

Introduktion til Biometri

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Agenda

This presentation holds an introduction to Biometrics including opportunities, selected case references, challenges, issues and collaborative interest groups...

- **Introduction to Biometrics**
- **Case stories**
- **Challenges and issues**
- **Questions**

Why Biometrics ?

In a world of (business) transactions - and potential fraud - there is an increasing need for security...

1. Something you know
 - Password, PIN code, word, phrase, family name, date of birth...
2. Something you have
 - Drivers license, Passport, Birth Certificate, Token (PKI), Dankort, Smartcard...
3. Something you are (**Biometrics**)
 - Physical characteristics
 - Behavioral characteristics

...and combinations...

What is Biometrics ?

The term Biometrics origins from Greek and means measures (metrics) of something living (bio). Today we expand the term...

Biometrics is the automated technique of...

- **measuring** a physical characteristic or personal trait and
- **comparing** it to information in a database or on a token
- for the purpose of **positive identification**

- and eventually authentication

What is Positive Identification?

The goal of biometrics is to establish a Positive Identification...

- Evidence proving that one is who he/she says he/she is
- Evidence establishing that one is among the group of people already known to the system
- Recognition by the system leads to authentication (acceptance or denial)

It is the reason for Positive Identification, that must be put to trial

Which types of Biometrics ?

Currently there is a neat list of biometric measures, with different maturity, complexity and usability trade-offs...

	1:1	1:N	Access
• Face recognition – Since forever	High	Medium	Medium
• Signature – 2000 years old	Low	Low	Low
• Fingerprint – 100 years old	High+	High+	High+
• Dental	High+	High	Low
• DNA	High+	High+	Low
• Retina Scan	High	Low	High+
• Iris Recognition	High+	High+	High+
• Voice	Low	Low	Medium
• Hand Geometry	High	Low	High
• Skin Texture
• Vein Patterns
• Gait

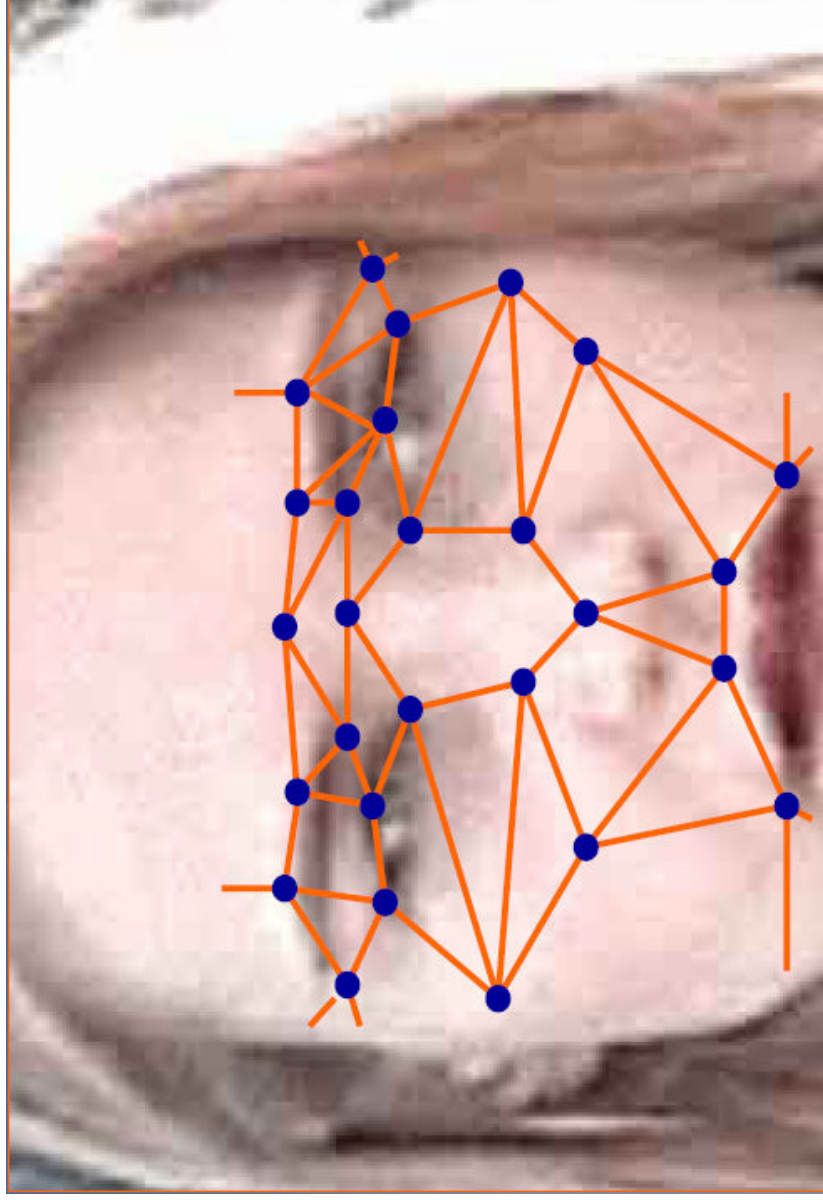
What is the Process ?

