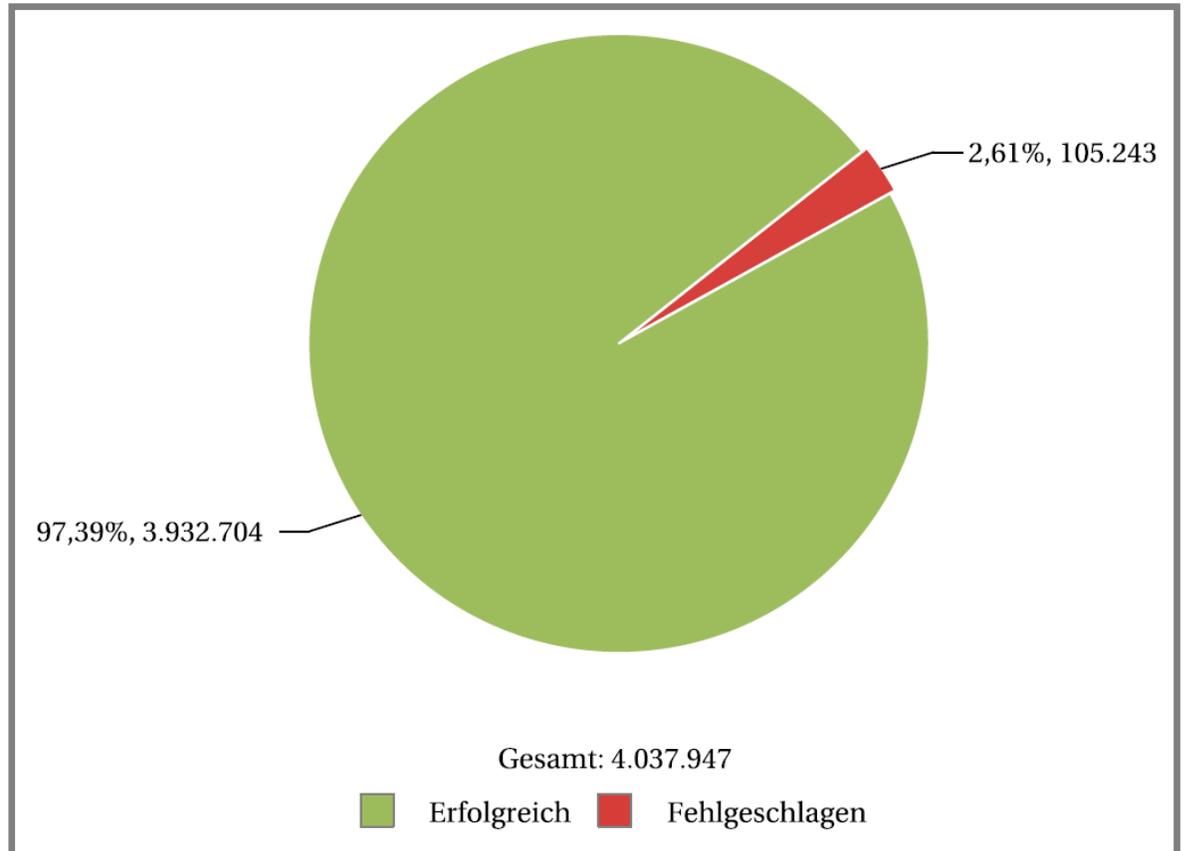
Prüfung	Anzahl Prüfprozesse	Anzahl Prüfprozesse erfolgreich	Anteil Prüfprozesse erfolgreich [%]	Anzahl Prüfprozesse unbestimmt	Anteil Prüfprozesse unbestimmt [%]	Anzahl Prüfprozesse fehlgeschlagen	Anteil Prüfprozesse fehlgeschlagen [%]	Anzahl Prüfprozesse nicht durchgeführt	Anteil Prüfprozesse nicht durchgeführt [%]
Chipzugriffsprüfung	4.037.947	4.037.847	100,00%	0	0,00%	0	0,00%	100	0,00%
Terminal-authentifizierung	4.037.947	512.940	12,70%	0	0,00%	0	0,00%	3.525.007	87,30%
Chipechtheitsprüfung	4.037.947	3.664.433	90,75%	1	0,00%	209	0,01%	373.304	9,24%
Chipsignaturprüfung	4.037.947	4.037.802	100,00%	11	0,00%	34	0,00%	100	0,00%
Aussteller-zertifikatsprüfung	4.037.947	4.037.617	99,99%	105	0,00%	125	0,00%	100	0,00%
Integritätsprüfung	4.037.947	4.037.812	100,00%	101	0,00%	34	0,00%	0	0,00%

