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Some Thoughts on Next Generation Travel Documents

R. Michael Holly

Chairman, New Technology Working Group

ICAO TRIP: Building Trust in Travel Document Security



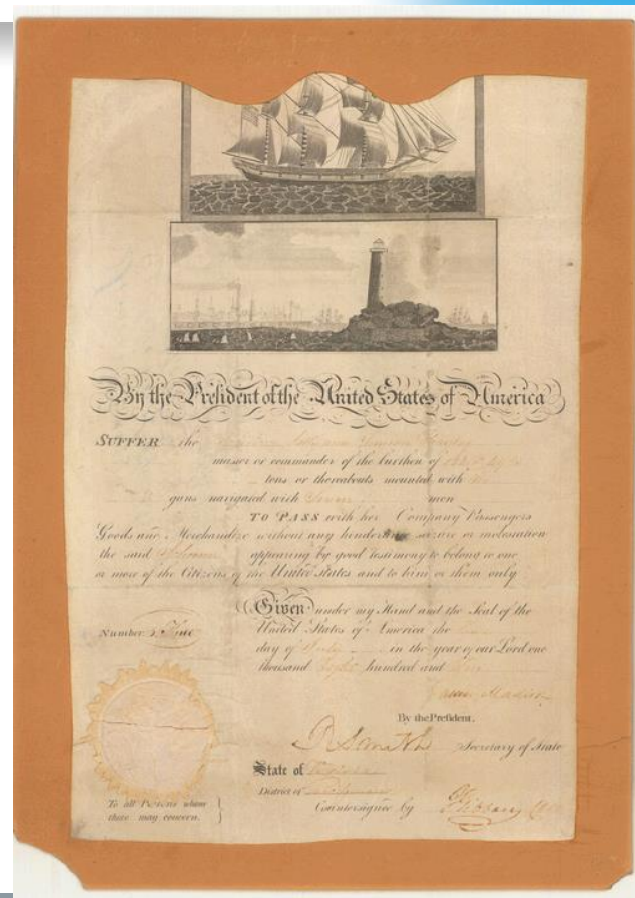
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The Mediterranean Passport For Ships and Cargo





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General description of traveler

Reg. N° 1111
Via au Consulat Genl de France
Bon p^r le voyage par le paquebot
Le Chateaugay
N° 1111
Art. 51
Droit

UNITED STATES OF AMERICA

To all to whom these Presents shall come, Greeting

DESCRIPTION

Age 68 Years
Nature & Sex L. French Eng.
Complexion Fair
Hair Gray
Eyes Blue
Mouth Large
Chin Round
Nose Straight
Forehead High
Complexion Fair
Hair Gray
Eyes Blue
Mouth Large
Chin Round
Nose Straight
Forehead High

Signature of the Traveler
Benj. Mallott

THE UNDERSIGNED, Secretary of State of the United States of America, hereby request all whom it may concern to permit, safely and freely to pass Benjamin A. Mallott accompanied by his wife a Citizens of the United States and in case of need to give them all lawful Aid and Protection

Given under my hand and the impression of the Seal of the DEPARTMENT OF STATE, at the City of Washington the 22 day of October, A.D. 1852.

Benjamin A. Mallott
318A
Person
Secretary of State.



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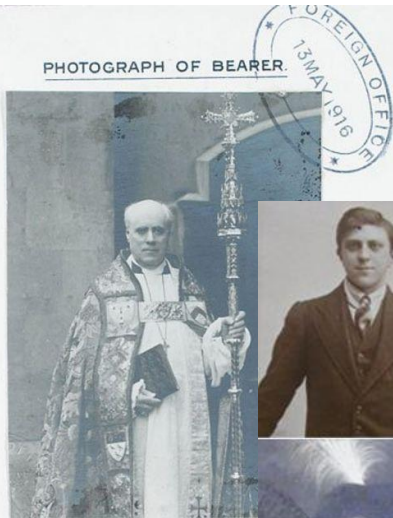
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Introduction of the photograph

PHOTOGRAPH OF BEARER.