A common process for using Biometrics involves four base activities. First at enrolment and then as part of the positive identification...

- Biometric capture (e.g. picture or fingerprint)
- Biometric processing (adjustment and storage)
- Feature extraction (and storage)
- Validation... based on score!
 - Verification (one-to-one)
 - Identification (one-to-many)
 - Watch lists (one-to-few)

How are Features Extracted ?

Connection of anchor points between eyebrows and skin, lips and skin, eyes and eyelids, and distinct bone features such as cheekbones and nose...



The angles in the triangles yields a unique(?) number – a template – that identifies the face...

The template number is compared to numbers in a database for closest match...

Next generation facial recognition

Stereoscopic 3D cameras... taking pictures with infrared light... and eventually capturing heat structure, veins, magnetic radiation, etc...



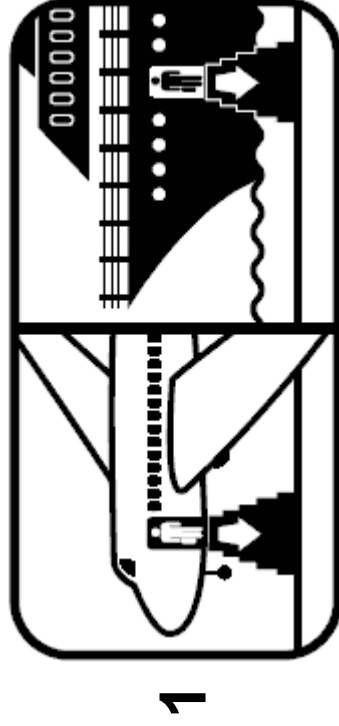
What is going on ?

A large number of projects is already at play...

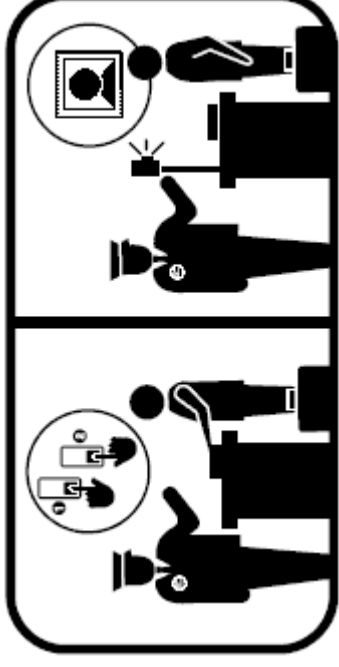
- PAS, SIS and VIS
- New Danish National ID (health care card)
- Danish Road Authorities
- PET
- BornholmsTrafikken
- Fitness centre
- User verification for computers, premises, cars etc. (fingerprint swipes)
- Disaster Victim Identification
- Intelligent Video
- Passenger verification at airports
- Season-cards for a public indoor swimming pool [CH]
- Access and payment in a school canteen [FR]
- Presence registration in an elementary school [UK]
- Personal authentication at public concerts [CH]

Case Example: US Visit

In US the most comprehensive biometric project, US-VISIT, was launched by DHS after September 11. Capturing fingerprints and image of all visitors...



