Department of Homeland Security

Less Than 10–Print Processing

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Less Than 10-P Processing

- 2-P Systems Becoming More Common
- Offer Significant Advantages
- But Interoperability Issues Remain
Examples of Less Than 10-P

• Border Control
• Mobile Law Enforcement
• Social Services/Welfare
• Driver’s License Identity Management
• Voter Registration Fraud Detection
US-VISIT

Entry:
Search & Enroll

- 10 sec response
- 3,335 Watchlist Hits
- 0.1% False Hit Rate

Watchlist Categories:
- Terrorists
- Wanted Criminals
- Sexual Offenders
- Immigration Violators

HIT!

US-VISIT IDENT

If no Watchlist hit, search & enroll into US-VISIT

Watchlist Fingerprint Database (1.2 Million)

US-VISIT Fingerprint Database (21 Million)

Statistics as of 4/20/2005
Mobile Law Enforcement

Example

Hennepin County, Minnesota

Identification Based Information System (IBIS)

CDMA (VPN)

VPN Through Firewall

Remote Terminal Device
- 2 Fingerprint images
- Photograph
- Text

Minnesota Bureau of Criminal Affairs

State AFIS

PIX Firewall

SMTP

Mail Server

DHS

TPIS

SRT/ERRT

SMTP

Mail Server

Watchlist

Recidivist

• Parallel 2-P Searches of State and DHS Fingerprint Systems

152 Mobile Devices Currently Used in LA, Ontario and Alameda Counties, California and Portland, Oregon
Advantages of Less Than 10-P

• Lower Scanner Costs
• Greater Subject Acceptance
• More Rapid Fingerprint Capture
• Less Required Bandwidth for Transmission
• Lower Data Storage Volumes/Costs
• Faster Search Times
• Lower Overall System Costs
Issues of Less Than 10-P

• Lack of Interoperability Standards
  - Image Quality
  - Image Aspects (Size, Resolution, etc.)
  - Number of/Which Fingers
  - Template Definition
• No Scanner Compliance Standards
• Reduced Information Available: Effect on TAR/FAR
TAR/FAR Effects

*NIST (NISTR 7110) Evaluated US-VISIT 2-P Performance*

- TAR Is Independent of Database Size (At least Up to 6M)
- FAR Increases With Database Size
- Both TAR and FAR Affected By Image Quality
- 1:many Accuracy For a 2-finger Search Against a 6M Subject Database is 95% With a False Hit Rate of 0.08% (Exceeding US-Visit Requirements)
- Using 2 Fingers, The 1:1 Matching Accuracy was 99.5% With A False Accept Rate of 0.1% (Exceeding Visit Requirements)
Impact of gallery size on performance (FAR)
US-VISIT Database Growth

- Number of People in Visit Matchers
- Months After Initial Deployment
- 01/05/2004
- Initiation of Visa Waiver Country Processing
US-VISIT Database Growth


False Accept Rate (FAR)

Number of People in Visit Matchers
US-VISIT Database Growth

- Effect of FAR Is Driven By Operational Issues
  - In “Lights Out” System Must Have Trade-off with TAR
  - In Human Verification System, Examiner Load Becomes Issue

- Example:

  0.4% FAR Results in (0.4% x 100K Trxs/Day) = 400 Examiner Verifications

- 24x7 Availability of Examiners Will allow US-VISIT To Grow To Very Large Size

- But Eventually Will Need To Reduce FAR
  - Additional Biometric
  - Better Image Quality
NIST Accuracy Chart
2-P Interoperability Issues

• NIST Image Quality Analysis
  - Recommends That Image Sizes Below 320 by 320 Not Be Used
  - Found Decrease in TAR (1:1) From 98.6% to 76.2% for 180 by 180 in Comparison to 368 by 368 For Single Finger
  - Image Compression in The Range Up to 20 to 1 Produces Minimal Effects on Accuracy
• Which Fingers?
• Template Definition
• Do We Need A 2-P Scanner Certification Process?