

# Biometric Offender Movement

Case Study Northern Ireland Prison Service  
CTA 2011

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# Agenda

- Background
- Northern Ireland Prison Service (NIPS) biometric history
- Context
- Project aims / drivers
- Technical project description
- Conclusions



## Hand Geometry Access Control

- Introduced 1998 for staff, contractors, official visitors
- From stand alone to network
- Integration into security management system



## Fingerprint Logon

- Secure Image Processing System 1999
- Staff fingerprint logon
- Authentication and audit trail



## Secure Biometric Logon

- Introduced 2006 Prisoner records in accommodation areas
- Authentication linked to network layer



## Visitor Management

- Fingerprint identification of visitors and offenders
- Check offenders and visitors in and out of visits
- Check visitors against red list

# Context

- Recently devolved Ministry of Justice April 2010
  - Increased political scrutiny
  - Bid for resources “prisons over health and education”
- Reform of Prison Service
  - Move towards normalization of service
  - Shift in focus from security to rehabilitation
    - 1,800 staff supervise 1600 offenders
    - Staff cuts of 500
- Public service budget cuts
  - Save \$105 Million over 4 years
  - Annual operating budget \$224M
  - Improve efficiency
    - CPP is \$152,000 p.a.
    - 2 x UK (\$72,000)



# Complex Offender Population

- HMP Maghaberry high security Prison
- Remand prisoner (pre-sentenced)
- Sentenced prisoners – low, medium and high security
- Sex offenders
- Illegal immigrants
- Separated population (paramilitary / terrorists)
- Informants (super grasses)



# Offender Movements

- No contact between paramilitaries and general population
- Lockdown when paramilitaries are moving
  - Effects general population, impacts constructive hours
- Movements under escort, 1 staff to 3 offenders per movement