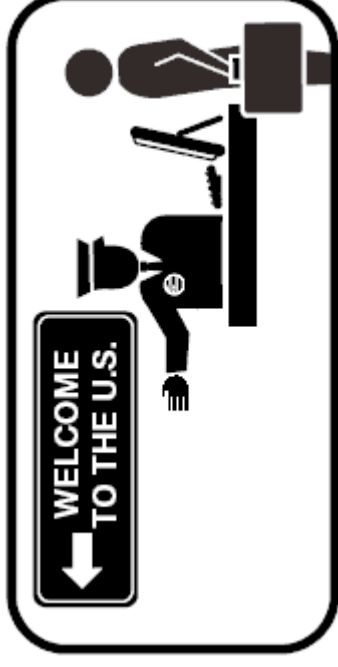
1



3



2



4

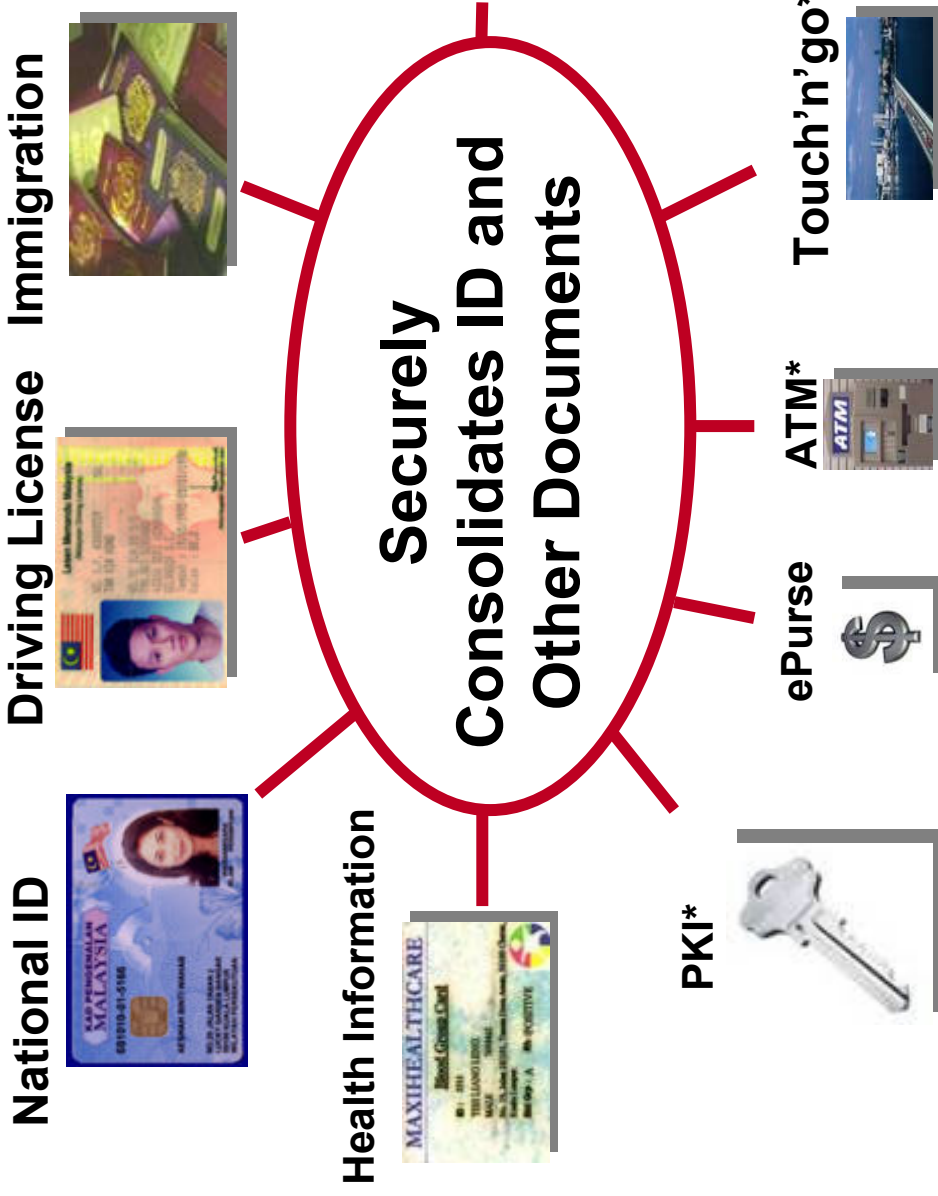
Case Example: Hooligans in Switzerland

In Switzerland Unisys is running a pilot where potential trouble makers are identified on the stadium...