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    - 2,6% rejects due to biometrics

biometric performance

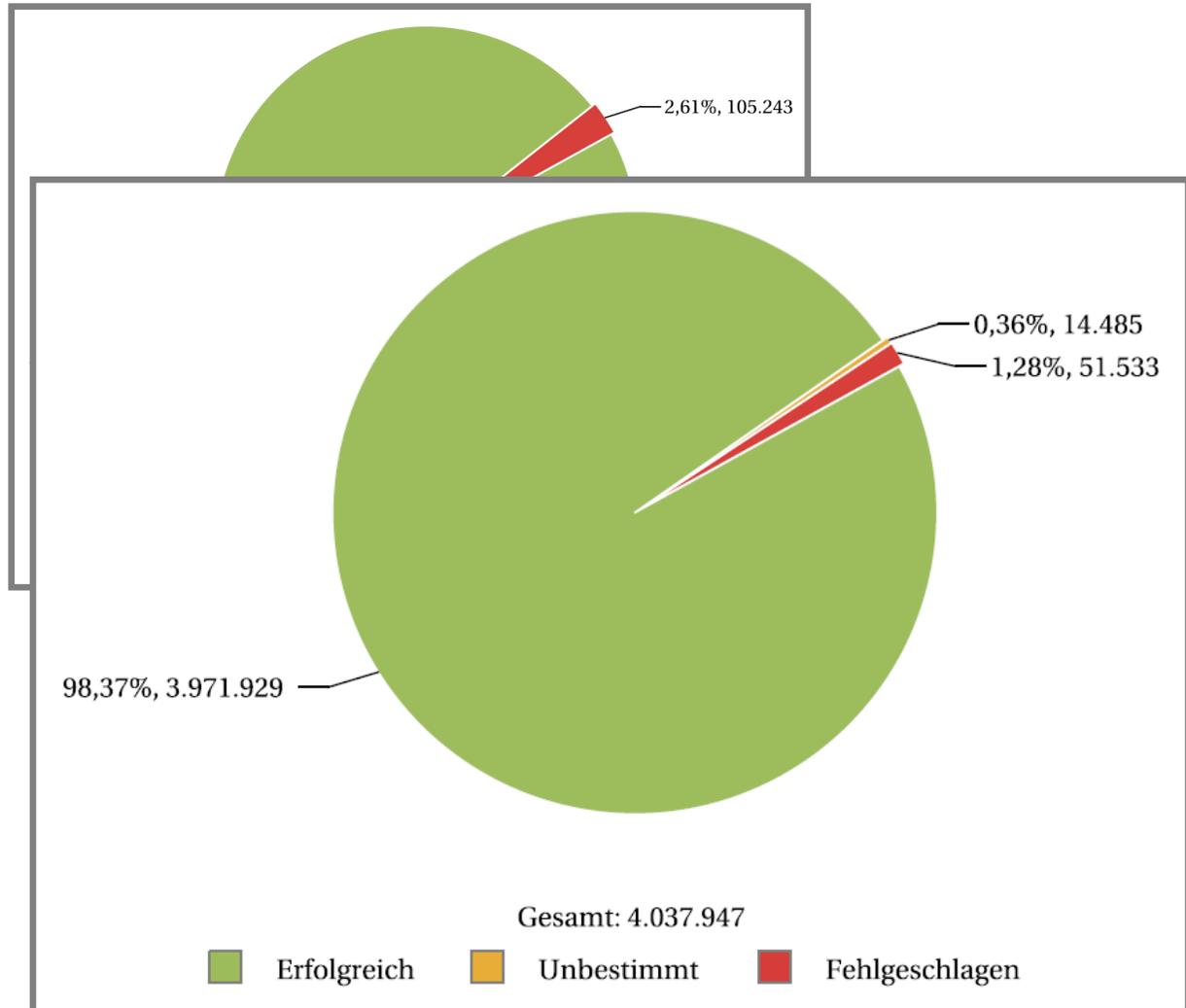


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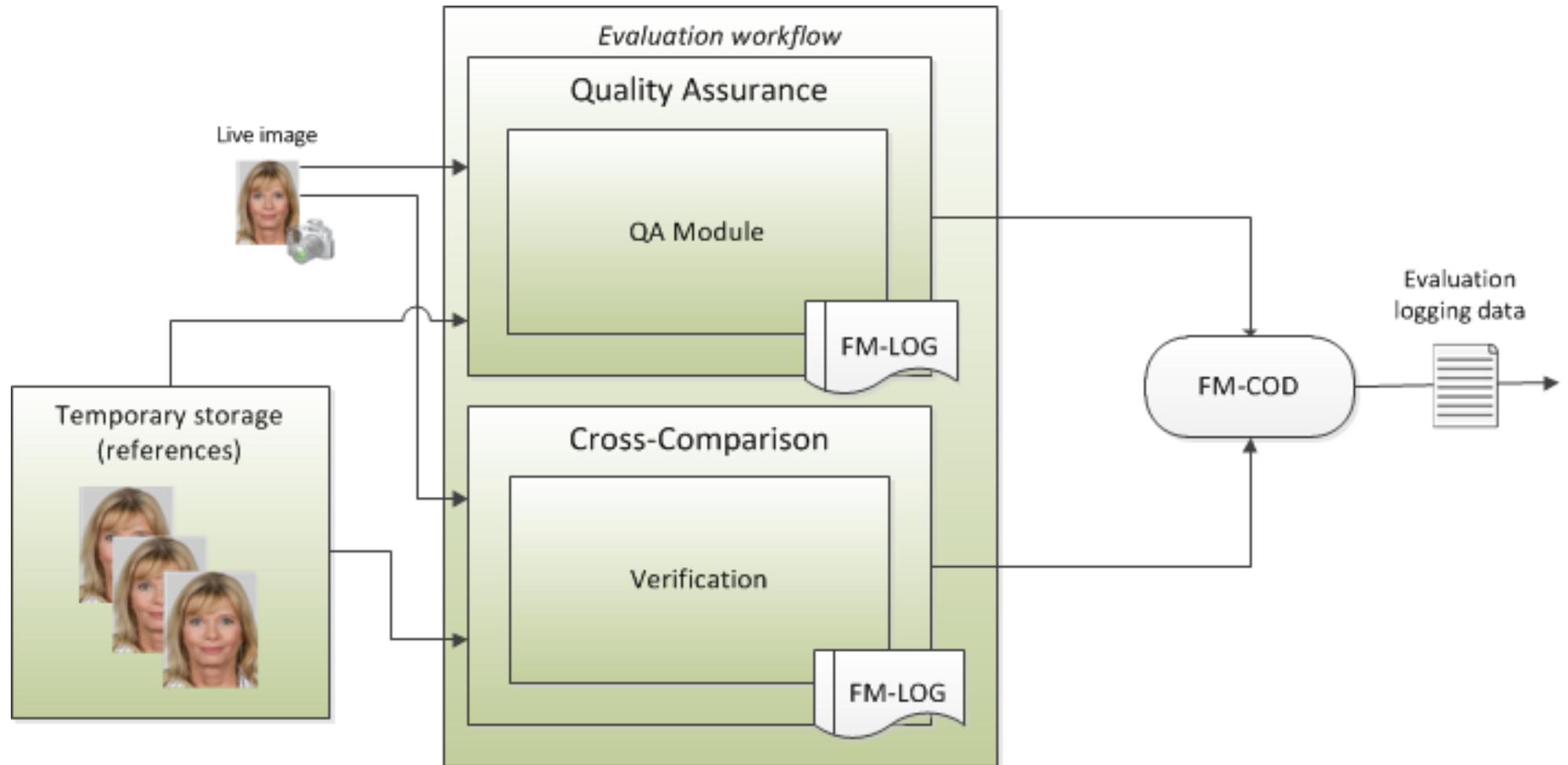


