Biometric Identity Management System

In February 2015, UNHCR completed development of it's new biometric identity management system (BIMS), building on the successful use of biometrics across a number of UNHCR operations globally. When fully rolled out, BIMS will support all standard registration activities and help to better register and protect people, verify their identity and target assistance for the forcibly displaced in operations around the world.

UNHCR
United Nations High Commissioner for Refugees
Haut Commissariat des Nations Unies pour les réfugiés

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Agenda

- Project Overview
- Solution Overview
- Operations
- High-level Architecture
- Metrics
- What's Next

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Overview

Project goals:

- Introduction of a global biometric enrolment and verification solution for the purpose of:
  - Equitable distribution of benefits (ration)
  - Move away from paper-based system where identity documents can be lost
  - Reduce fraud
- Usage must be possible in urban centers as well as in field environments
- Scope: capture, enrolment and verification of the biometric data of the entire refugee population across disparate locations

Key requirements:

- Modular system design
- Rugged, Fast, accurate, effective, non-invasive, intuitive
- Scalable and extensible
- Non-proprietary and vendor agnostic

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Overview

Supported functions:

- Enrollment
- Identification and Verification
- Deduplication and resolution of adjudication cases
- Administration portal (User Administration, Roles and Permissions, Synchronization configuration)
- Reporting
- System Monitoring
- Simple License Management

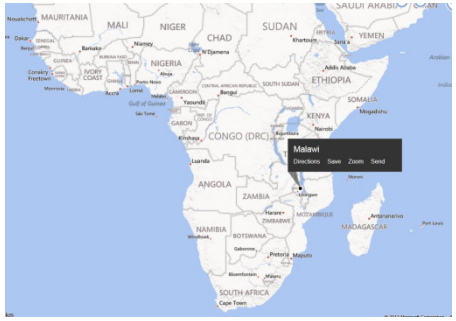
Project scope:

- Customization, Configuration, Integration
- Client training (train-the-trainer)
- Customized training materials and user documentation
- Client administrator training and documentation
- UAT environment setup
- Transition to Support and Maintenance

Integration and Customization timeline:

- 5 months for customization, User Acceptance Test and Deployment
- 1 month for the field Site Acceptance Test

Pilot



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BIMS – Biometric Capture

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BIMS Operations – Fingerprint Capture

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BIMS Operations – Iris Capture

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BIMS Operations - Thailand

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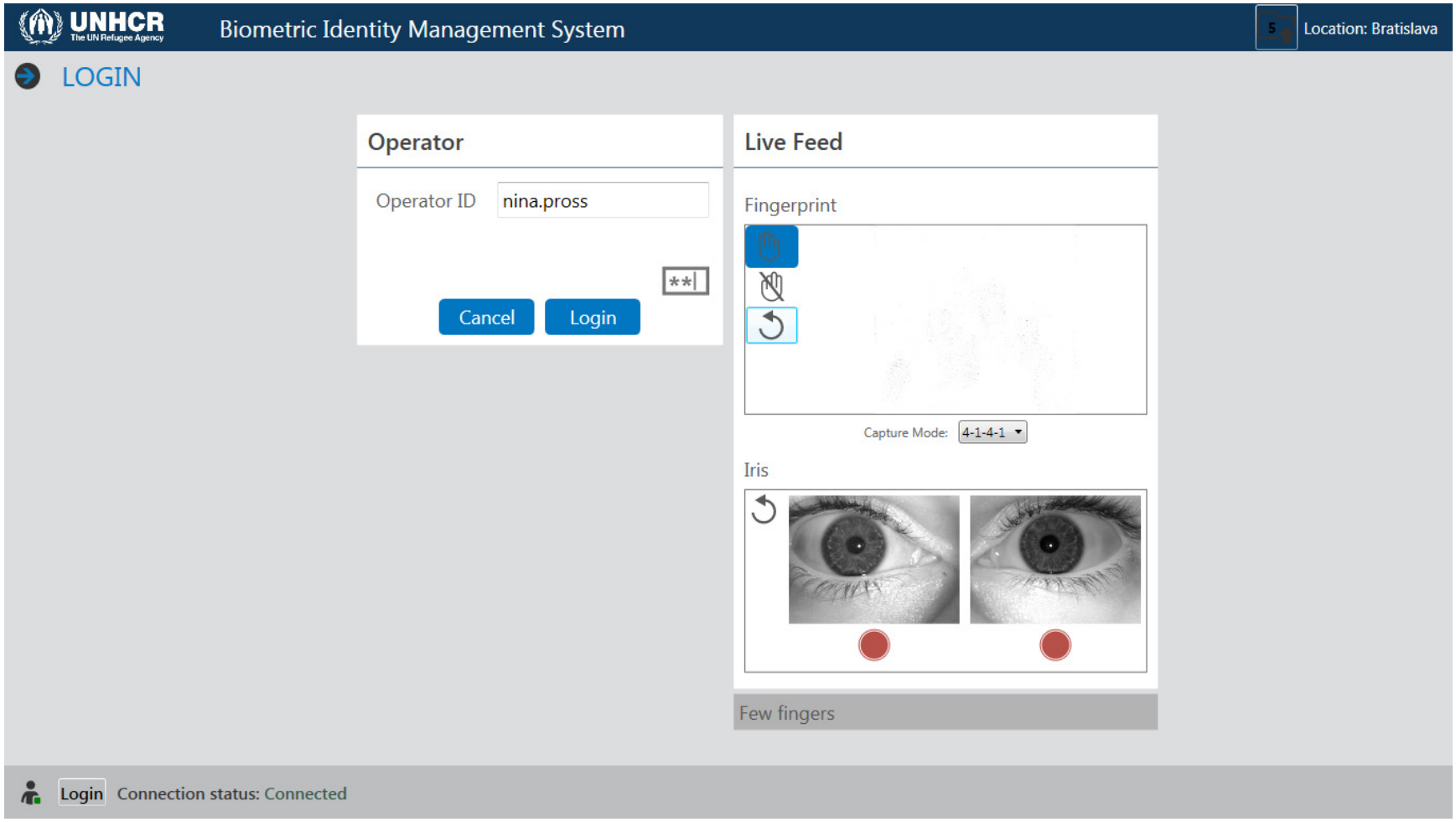
BIMS - Login