Case Example: MyKad in Malaysia

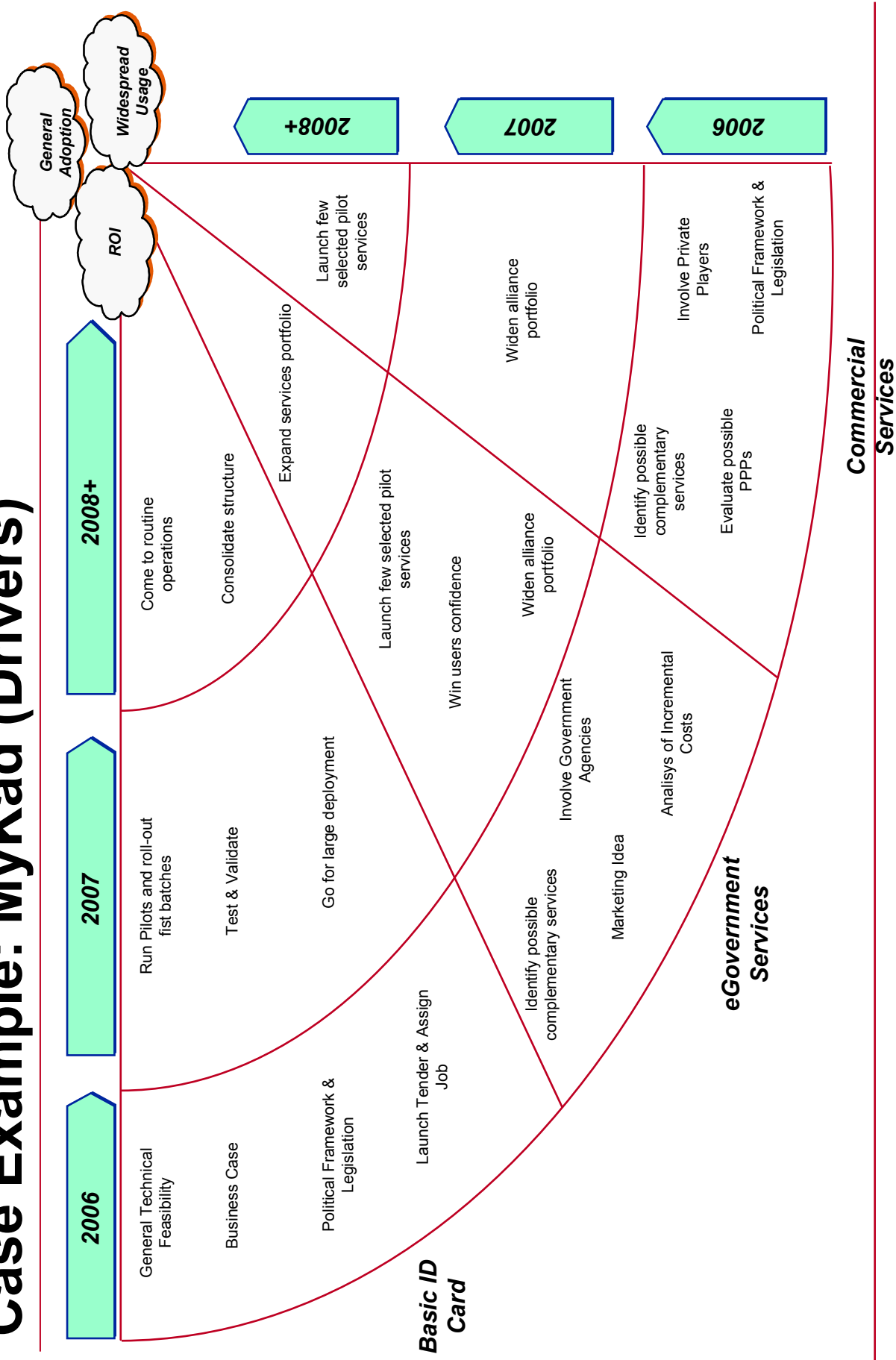
In Malaysia multiple Government Agencies is integrated through a common technical infrastructure – 17M card holders (!)