In booklet form

2

تفصیلات

DESCRIPTION
SIGNALEMENT

<p>پیشہ Profession مقام و تاریخ پیدائش Place and Date of Birth Lieu et date de naissance</p> <p>مذہب Domicile</p> <p>قد Height Taille</p> <p>آنکھوں کا رنگ Colour of eyes Couleur des yeux</p> <p>بالوں کا رنگ Colour of hair Couleur des cheveux</p> <p>نمایاں امتیازی نشانات Visible distinguishing marks Signes particuliers</p>	<p style="text-align: center;">الہیہ Wife-Femme</p> <p><i>Yasmin</i></p> <p><i>Mohd. Khan Mohd. Khan</i></p> <p><i>26.11.1895 1913</i></p> <p><i>Pakistan Pakistan</i></p> <p><i>5' 5" 5' 5"</i></p> <p><i>Black Black</i></p> <p><i>Grey Black</i></p> <p><i>- -</i></p> <p style="text-align: center;">بچے</p> <p style="text-align: center;">CHILDREN - ENFANTS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">نام Name Nom</td> <td style="width: 33%;">تاریخ پیدائش Date of birth Date de naissance</td> <td style="width: 33%;">صنف Sex Sexe</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>	نام Name Nom	تاریخ پیدائش Date of birth Date de naissance	صنف Sex Sexe									
نام Name Nom	تاریخ پیدائش Date of birth Date de naissance	صنف Sex Sexe											

3

حاملہ کی تصویر

PHOTOGRAPH OF BEARER



الہیہ
WIFE FEMME



(photo)

بچے

CHILDREN - ENFANTS

نام Name Nom	تاریخ پیدائش Date of birth Date de naissance	صنف Sex Sexe

بچے

CHILDREN - ENFANTS

نام Name Nom	تاریخ پیدائش Date of birth Date de naissance	صنف Sex Sexe



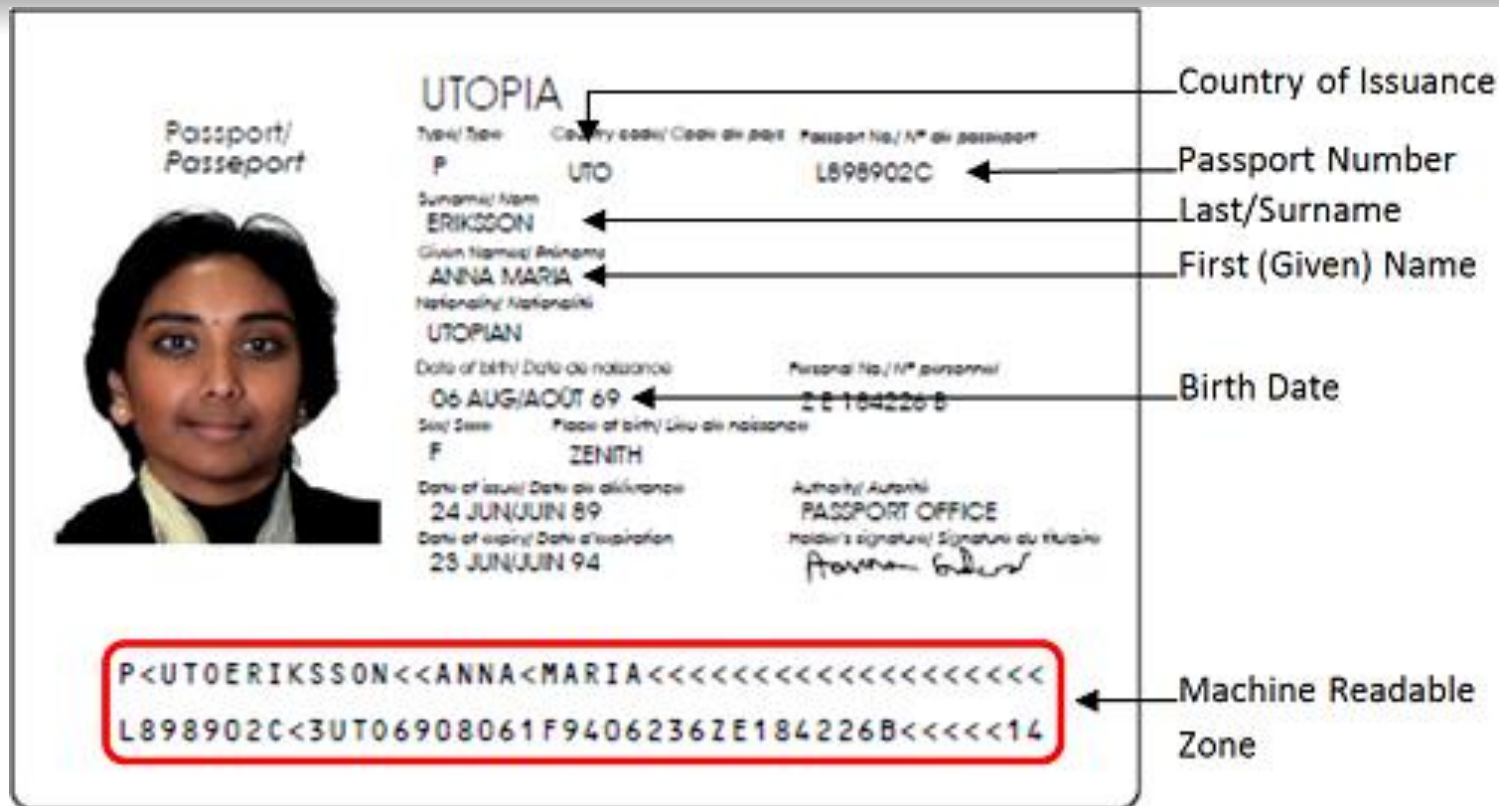
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Standard Format





