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Identity Intelligence:
Biometrics & the Emergence of Person Centric Identity

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About Acuity

Acuity Market Intelligence consistently delivers thought-provoking, hype-free, data-driven insight and analysis.

- Strategic Research Consultancy Founded in 2001, by C. Maxine Most
- Proven accurate market analysis
- Focus on biometrics and eIDs
- Latest research: Global and Regional Biometric, ePassport and eVisa, and National ID Industry Reports

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Today's Discussion

- Why Biometric Data is Different
- Biometric Data Collection Components
  - Biometric Enrollment
  - Biometric Data Management
  - Biometric Verification
- Biometric Data is Proliferating
- Imminent Biometric Drivers
  - Mobility
  - Trusted Virtual ID
- Evolution Towards *Person Centric Identity*
- Implications for Identity Intelligence

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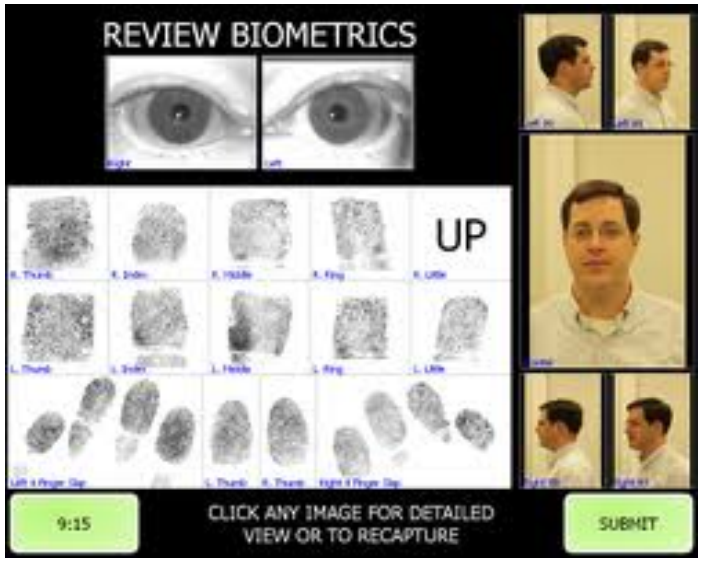
Biometric Data Collection: Enrollment

- Requires Very High Quality Image Capture
  - Initial capture critical to downstream matching
- Human Factors Issues
  - Human-Machine Interface
  - Not every biometric can be captured from every
  - person
  - Learned behaviors
- Level of Participation
  - Overt but Passive
  - Trend towards “do nothing” biometric



- Business Models
  - Single purpose or Multi purpose, In-house or Service Model
  - Service Model most likely scenario
- Security
  - Facility, Staff, IT Infrastructure

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Why Biometric is Data Different

Mass of Contradictions – Part Perception, Part Reality

1) Inexact Identification
   - Statistical Thresholds based on mathematical models

   YET More "Intimate" than other other types of data e.g. financial, health
   - It is not "about" you , it "is" you

2) Personal NOT Private
   - Face and Voice are in public sphere

   YET Higher Security, Privacy, and Civil Liberties Expectations
   - True for Public and Private Sector applications

3) Acceptance is High
   - Lots of Positive Reviews, High Level of Consumer Willingness

   YET Uncertainty/Trust Issues High as well
   - New, Unfamiliar = FUD Factor

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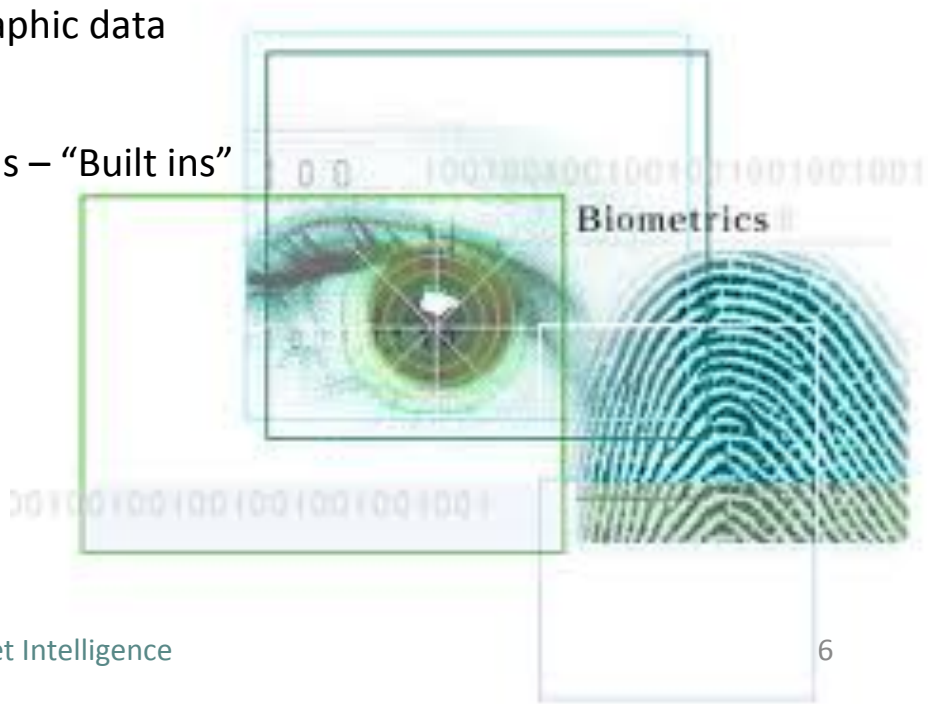
Biometric Data Collection: Data Management