Security

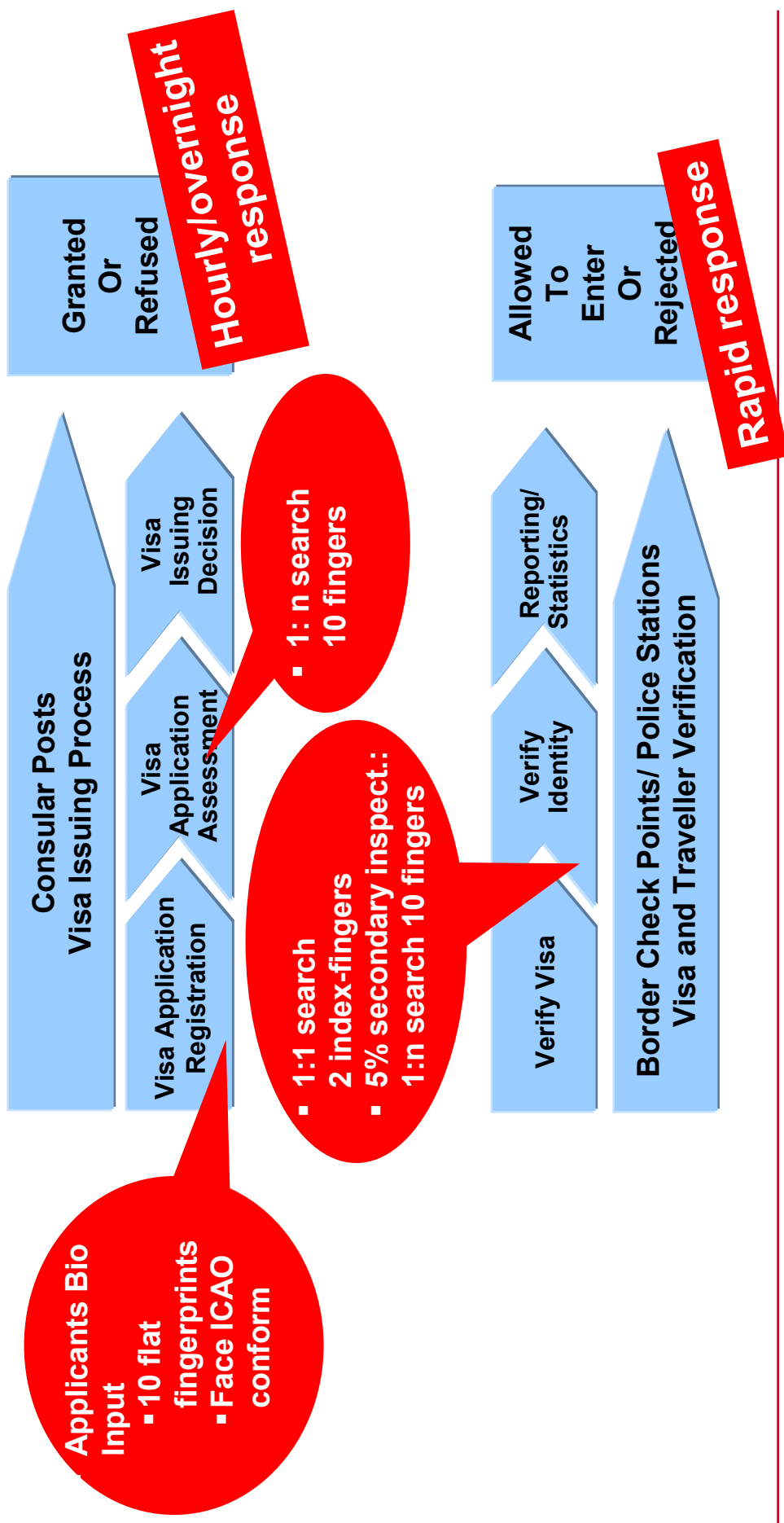
- Card
 - Rainbow printing
 - Micro lettering
 - Guilloche pattern
 - Holographic Overlay
 - Ultra Violet Image
 - Latent Text
 - Relief Pattern
- Chip
 - 32 K
 - ISO 7816 Compliant
 - Thumb print minutiae
 - Color photo