Introduction of Machine Readable Zone

MRZ im Format td-3 (MRP, machine readable passport)

P<D<<ADENAUER<<KONRAD<HERMANN<JOSEPH<<<<<<<<
1234567897D<<7601059M6704115<<<<<<<<<<<<<2

MRZ im Format td-2

IDD<<ADENAUER<<KONRAD<HERMANN<JOSEPH
1234567897D<<7601059M6704115<<<<<<<2

MRZ im Format td-1

```
I D D < < 1 2 3 4 5 6 7 8 9 7 < < < < < < < < < < < < < < < <  
7 6 0 1 0 5 9 M 6 7 0 4 1 1 5 D < < < < < < < < < < < < < < 2  
A D E N A U E R < < K O N R A D < H E R M A N N < J O S E P
```



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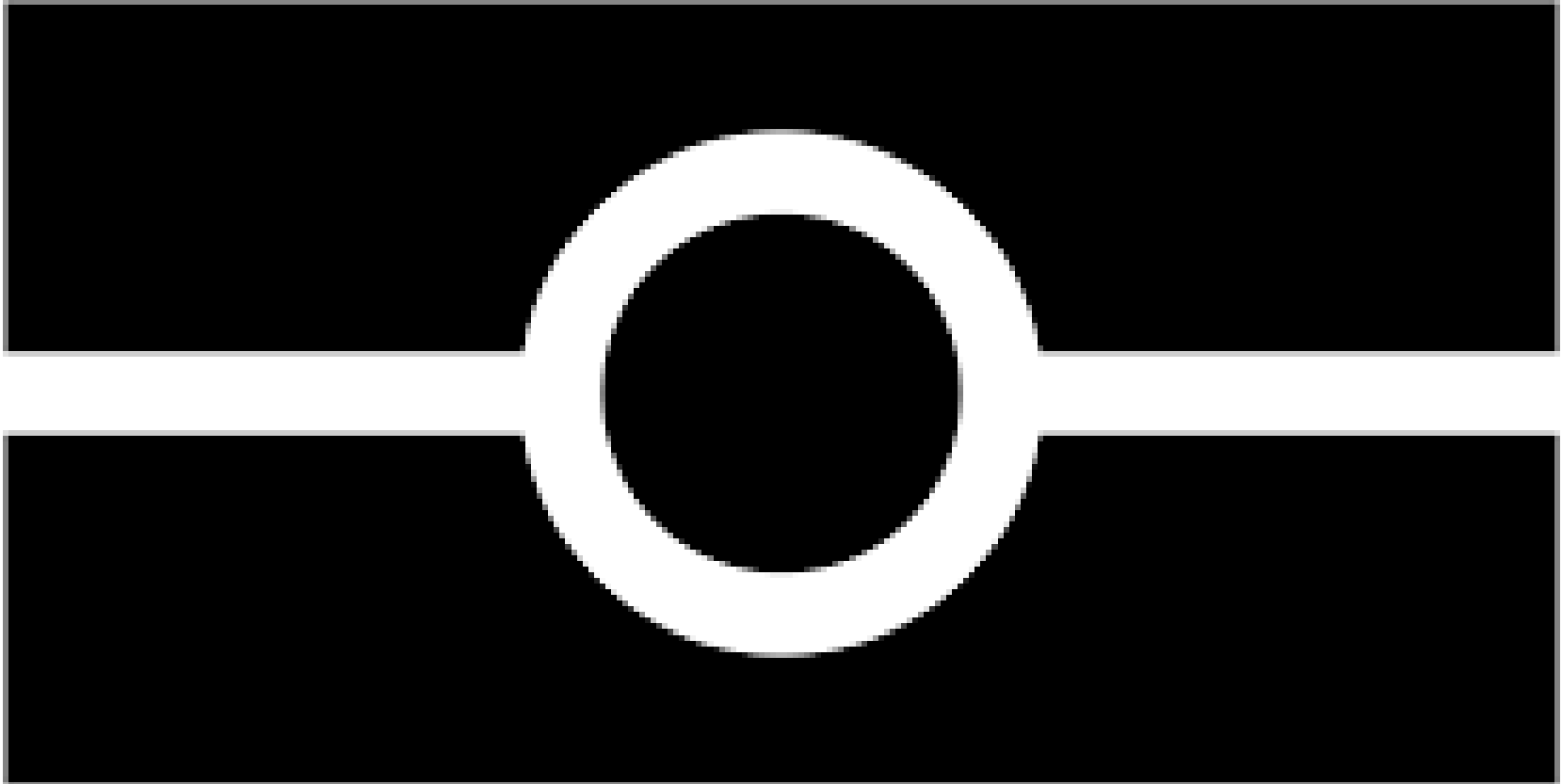




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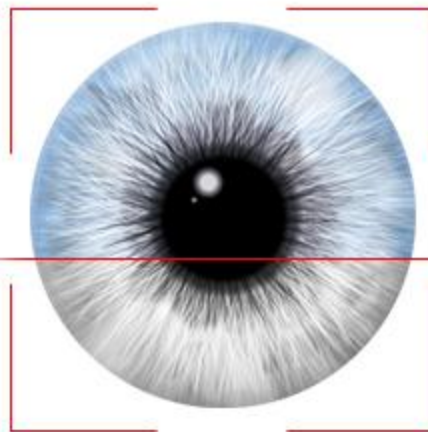
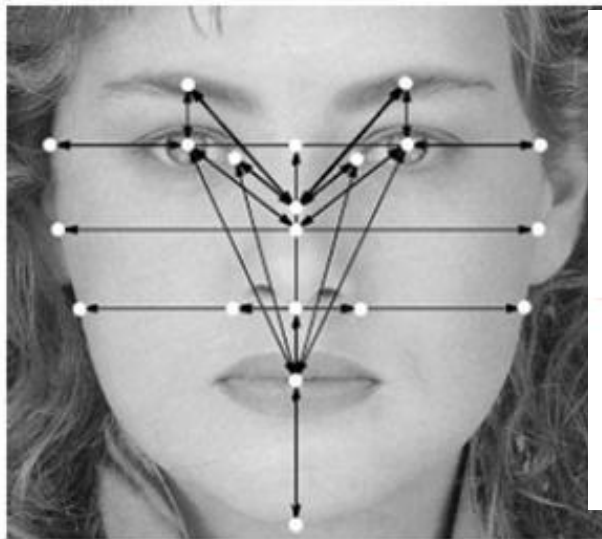