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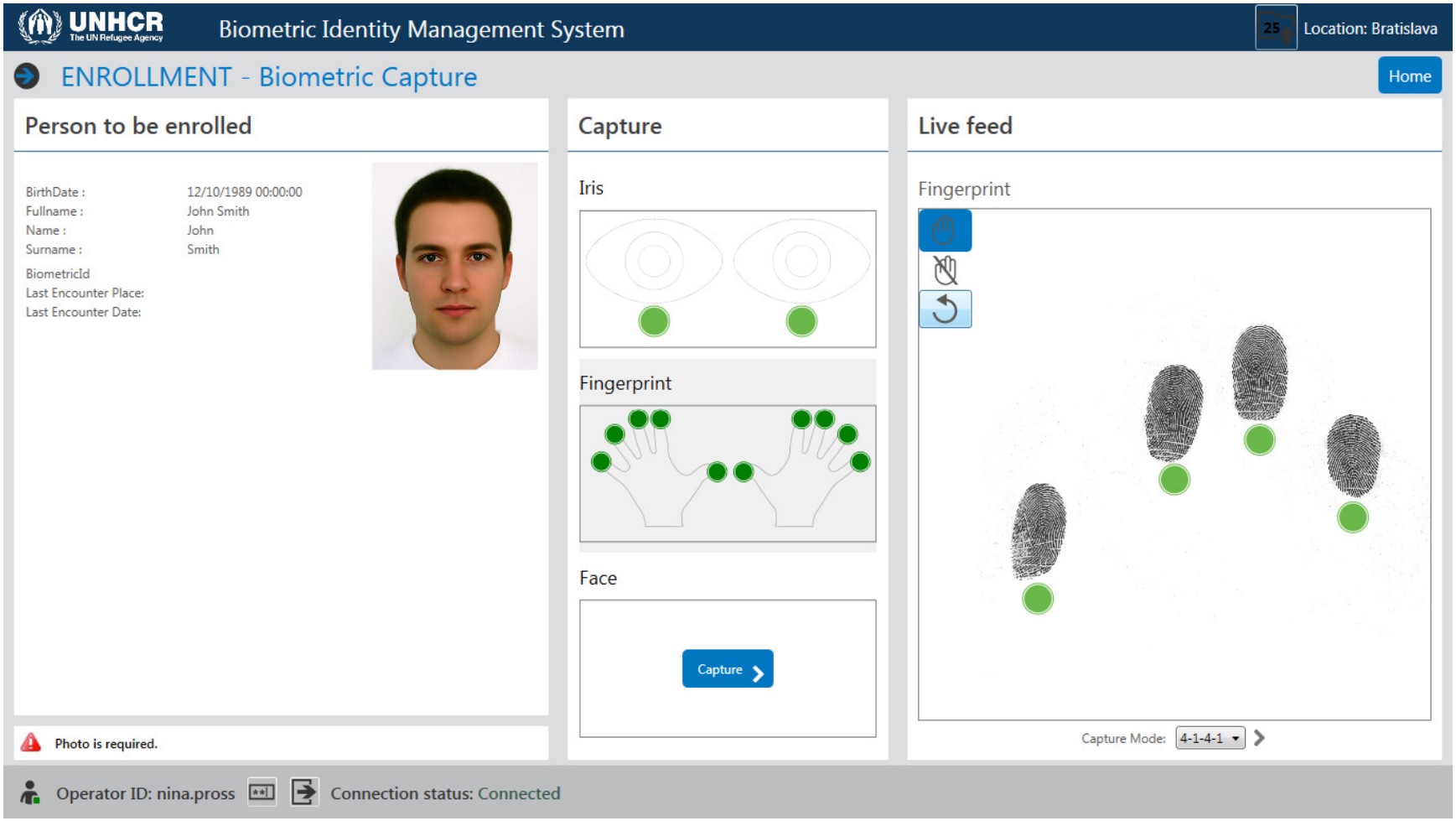
BIMS - Enrollment