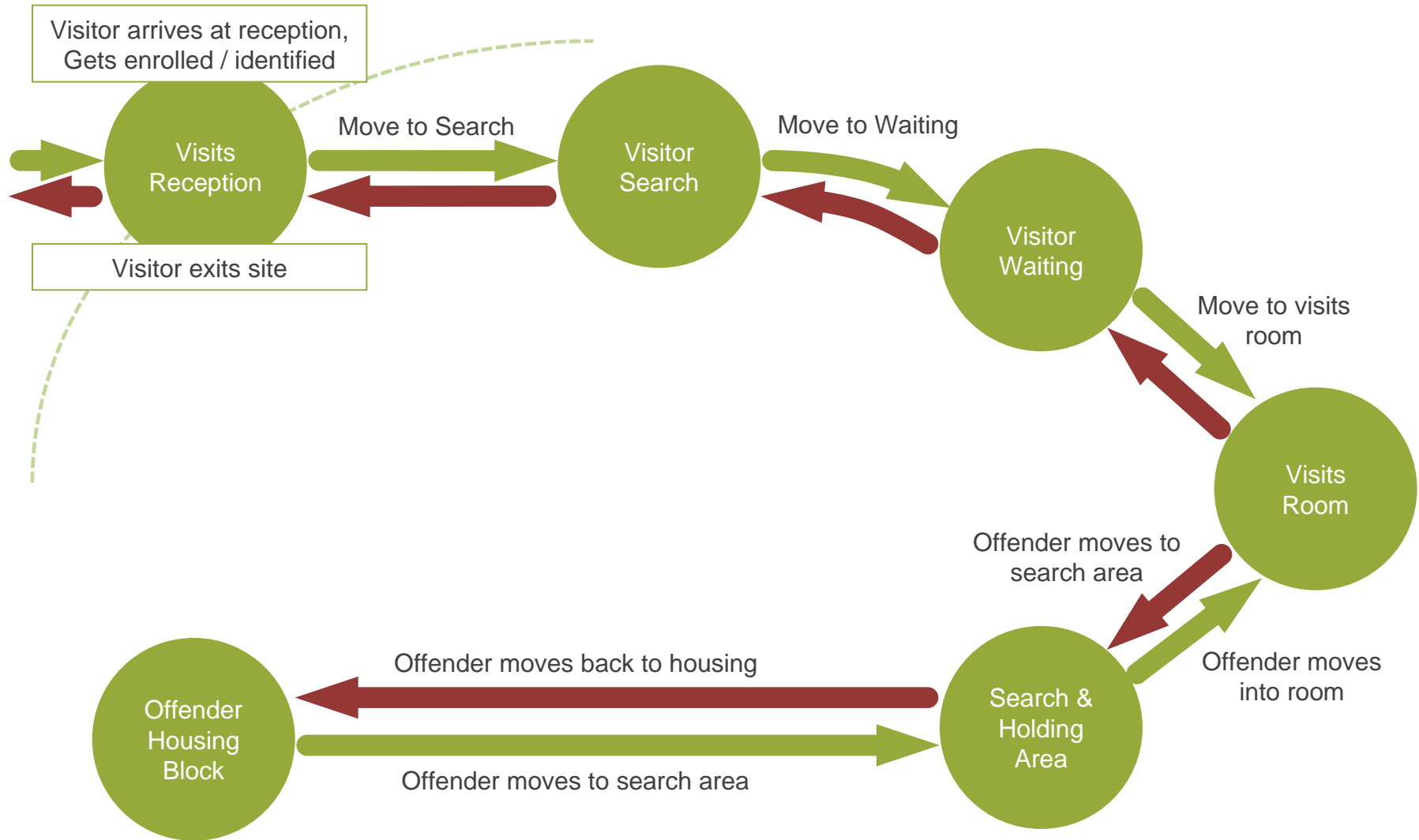
# Offender Movement Aims

- Reduce escorted movements and associated staff costs
- Operate multiple security regimes appropriate to offender security classifications
- Real time offender location information

# Current Visitor Management System

- Separate system to manage visit booking and workflow
- Uses biometric finger print identification for offenders and visitors
- The system is installed on multiple sites

# Movements



# Current Visitor Management System

- **Issues**

- Not multi-site aware
- Only enrolls a single finger
- No automatic update of offender location
- Not integrated with the Offender Management System
- Not designed to be expandable for general offender movement tracking
- Officer time wasted escorting low risk offenders

# Requirements

- Integration with the Offender Management System
- Multi-site aware
- Automatic update of offender location
- Allow for use of biometrics for other tasks
- Biometric must be capable of identification

# Requirements (contd...)

- A system capacity for at least 20,000 offenders and 100,000 visitors
- 1 in 500 error for false accept or false reject
- Registration process should take less than 3 minutes on 99% of registration transactions
- The system should be independently penetration tested.
- Biometric identification should be on average less than 2 seconds
- The biometric must be suitable for use with children from age 5

# Biometric Selection

- What are Biometrics?
- Technologies considered
  - Iris recognition
  - Finger vein
  - Facial recognition
  - Fingerprint recognition
  - Hand geometry





# Selection Matrix

Technology	Meets Requirements	Ease of Use	User Perception	User Volume	Matching Speed	Accuracy	Cost
Iris	✓	M	L	H	H	VH	\$\$\$
Finger Vein	✓	H	M	L	M	M	\$\$
Facial Rec.	✓	M	H	M/H	M	M	\$\$
Finger Print	✓	H	M	H	M	H	\$\$
Hand Geometry	✗	H	M	M	H	M	\$\$

# Chosen Technology

- **Fingerprint recognition**
  - Reason for choice
    - Familiarity for users
    - Cost
    - Ease of enrolment
    - Accuracy