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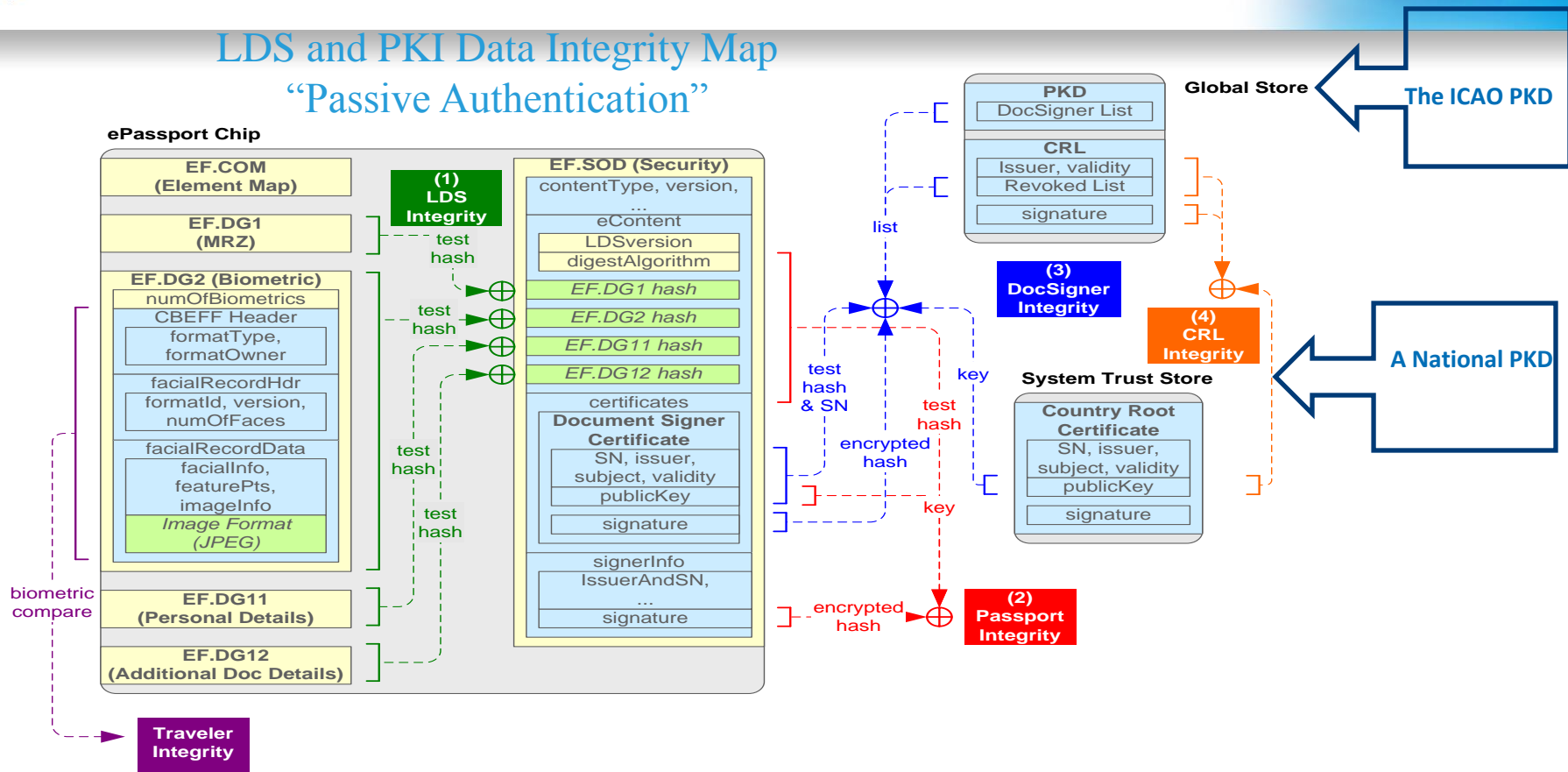
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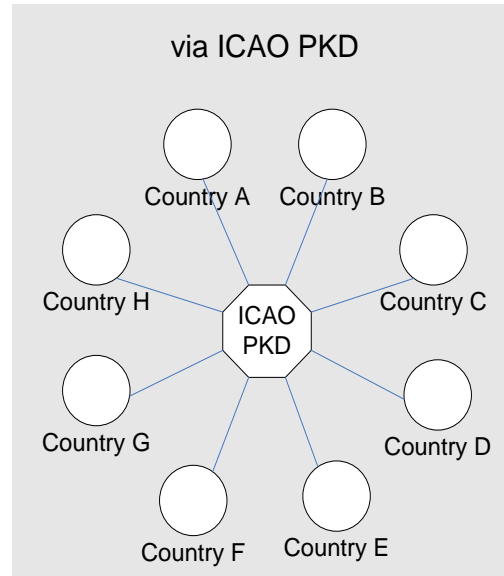
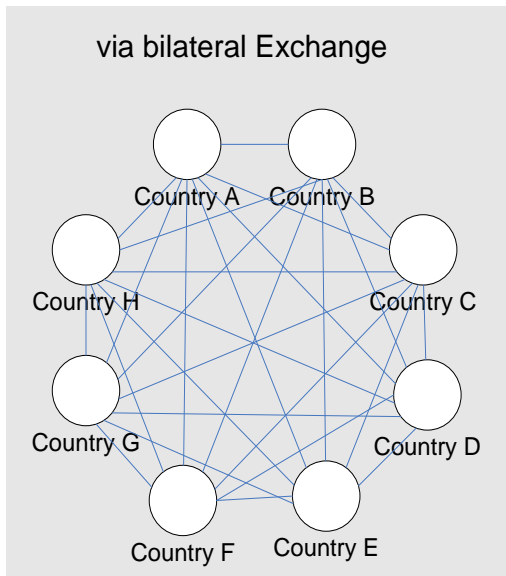