- Ownership and Control
  - Data Types - image, template, encrypted template, revocable template
  - Distribution - data type, revocable security, expiration dates
- Storage
  - Centralized or Distributed
  - Network or Vault
  - Independently or co- located with biographic data
- Limitations of Use
  - Data Protection and Engineered solutions – "Built ins"
  - TURBINE Project
- Security
  - Facilities, Staff, IT Infrastructure
- Liability
  - Lost, Stolen, Inadvertently Shared
  - Termination



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TURBINE Project (www.turbine-project.org)

- TURBINE (TrUsted Revocable Biometric IdeNtitiEs)
- EU funded research project - three years to develop innovative digital identity solutions, combining:
  - Secure, user identification based on fingerprint authentication
  - Reliable protection of biometrics through advanced cryptography
- Research efforts to transform fingerprint biometric so result can only be re-generated by person
- TURBINE will provide assurance that:
  - Data used for the authentication, generated from the fingerprint, cannot be used to restore the original fingerprint sample
  - Individual can create "pseudo-identities" for different applications with same fingerprint, ensuring that these different identities (and hence the related personal data) cannot be linked to each other, and
  - Individual can revoke an identity for a given application

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Biometric Data Collection: Verification

- Image Quality Requirements Lower
- Personal Devices
  - Primarily 1: 1, High level of individual control
  - Limited control over data shared for transactions
    - Image, template, authentication
- Overt – Public and Private
  - 1:n and 1:1, Limited individual control
  - Security – Facility, Staff, IT Infrastructure
  - Storage of data and transaction details
  - Includes "overt surveillance" – area notifications
- Covert – Public and Private
  - 1:n (limited)
  - Limited to narrowly defined, highly controlled environments

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Biometric Data is Proliferating

- Biometrics Increasingly Critical ID Component
  - Screening & Identification
  - Law Enforcement, National Security Watch lists, Employment Eligibility
- eIDs for Security & Facilitation
  - ePassports, eVisas, BCCs, National IDs, DLs, Health IDs
- Facilitated Border Controls
  - US: US-VISIT, Global Entry, NEXUS, Enhanced DLs, BCC, SENTRI, FAST
  - GLOBAL: SmartGate, IRIS, RAPID, PRVIUM, PEGASE, ABG