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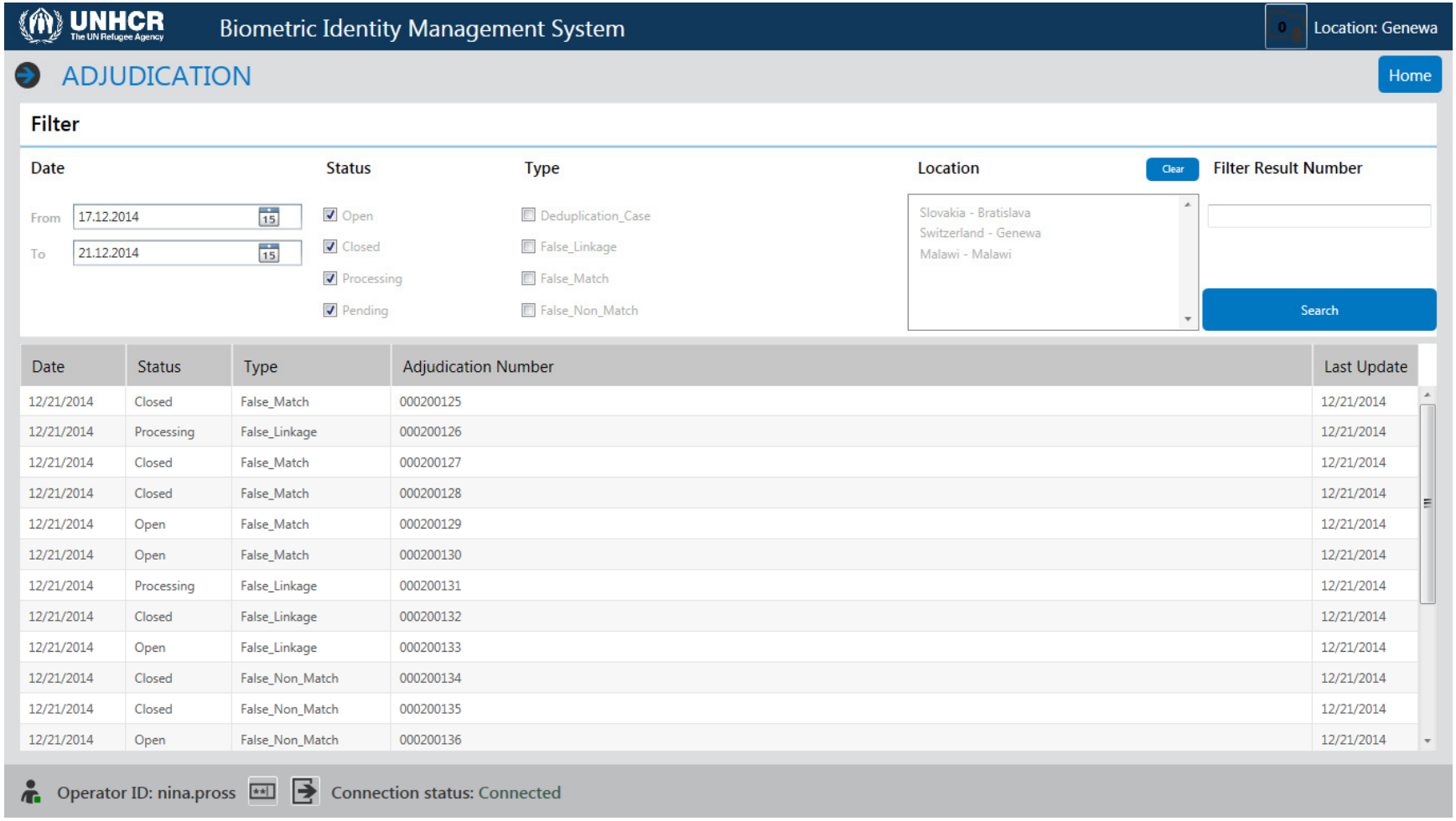
BIMS - Adjudication