LDS and PKI Data Integrity Map “Passive Authentication”





Distribution of Certificates and CRLs



This example shows 8 states requiring 56 bilateral exchanges (left) or 2 exchanges with the PKD (right) to be up to date with certificates and CRLs. In case of 188 ICAO States 35,156 bilateral exchanges would be necessary while there are still 2 exchanges necessary with the PKD.



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ePassport Data

Logical Data Structure 1
Biographic Data
Locked at Issuance

Logical Data
Structure 2
Travel Data
Entered Over
Validity



LDS 2



DIGITIZATION & ARCHIVING





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e-Visa

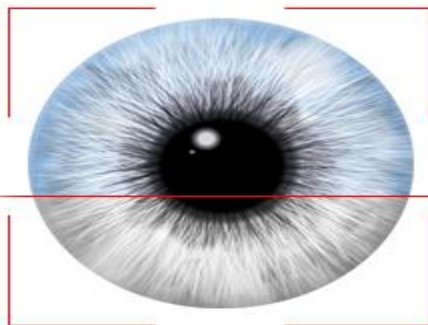
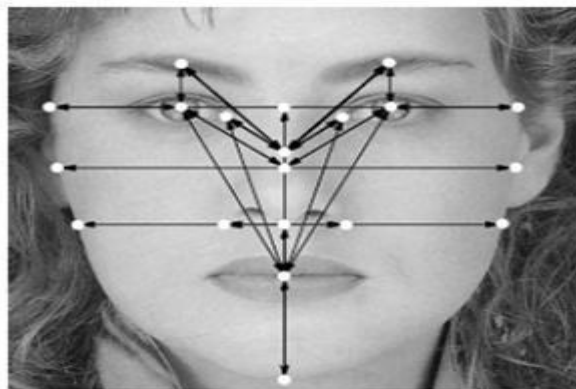