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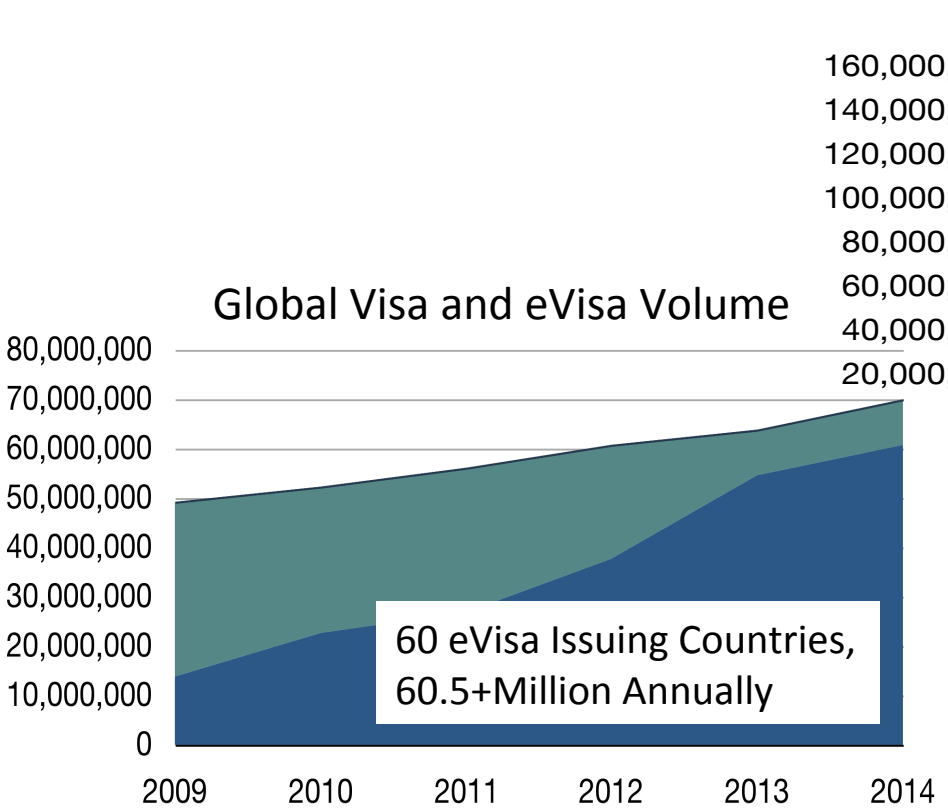
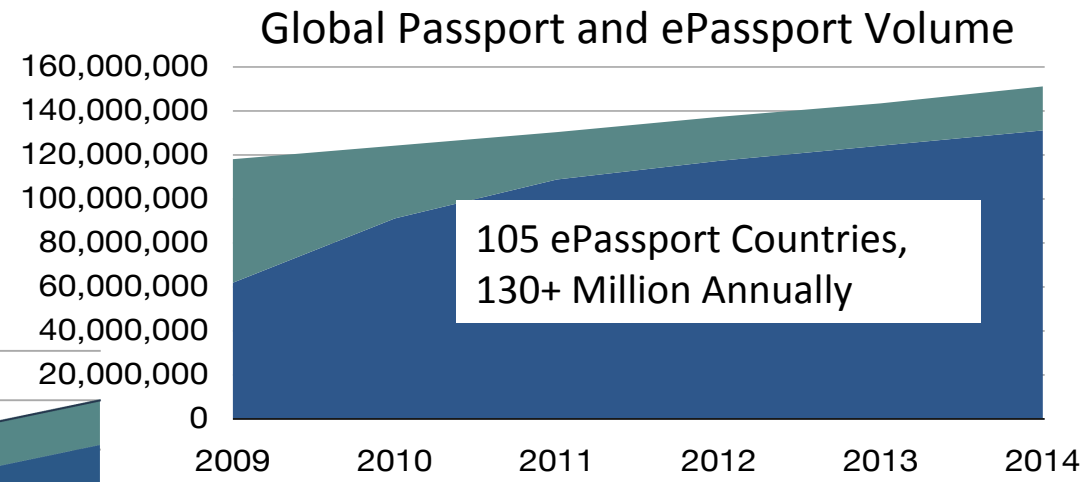
ePassport & eVisa Adoption by Volume

By 2014, 87% of all Passports issued will be ePassports and 87% of all Visas issued will be eVisas





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National eID Adoption by Country

Global number of Countries issuing National ID's						
	2010	2011	2012	2013	2014	2015
Traditional	71	62	58	45	45	43
Share of total	*71%*	*60%*	*51%*	*37%*	*36%*	*34%*
eID*	29	41	55	76	80	82
Share of total	*29%*	*40%*	*49%*	*63%*	*64%*	*66%*
Total	100	103	113	121	125	125

Majority of Nat ID countries issue eIDs by 2013
Market Share Inversion from Traditional to eID