Case Example: MyKad (Drivers)



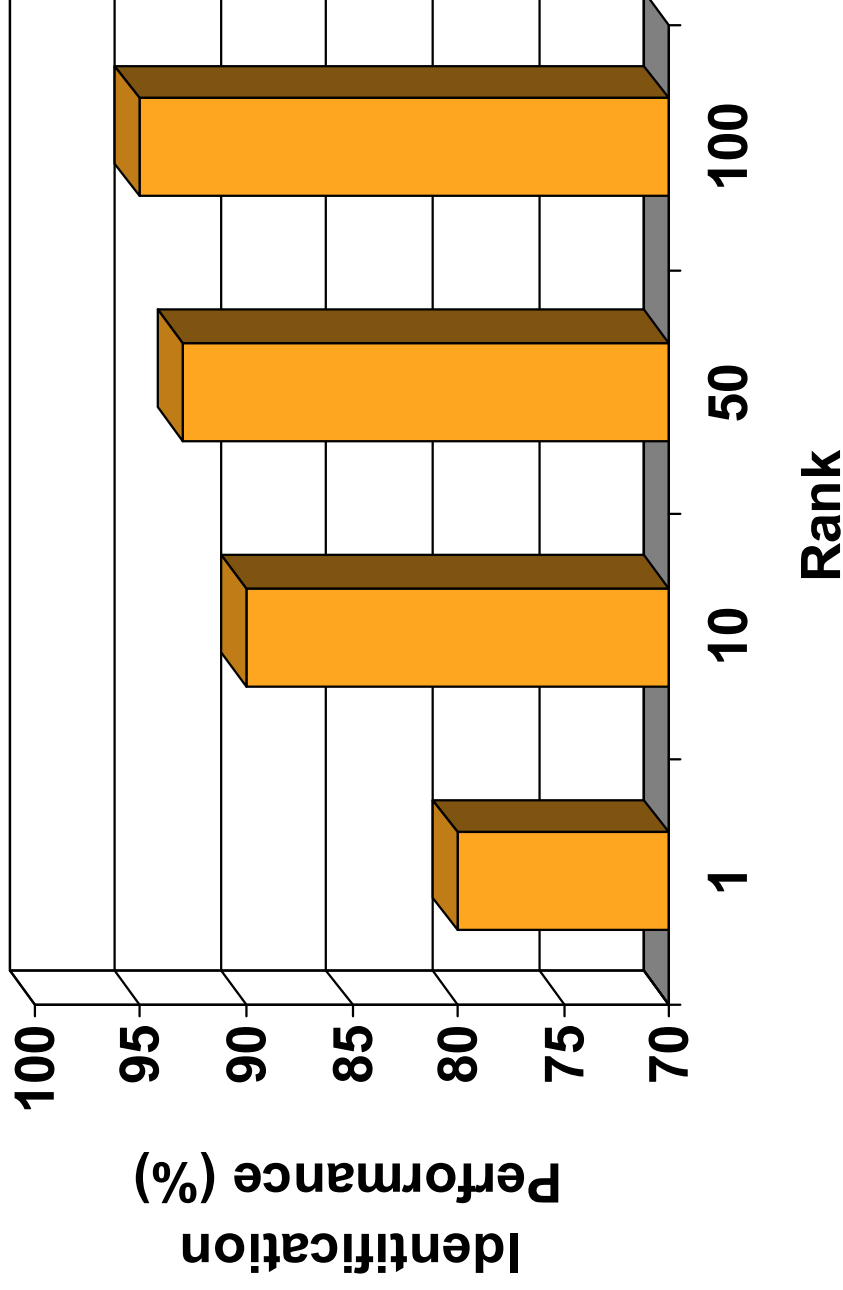
Case Example: VIS in EU

EU is about to build the worlds largest system and database for storing, matching and retrieving fingerprints...