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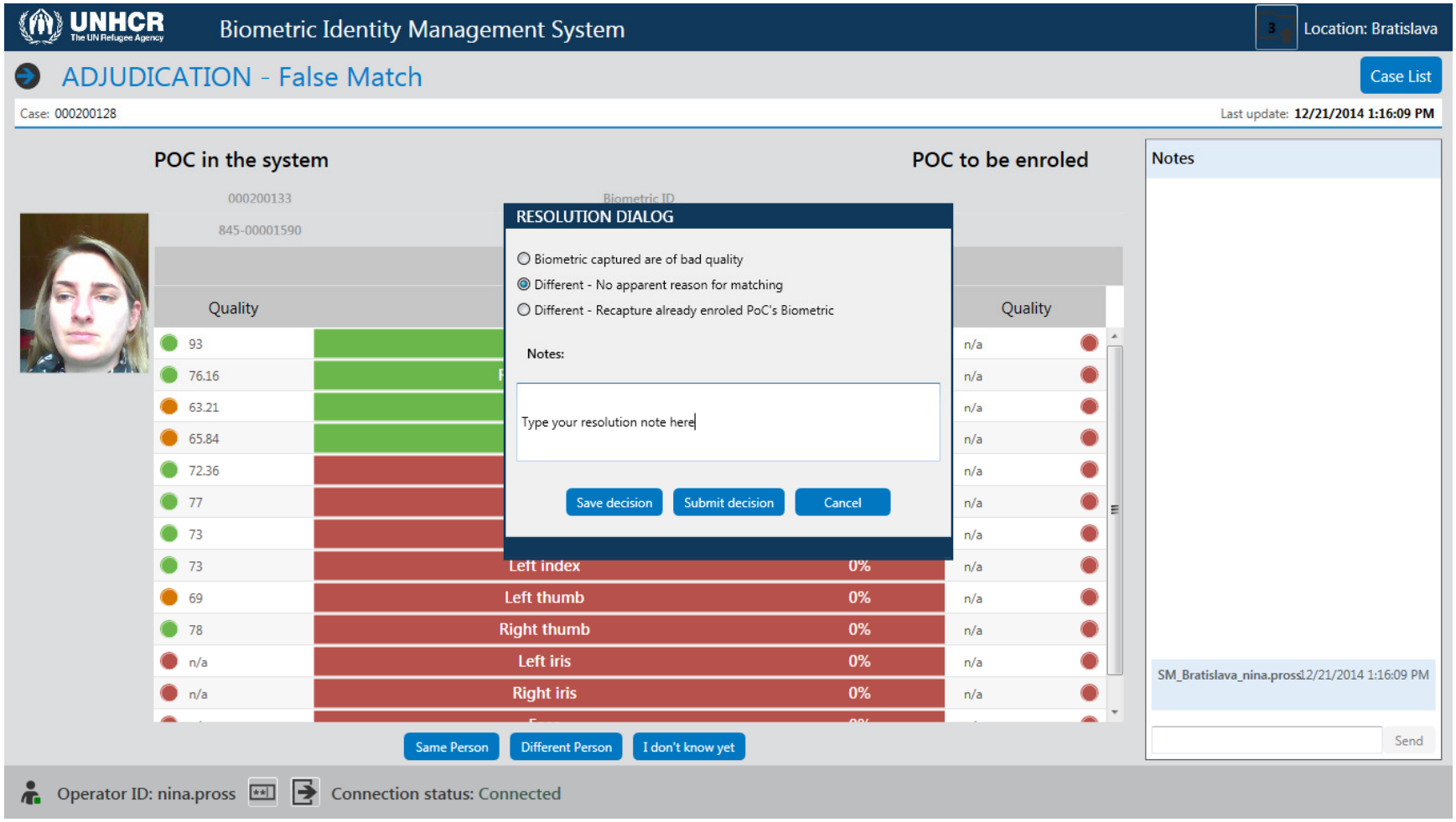
BIMS - Adjudication