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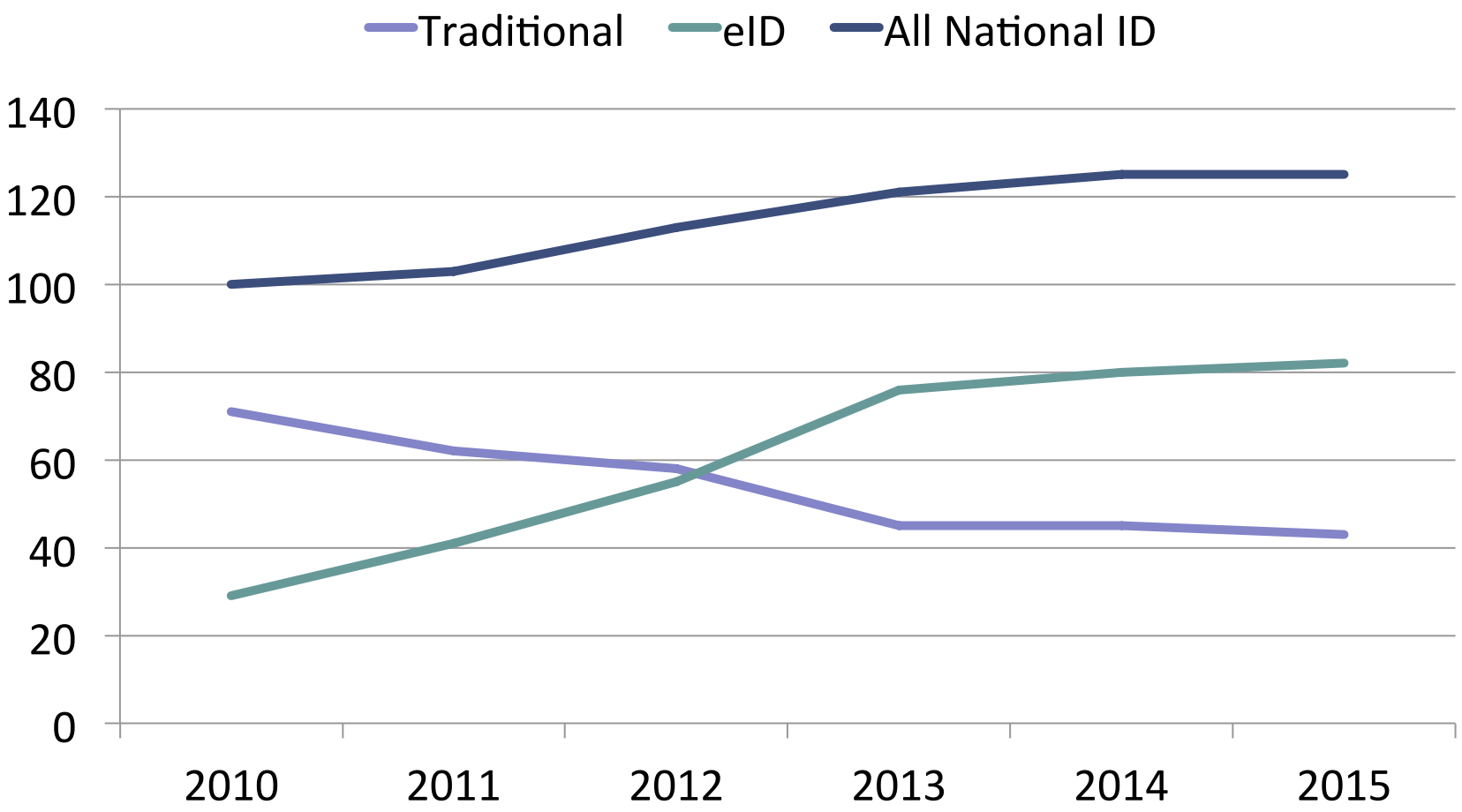
National eID Adoption by Country



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Biometric Facilitated Border Programs: US

- US-VISIT: Collection of biometrics—fingerprints and photo —from international travelers at U.S. visa-issuing posts and ports of entry
- Global Entry: Expedited Passport Control for Registered Travelers via Kiosks at 20 International airports ALSO FLUX – cooperative Global Entry and Netherlands PRIVIUM program
- NEXUS: WHTI-compliant alternative to passport provides expedited travel via land, air or sea between the U.S. and Canada border for citizens of both countries.
- SENTRI: Secure Electronic Network for Travelers Rapid Inspection - expedited CBP processing for pre-approved, low-risk travelers in dedicated commuter lane to expedite daily travel across the U.S border at Otay Mesa, El Paso, San Ysidro, Calexico, Nogales, Hidalgo, Brownsville, Anzalduas, Laredo, and San Luis

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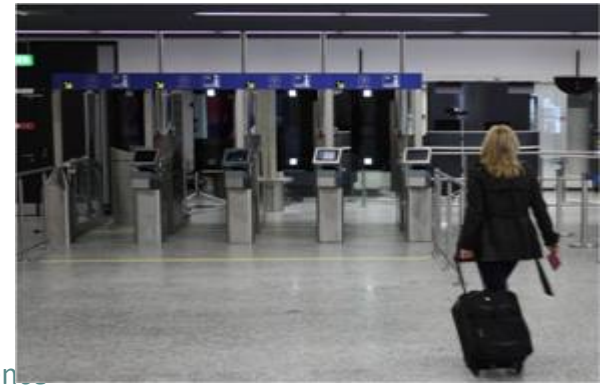
Biometric Facilitated Border Programs: US