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ÉIRE / IRELAND / IRLANDE
PAS / PASSPORT / PASSEPORT

An tAontas Eorpach
European Union



SAGHAS / TYPE / TYPE TIR / COUNTRY / PAYS
IP IRL

SLOINNE / SURNAME / NOM
O'SULLIVAN

TÚSAINM (NEACHA) / FORENAME(S) / PRÉNOM(S)
LAUREN

NAISIÚNTACHT / NATIONALITY / NATIONALITÉ
ÉIREANNACH/IRISH

DATA BREITHE / DATE OF BIRTH / DATE DE NAISSANCE
04 BEA/MAY 1988

GRÉAS / SEX / SEXE ÁIT BHREITHE / PLACE OF BIRTH / LIEU DE NAISSANCE
F BAILE ÁTHA CLIATH/DUBLIN

DATA EISIÚNA / DATE OF ISSUE / DATE DE DÉLIVRANCE
10 MFO/SEP 2013

AS FEIDHM / DATE OF EXPIRY / DATE D'EXPIRATION
09 MFO/SEP 2023

ÚDARÁS / AUTHORITY / AUTORITÉ
Oifig na bPasanna,
Baile Átha Cliath
Passport Office, Dublin



X *Lauren O'Sullivan*

SINIU / SIGNATURE / SIGNATURE

SPECIMEN





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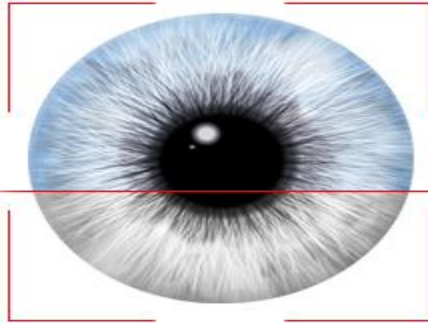
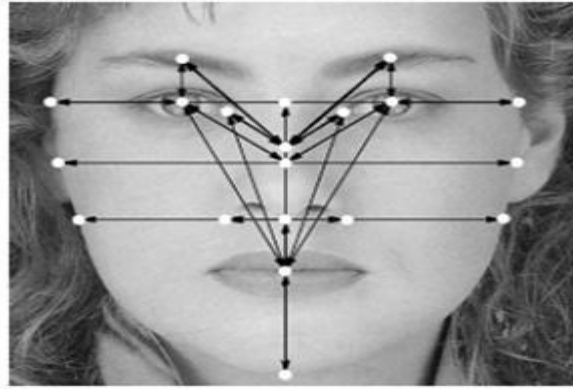
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Biometric Identity Data...





- Few data owners really want to share their data.
- Issuing Authorities resists shipping all their data to other government entities and certainly other governments.
- The government doesn't want to expose citizen data or their “subjects of interest” to the international community.
- Data sharing must meet appropriate legal standards and our personal privacy expectations.



Anonymous Resolution

- A technique that allows data holders to share anonymized identity-based data ...
- whereby all identities are managed and correlated while in their cryptographic form ...
- resulting in a more secure and privacy-enhancing way to share and resolve identities.
- Separating the Anonymous Content Database from users – by using third party agent to perform the processing (e.g., ICAO).



INPUT VALUE



Rene Michael Holly

+

Biometric

One-Way Hash
Function
(e.g., MD-5 or
SHA-1, SHA-256)

OUTPUT VALUE

One-Way Hash Value (MD-5)