Case Example: VIS in EU

Performance increases if we are satisfied with larger number of potential subjects (i.e. less precision) in the one-to-many matching. So does the manual after work!



What are the Challenges / Issues ?

A number of challenges or issues must be addressed when working with biometrics...

- **Security (errors and circumvention)**
- **Privacy (link to info and id change)**
- **Interoperability (standards)**
- **Cost (solution, regulations, security*2)**
- **Social Issues (purpose, exclusion, trust)**
- **Economics (efficient transactions)**
- **Legal Issues (info tie, law enforcement)**
- **Technology (perform, storage, modality)**
- **Medical Issues (direct, indirect)**



Data Protection decisions must be made in the individual situation

Solving the issues...

Biometrics is still emerging, and new initiatives (research, development, pilots and projects) must often be carried out in collaboration with partners and authorities...

- **IT-brancheforeningen - Biometric Council**
- **Danish Biometric Research Project Consortium**
- **International Civil Aviation Organization**
- **European Biometrics Portal [EU]**
- **European Biometrics Forum**
- **Bio API Consortium**
- **Biometrics Institute [AUS]**
- **...**

What should we look for ?

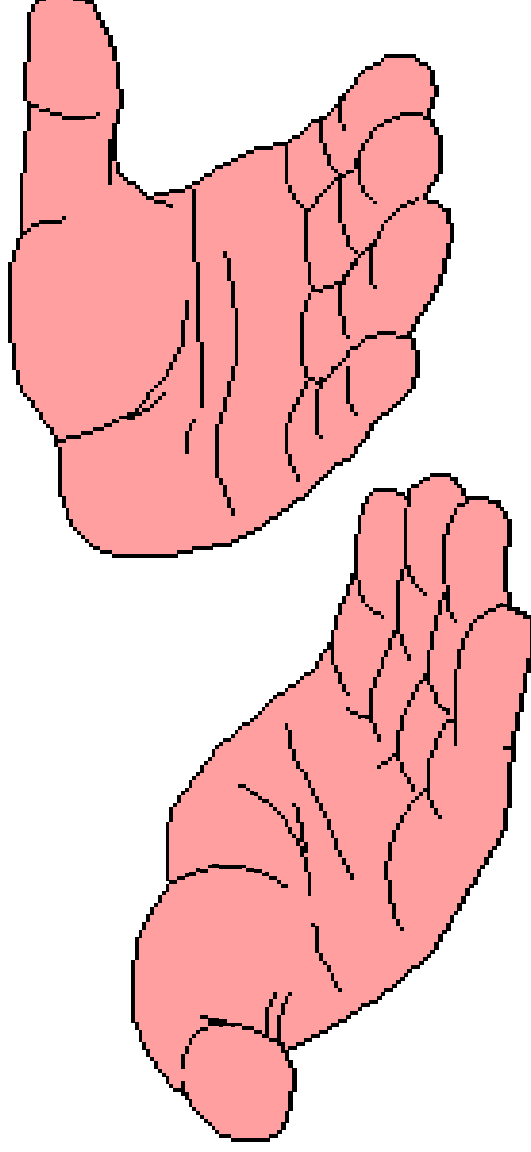
Seven key areas has been selected as predominant topics for discussion in the (near) future...

- **Biometric Enrolment Technologies (commoditized)**
- **Customer Relationship Management**
- **Public Policy**
- **National Identification Programs ()**
- **Multi-purpose credentials**
- **Domestic Surveillance**
- **Privacy**



Questions

Thank you for attending this presentation. Questions or comments not put forward earlier are very welcome now, or later...



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