- Enhanced DLS: WHTI compliant allow travel over US Canadian border
- Border Crossing Cards: 7 million laser visas -- machine-readable, credit-card-sized documents with digitally encoded biometric data, including face and fingerprint.
- FAST: 87K WHTI-compliant Driver cards for US entry by land or sea and expedited release to approved commercial truck drivers between the U.S and Canada or to the U.S. from Mexico. 55 of 105 northern and southern land border ports including dedicated FAST lanes in Michigan, New York and Washington, California, and Texas.

Biometric Facilitated Border Programs: Global

- Automated Border Control
  - SmartGate (Australia, NZ): Face based on ePassport exit and entry
  - IRIS (UK): Iris based expedited entry
  - Heathrow Trial: Face based on ePassport entry
  - RAPID (Portugal): Face based expedited entry
  - PRVIUM (Netherlands): Iris based expedited exit
  - PEGASE (France): Finger based expedited entry
  - ABG (Germany): Iris based expedited entry and exit
  - Japan, Hong Kong & Macau, Finland, etc.

- Visas, Visa Waivers, Asylum Seekers – EU, Japan, Indonesia, Malaysia, Australia, NZ, etc.

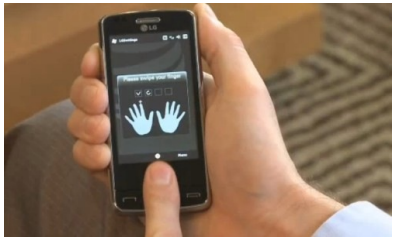


Imminent Driver: Mobility

- Mobility & Associated Infrastructures, Platforms, and Applications are Key to Understanding Biometric Market Evolution for the Foreseeable Future
  - Successful NFC-enabled Mobile Payment Trials on EVERY Continent
    - Handset Manufacturers, Mobile Operators, and Financial Institutions are collaborating on NFC-enabled Transaction Infrastructure
  - Biometrics secure Mobility in the field; Better secure Home Base as well
    - The "iPhone" Changes EVERYTHING
      - Proliferation of Mobile Devices an IT NIGTHMARE
      - "Is there an app for that?"

Imminent Driver: Mobility

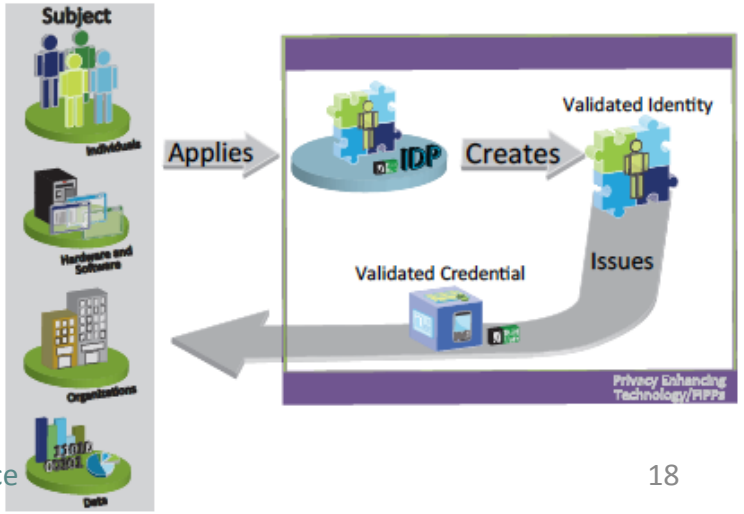
- Devices are getting smarter, faster, more accessible AND cheaper
  - Sensors embedded in Device: pointer, on/off switch
  - NFC is coming full-throttle
  - Dual Facing Cameras
  - Payment Processing



- Everybody is using them all the time for CRITICAL proprietary, high-security Data and File Access and Communications
    - Commercial, Military, & Civilian Applications
- And there are MORE OF THEM
  - 5B phones for 6.9B people = 72.6 %
  - Russia 147%, Italy 125%, Hong Kong 187%, Montenegro 192%

Imminent Driver: Trusted Virtual ID

- NSTIC – US National Strategy for Trusted Identities in Cyberspace
  - Strategy to raise level of trust of identities of individuals, organizations, networks, services, and devices for online transactions
  - Public/private sector collaboration to create Identity Ecosystem where participants enjoy trust and security for sensitive online transactions
  - User-centric online environment, a set of technologies, policies, and agreed upon standards that securely supports transactions ranging from anonymous to fully authenticated and from low to high value.
  - Key attributes privacy, convenience, efficiency, ease-of-use, security, confidence, innovation, and choice.