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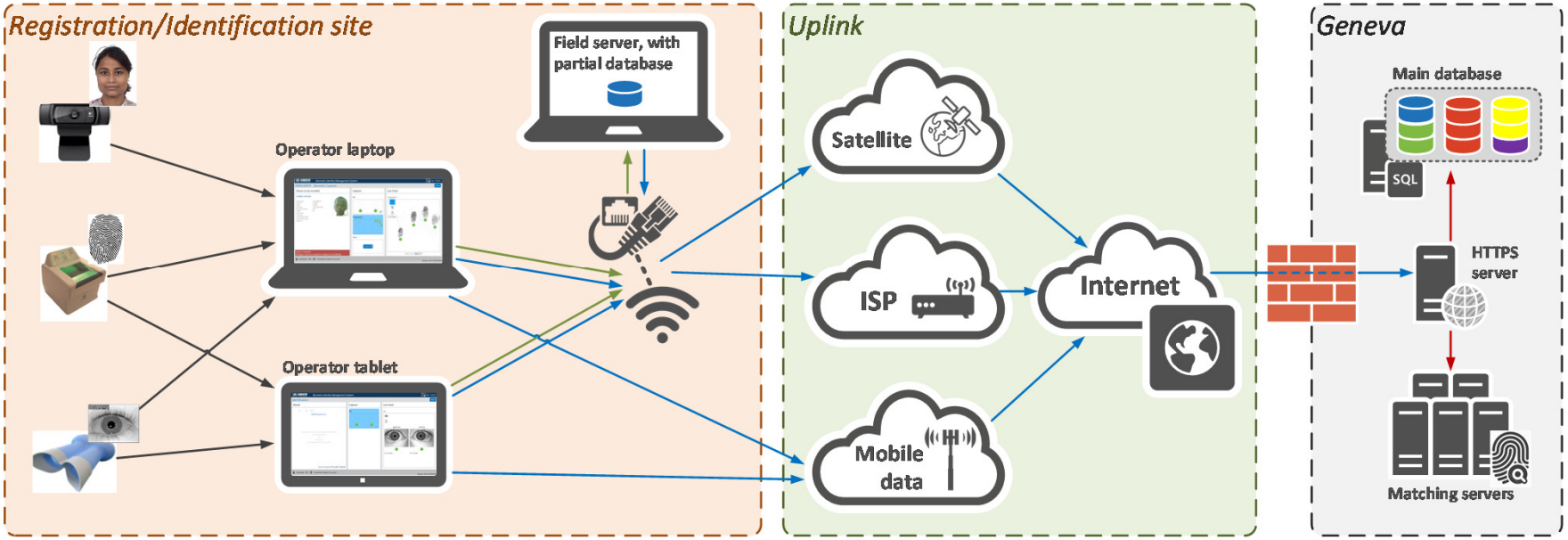
BIMS - Architecture

BIMS Capture Devices
- *10 fingerprint images*
- *2 iris images*
- *1 facial image*

BIMS Local Server
- *Creates biometric templates*
- *Matches with local database to ensure no duplicates*
- *Queues enrolment for submission to Central System*



BIMS Central Server
- *Accepts enrolment package from BIMS Local Server*
- *De-duplicates enrolment with global gallery of biometric records*

Manages synchronization between Local Servers (Local-Central-Local)
- *Manages adjudication cases (suspected duplicates) and sends cases down to relevant Local BIMS Server*

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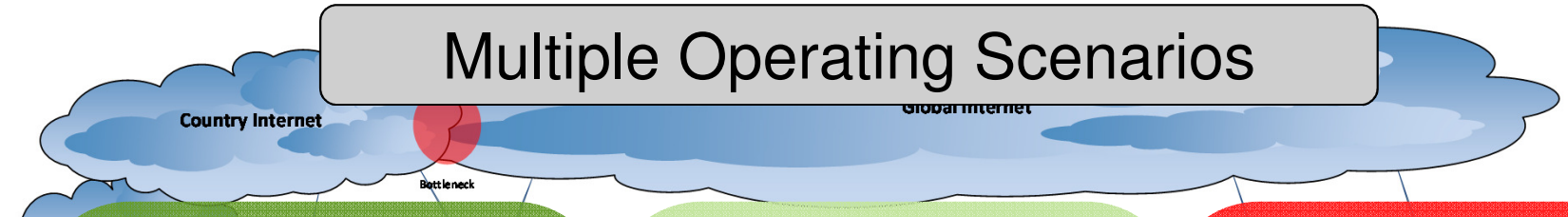
Multiple Operating Scenarios



Strong and Reliable Connectivity

Online system with direct connection to global database

Intermittent / Weak Connection

Partially-online system, which syncs automatically with global database whenever possible

No Connectivity

Fully offline system, with no connection to global database

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Pilot Metrics - Overview

- 16 enrolment stations
- 4 verification stations
- Target average of 1,000 per day
- 16,849 refugees enrolled
- 314 adjudication cases (91% of which were in the 0-3 age range)
- 4 week exercise
- 140 staff

The exercise has proven that iris was the easiest biometric to capture with a recapture attempt only once every 7 enrollees on average and 1 in 5 enrollees had to recapture some fingerprints mostly recapturing a complete slap (4 fingers). Due to the challenging lighting and background, face has proven to be the biometric with the highest recapture rate with an average 2 captures per enrollee to acquire a good face quality image.