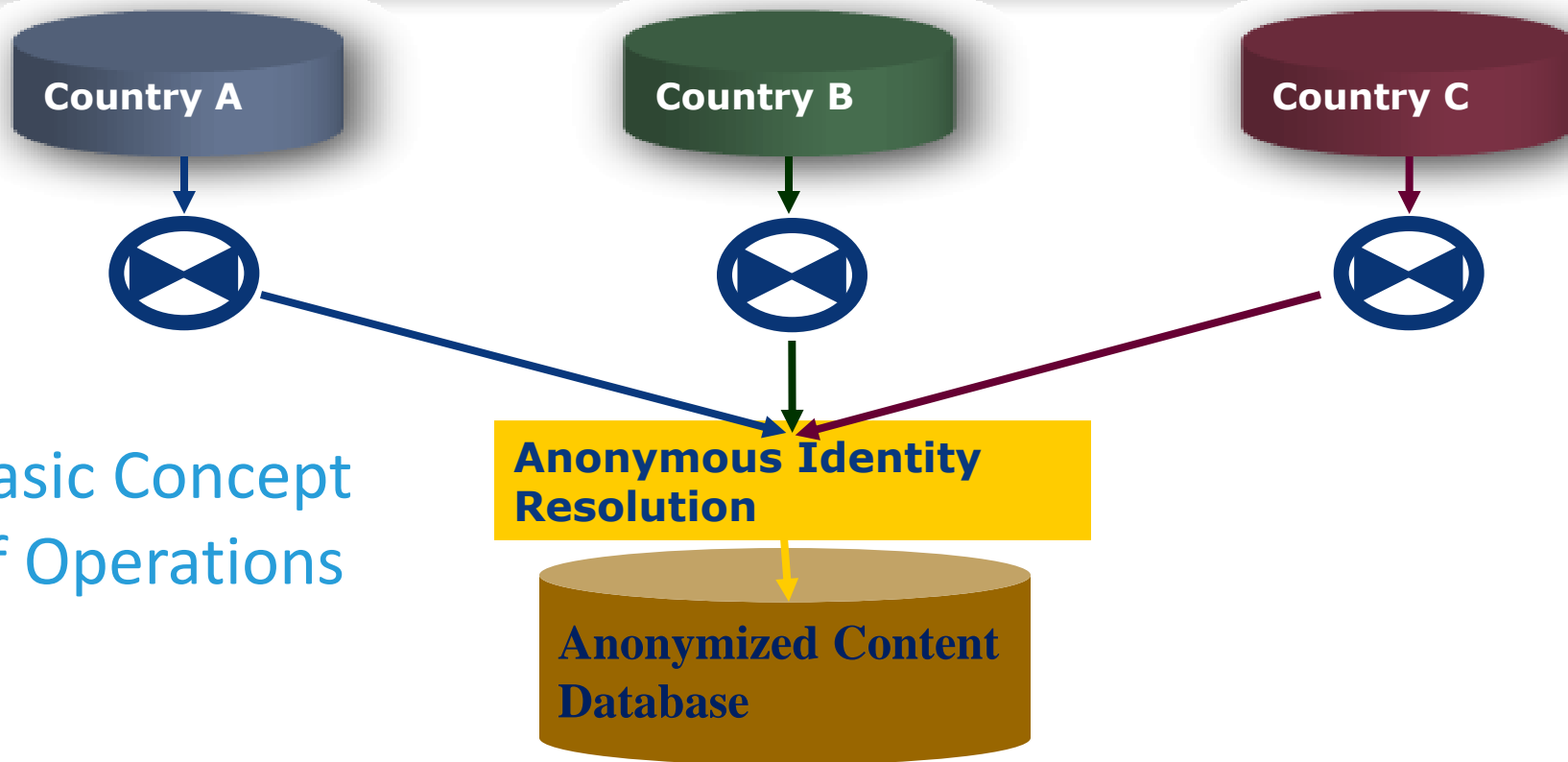
cbd034409c22929518fa494f99dc
9964

Result: An irreversible signature

Use: Fundamental building block
used in modern cryptography



Basic Concept of Operations





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Issuing State

Rene Michael Holly
US Citizen
Biographic and
biometric identity
data



Anonymizer

Identity Confirmed

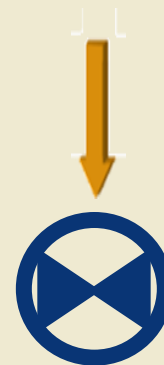
Rene Michael Holly
US Citizen
Biographic and biometric
identity data confirmed



Anonymous
Identity Resolution

Receiving State

Unknown Traveler
biometric identity data



Anonymizer



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**Robust identity management is
the key to producing a
secure travel document.**



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Attributed Identity



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Biometric Identity



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Biographical Identity



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**“all member states can
uniquely identify
individuals”**



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