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Imminent Driver: Trusted Virtual ID

RISE

- RISE - Rising Pan European and International Awareness of Biometrics and Security Ethics
  - International initiative for promoting Awareness on Ethical Aspects of Biometrics and Security Technologies
  - International dialogue on biometrics, data sharing and protection, privacy and security issues

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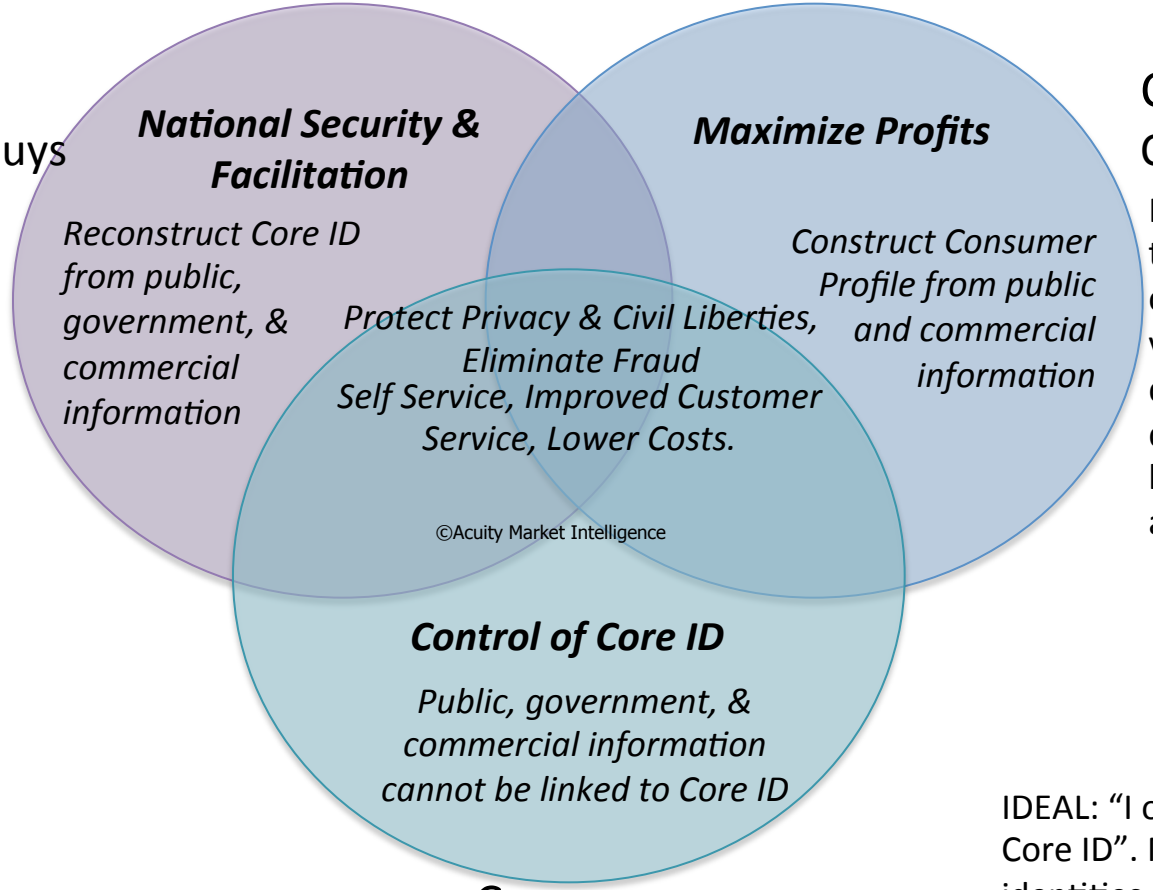
Evolution Towards Person Centric ID

Government:
Find Good & Bad Guys

IDEAL: A single, real-time representation of an individual based on various physical/virtual data types from various data sources: biographic, biometric, and contextual.



Commercial:
Customer Service

IDEAL: An accurate real-time representation of a consumer based on various physical/virtual data types from various data sources: biographic, biometric, and contextual.