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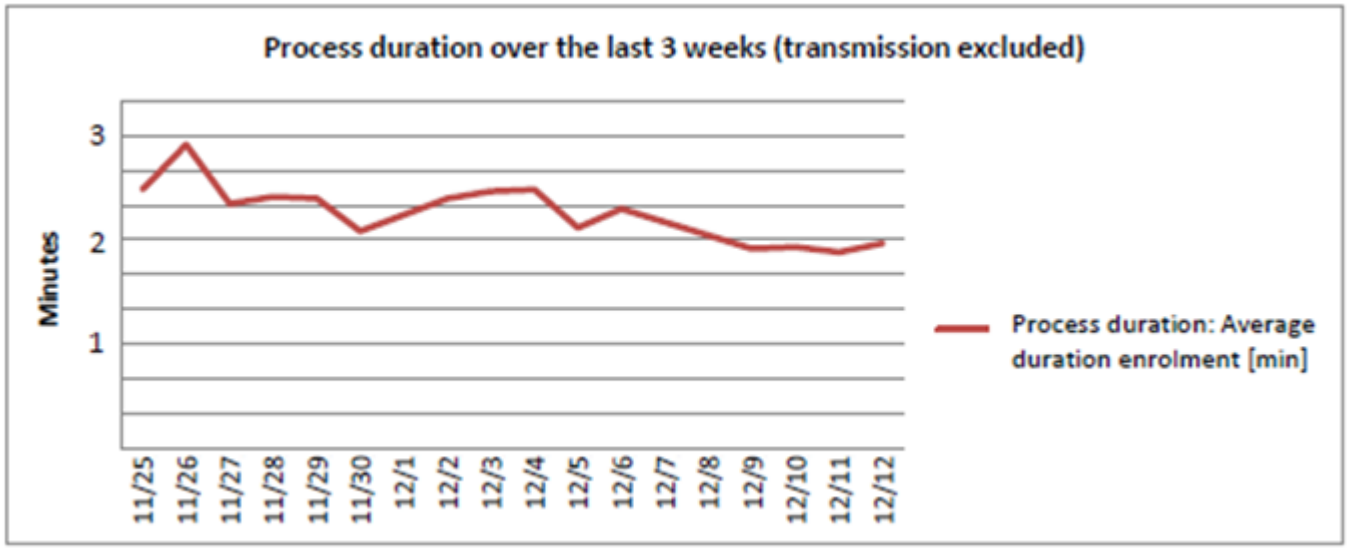
Operators stated they were comfortable with the application after only 30 – 60 minutes of operations – after a half-day training session prior to Go-Live.

The average enrolment process lasted 2 minutes 11 seconds, and the average time was reduced to under 2 minutes towards the end of the pilot, as the operators became increasingly proficient with the system.



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Pilot Metrics - Fingerprint

Of the whole population, 81% could capture good quality fingerprints, 12% low quality and 7% couldn't capture.

Ages 4+

- 87% over four 'good' fingerprints
- 12% low quality fingerprints
- 1% no capture

Ages 0-3

- 2% over four 'good' fingerprints
- 2% low quality fingerprints
- 96% no capture

***Fingerprint quality**: Samples with a NIST Fingerprint Image Quality (NFIQ) score of 1, 2, or 3 are considered 'good' quality.*

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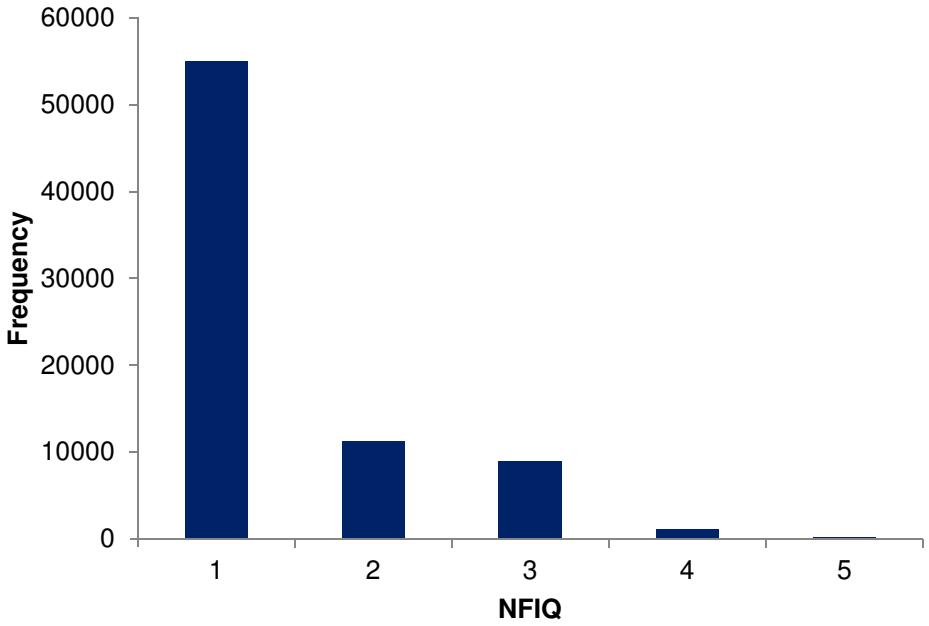
Post-Pilot Metrics - Fingerprint



Taking a sample of 76,000 enrolled identities in production, 98% of the fingerprints were NFIQ 3 or better

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Rick Lazarick analyzed the poor quality samples and highlighted that index fingers and thumbs proved to be the largest percentage of the poor quality samples:

Finger	NFIQ-5	NFIQ-4	5 in %	4 in %
1	14	279	8.4%	24.8%
2	40	91	24.0%	8.1%
3	5	35	3.0%	3.1%
4	8	77	4.8%	6.8%
5	14	47	8.4%	4.2%
6	15	344	9.0%	30.6%
7	32	72	19.2%	6.4%
8	7	63	4.2%	5.6%
9	13	86	7.8%	7.6%
10	19	31	11.4%	2.8%

Index fingers (2,7) have much larger NFIQ=5 proportions

Thumbs (1,6) have much larger NFIQ=4 proportions.

