



May 3 – 5, 2016: Gaithersburg, MD

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 *Agenda*



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





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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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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



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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



UNHCR *BIMS – Biometric Capture*









UNHCR BIMS Operations – Fingerprint Capture





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UNHCR BIMS Operations – Iris Capture







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UNHCR *BIMS Operations - Thailand*



INTERNATIONAL BIOMETRIC PERFORMANCE CONFERENCE Evaluation and Performance of Biometric Technologies



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UNHCR *BIMS - Login*



	Biometric Identity Management System		Location: Bratislava
login			
	Operator	Live Feed	
	Operator ID nina.pross ** Cancel Login	Fingerprint	
Login Connection	status: Connected		

UNHCR *BIMS - Enrollment*





UNHCR The UN Refugee Agency	Biometric Identity Management S	ystem	25	Location: Bratislava		
ENROLLMENT - Biometric Capture						
Person to be er	nrolled	Capture	Live feed			
BirthDate : Fullname : Name : Surname : BiometricId Last Encounter Place: Last Encounter Date:	12/10/1989 00:00:00 John Smith John Smith	Iris Cepture	Fingerprint			
A Photo is required.			Capture Mode: 4-1-4-1 V			
h Operator ID: nina.pross 💷 💽 Connection status: Connected						

UNHCR *BIMS - Adjudication*





	HCR efugee Agency	Biometric Identit	y Management System			Location: Genev
) ADJ	UDICATI	ON				Hom
Filter						
Date		Status	Туре	Location	Clear Filter	Result Number
From 17.12 To 21.12	.2014	15 Ø Open 15 Ø Closed Ø Processi Ø Pending	Deduplication_Case False_Linkage G False_Match False_Non_Match	Slovakia - Bratislava Switzerland - Genewa Malawi - Malawi	•	Search
Date	Status	Туре	Adjudication Number			Last Update
2/21/2014	Closed	False_Match	000200125			12/21/2014
2/21/2014	Processing	False_Linkage	000200126			12/21/2014
2/21/2014	Closed	False_Match	000200127			12/21/2014
2/21/2014	Closed	False_Match	000200128			12/21/2014
2/21/2014	Open	False_Match	000200129			12/21/2014
2/21/2014	Open	False_Match	000200130			12/21/2014
2/21/2014	Processing	False_Linkage	000200131			12/21/2014
2/21/2014	Closed	False_Linkage	000200132			12/21/2014
2/21/2014	Open	False_Linkage	000200133			12/21/2014
2/21/2014	Closed	False_Non_Match	000200134			12/21/2014
2/21/2014	Closed	False_Non_Match	000200135			12/21/2014

UNHCR *BIMS - Adjudication*





UNHCR The UN Refugee Agency	Biometric Identity Managen	Location: Bratislava		
ADJUDICAT	Case List			
Case: 000200128				Last update: 12/21/2014 1:16:09 PM
POC	in the system	POG	C to be enroled	Notes
	000200133	Biometric ID		
	845-00001590	RESOLUTION DIALOG		
		Biometric captured are of bad quality		
	Quality	Different - No apparent reason for matching Different - Recenture already enroled PoC's Riometric	Quality	
	516	Notes:		
63	221		n/a	
65.	5.84	Type your resolution note here	n/a	
0 72	2.36		n/a	
• 77	,	Save decision Submit decision Cancel	n/a 🕚 🚅	
9 73	3		n/a 🔴	
9 73	3	Left index 0%	n/a 🔴	
69		Left thumb 0%	n/a 🔴	
9 78	3	Right thumb 0%	n/a 🔴	
🔴 n/a	/a	Left iris 0%	n/a 🕚	SM Bratislava pipa pross12/21/2014 1:16:09 PM
🔴 n/a	'a	Right iris 0%	n/a 🔴	5m_5rdd5d0d_mmapro522/21/2014 212.05 1 m
~ .				Send
	Same Person	Different Person I don't know yet		J. J
🔒 Operator ID: nina.p	pross 📧 💽 Connection status: Con	nnected		

UNHCR BIMS - Architecture





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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

UNHCR *BIMS - Architecture*



UNHCR *Pilot Metrics - Overview*





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- 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.

UNHCR *Pilot Metrics - Overview*



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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.



UNHCR Pilot Metrics - Fingerprint





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

European

Association f

Biometrics

ea

UNHCR *Post-Pilot Metrics - Fingerprint*



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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.

UNHCR *Pilot Metrics - Iris*



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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.

UNHCR *Pilot Metrics - Face*



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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.

UNHCR *Pilot Metrics - Age*





UNHCR *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

UNHCR *What's Next*



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Planning is underway with the following UNHCR operations



UNHCR *Thank You*



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