Consumer:
Personal Data Ownership & Control

IDEAL: "I own and control my Core ID". Multiple limited identities containing only as much information as needed for a specific purpose for public, commercial, and government purposes.

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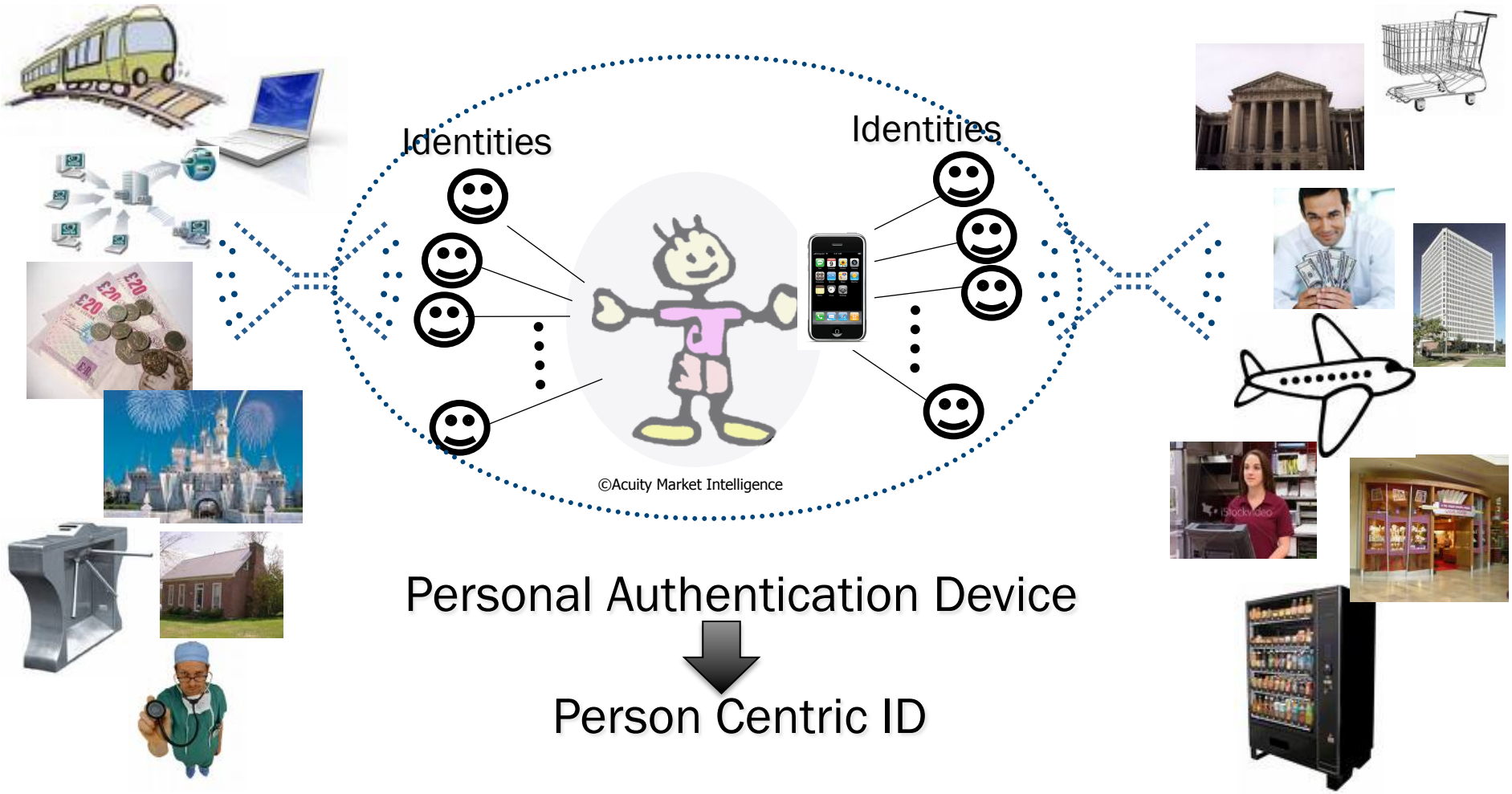
Consumer Person Centric ID