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Of the whole population, 85% could capture good quality irises, 8% could capture one good quality iris, 1% low quality and 6% couldn't capture at all.

Ages 4+

- 98% at least one 'good' iris
- 1% low quality irises
- 1% no capture

Ages 0-3

- 14% at least one 'good' irises
- 0.1% low quality irises
- 85.9% no capture

Iris quality*: Following ISO/IEC 19794-6:2011: focus, contrast, occlusion, Signal to Noise (SNR), saturation, and grey level are assessed to determine quality.*

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Of the whole population, 85% could capture good quality irises, 8% could capture one good quality iris, 1% low quality and 6% couldn't capture at all.

Ages 4+

- 79% 'good' face
- 20% low quality face
- 1% no capture

Ages 0-3

- 57% 'good' face
- 42% low quality face
- 1% no capture

***Face quality**: Following ISO/IEC 19794-5:2011: eye gaze, eyes openness, red eye, exposure, natural skin color, image, focus, hot spots, horizontal and vertical alignment, sharpness, image resolution, plain background, width-height head ratio are assessed to determine quality.*

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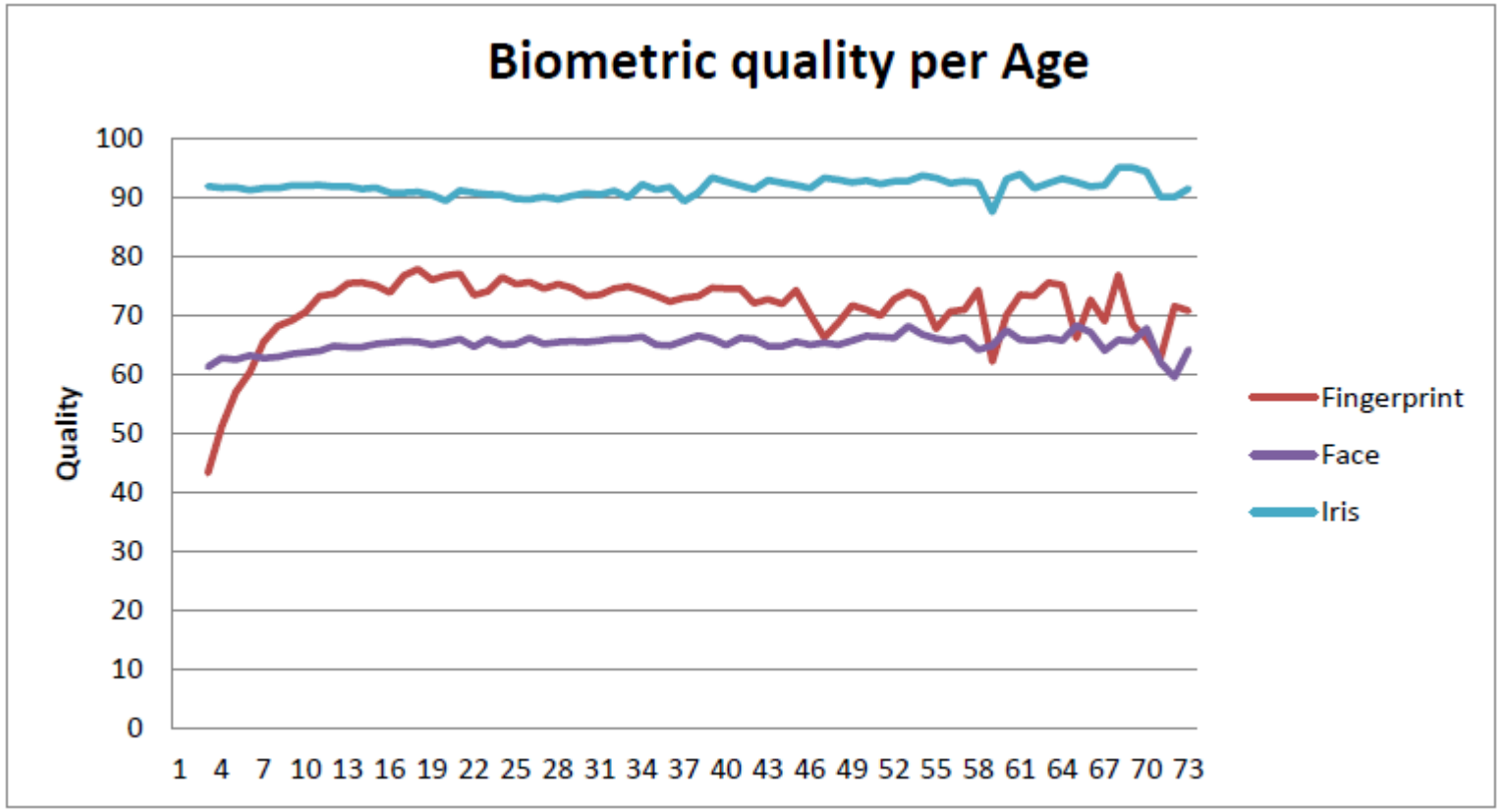
Pilot Metrics - Age