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    - 2,6% rejects due to biometrics
      - 1,3% score below threshold (@ 0,1% FAR)
      - 0,4% failure to acquire
      - 0,9% PAD alert

biometric performance

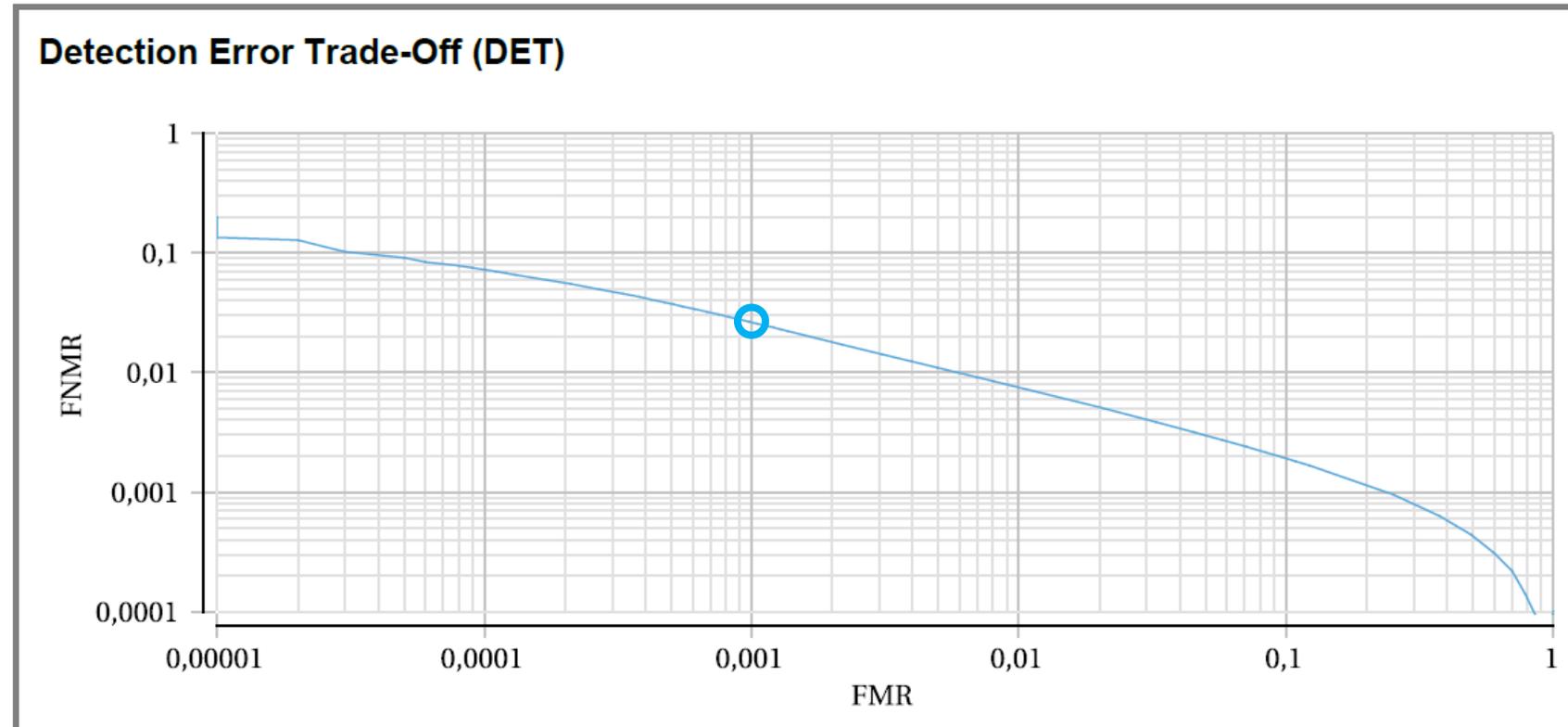


# EasyPASS biometric evaluation workflow – monitoring the biometric point of operation



# EasyPASS biometric evaluation workflow – monitoring the biometric point of operation

Cognitec FaceVACS v9.1.1

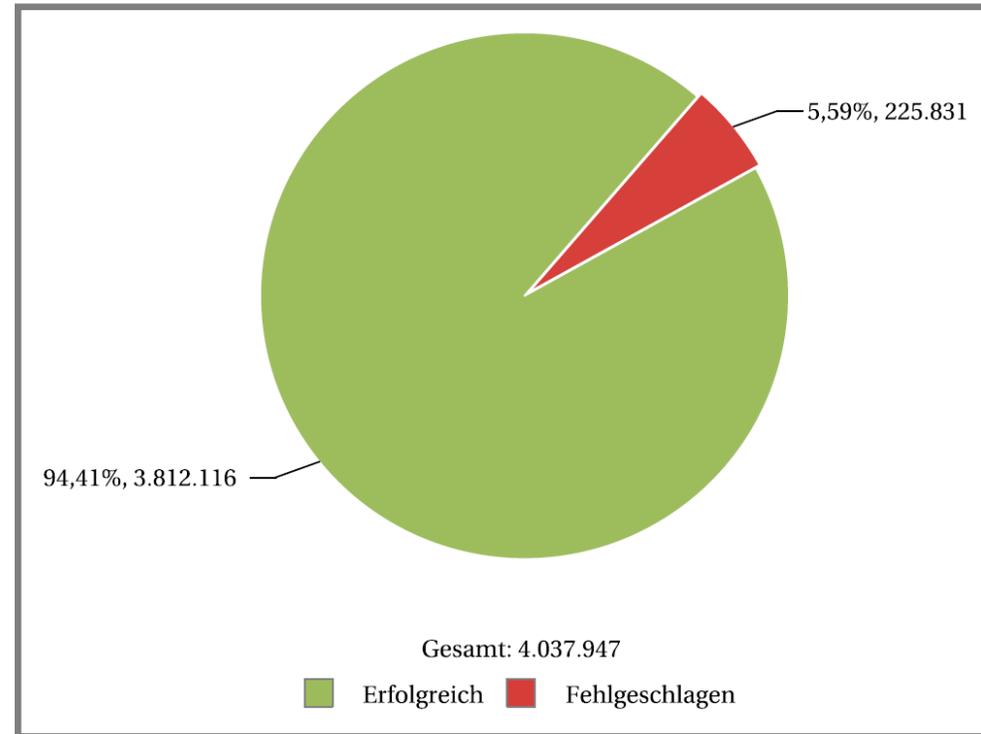


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    - 0,01% rejects due to electronic document checks
    - 2,6% rejects due to biometrics
    - 3% rejects due to other reasons
      - optical document checks
      - background checks
      - traveler behavior (e.g. pushing door)

## operational performance



# EasyPASS eMRTD performance reporting



- eMRTD performance reports are compiled for each EasyPASS-enabled country
  - compiled on a annual/quarterly basis
  - allow performance comparison for eMRTDs of different countries within EasyPASS
  - yet bilaterally exchanged with some few countries (within Frontex and ICAO working groups)
- eMRTD performance report (DEU, 10 weeks, since 09/2018)
  - eMRTD chip reading times
  - eMRTD electronic check results

Country	# eMRTD	Average [sec]
DEU	2.734.800	2,65
All countries	> 4.000.000	2,82