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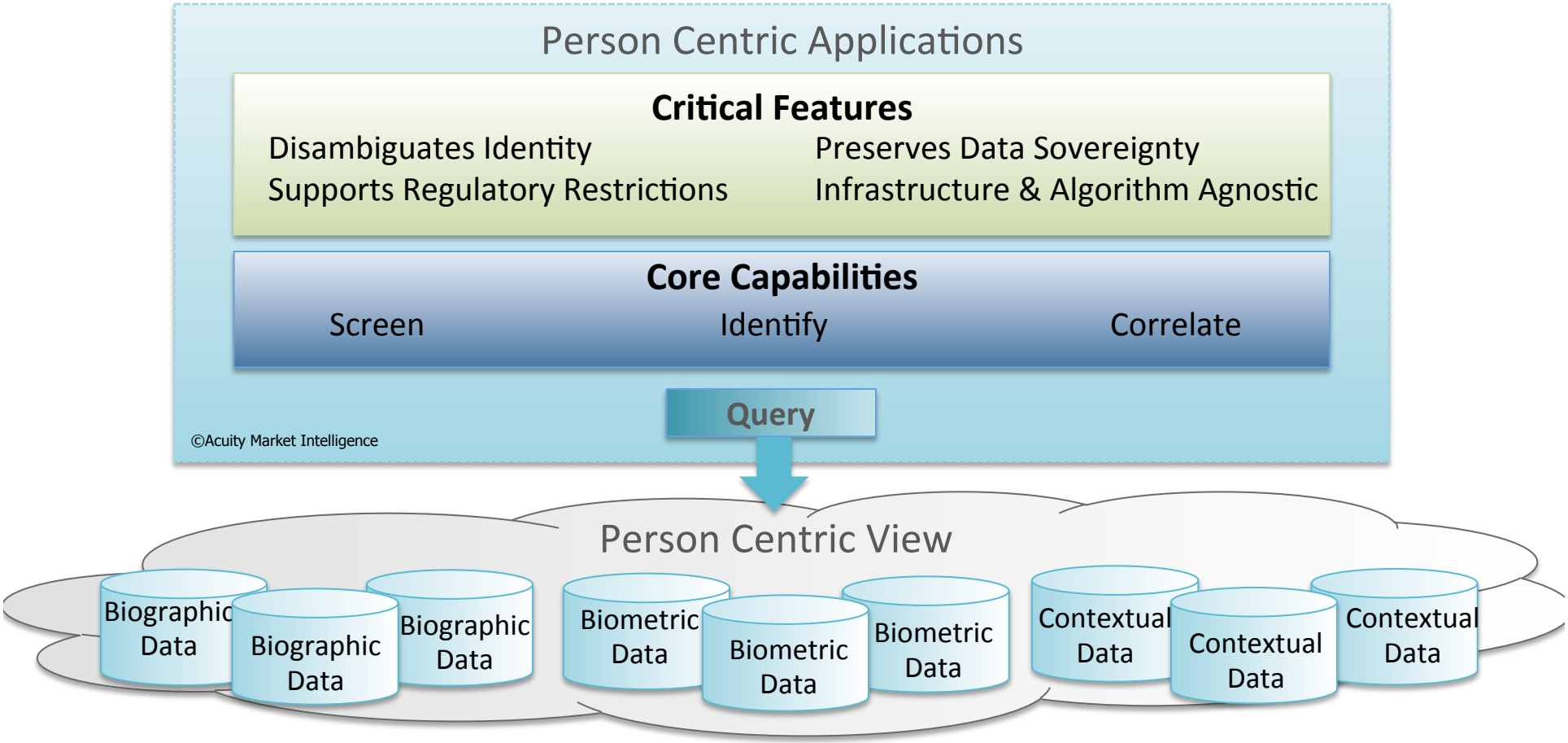
Government & Commercial Person Centric ID



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Implications for Identity Intelligence

- Biometric data is more proprietary than other kinds of personal data DEMANDS "built-in" restrictive data protection policy and engineering
  - Challenges to widespread adoption of biometrically enabled applications are Programmatic, Policy, Security, and Infrastructure
- Near term adoption of biometrics and associated Identity Infrastructures driven by proliferation of Mobile Devices and Trusted Virtual ID platforms
- Ensuing Person Centric ID will help and hurt Identity Intelligence processes
  - Conflicts between Consumer, Commercial and Government Interests
  - Consumer Centric Model will create limits across biometric, biographic, and on and off line contextual data
    - International Government committed to protecting identity information - TURBINE, NSTIC & RISE
    - International organizations committed to protect digital identities as a human rights issue
  - Vendor community promotes "privacy enhancing" aspects of biometrics
- Technologies available to enable anonymous fused matching of biometric, biographic, and contextual data across disparate systems BUT given biometric "built ins" may not work

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Thank you !

For more information on or to preview Acuity's research and analysis please visit www.acuity-mi.com

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