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Status – SEP 2015

Enrolled population to date: 385,000

Enrollment by country:

- CHAD: **276,000**
- RoC (Congo): **11,000**
- Thailand: **95,000**
- India: **3,000**

Enrolment Rate (max observed): 3,000/day per location

Enrollment Rate (max observed): 5,000/day centrally

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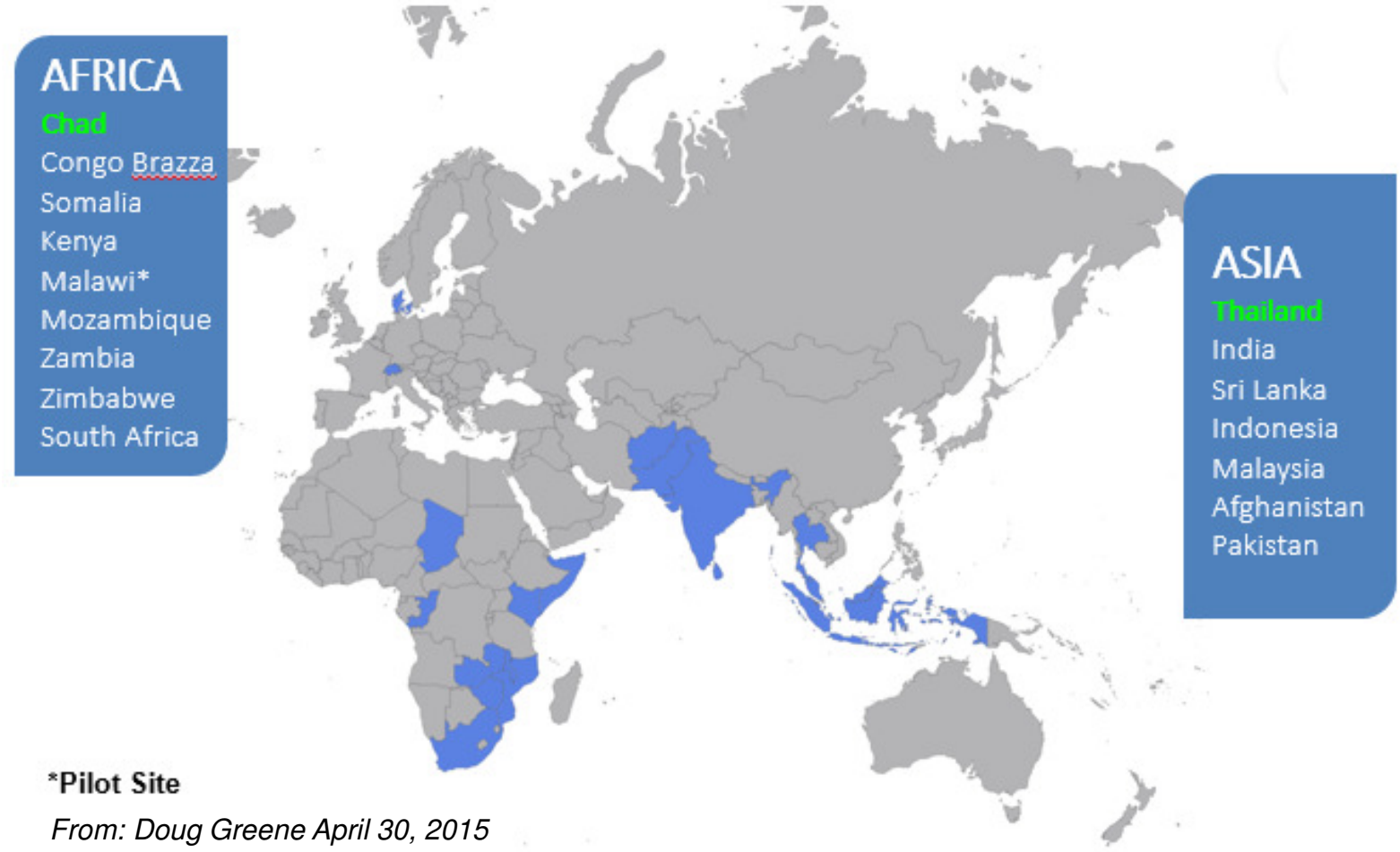
What's Next

Planning is underway with the following UNHCR operations



***Pilot Site**

From: Doug Greene April 30, 2015

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Thank You

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