Country (min)	> 300	1,39
Country (max)	> 60.000	5,54

Country	# eMRTD	Success rate
DEU	2.734.800	100,00%
All countries	> 4.000.000	99,99%
Country (max)	> 2.000.000	100,00%
Country (min)	> 100	72,81%

# EasyPASS eMRTD performance reporting



- eMRTD performance report (DEU, 10 weeks, since 09/2018)
  - Biometric face verification times

Country	# Verifications	Average [sec]
DEU	2.734.800	2,32
All countries	> 4.000.000	2,34
Country (min)	> 9.000	1,84
Country (max)	> 7.000	3,42

- Biometric face verification results

Country	# Verifications	Success rate
DEU	2.734.800	98,59%
All countries	> 4.000.000	98,37%
Country (max)	> 4.000	99,76%
Country (min)	> 300	87,71%

# Take home messages

- ePassport is the **key enabler** for implementing and running ABC systems
- Electronic document checks
  - distribution/availability of CSCA certificates is still a main challenge
  - **certificates (public keys) need to be public !!!**
- Operational monitoring
  - essential tool to support day-to-day operations at the border
    - usage statistics, performance evaluations, system failure detection, etc.
  - to be done/to be improved:
    - **harmonized/common metrics** regarding **ABC/eMRTD performance assessment**
    - **communication/exchange of performance reports**



# Thank you very much!

## Contact

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