# Fingerprint Device Choice

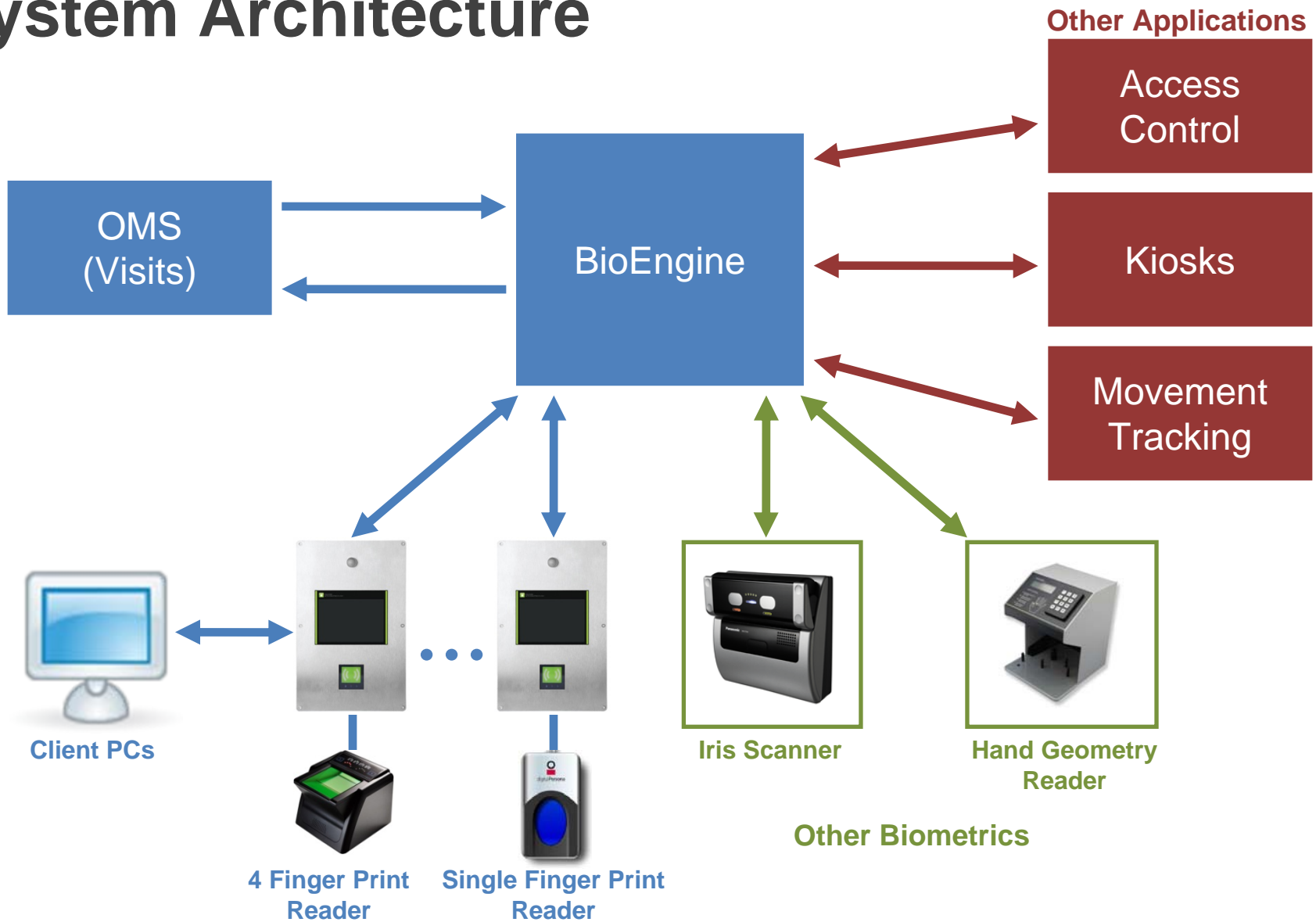
- Mixture of sensors
  - 4 finger scanners
    - Speed of capture for all fingers
    - High resolution images
  - 1 finger scanners
    - Cost



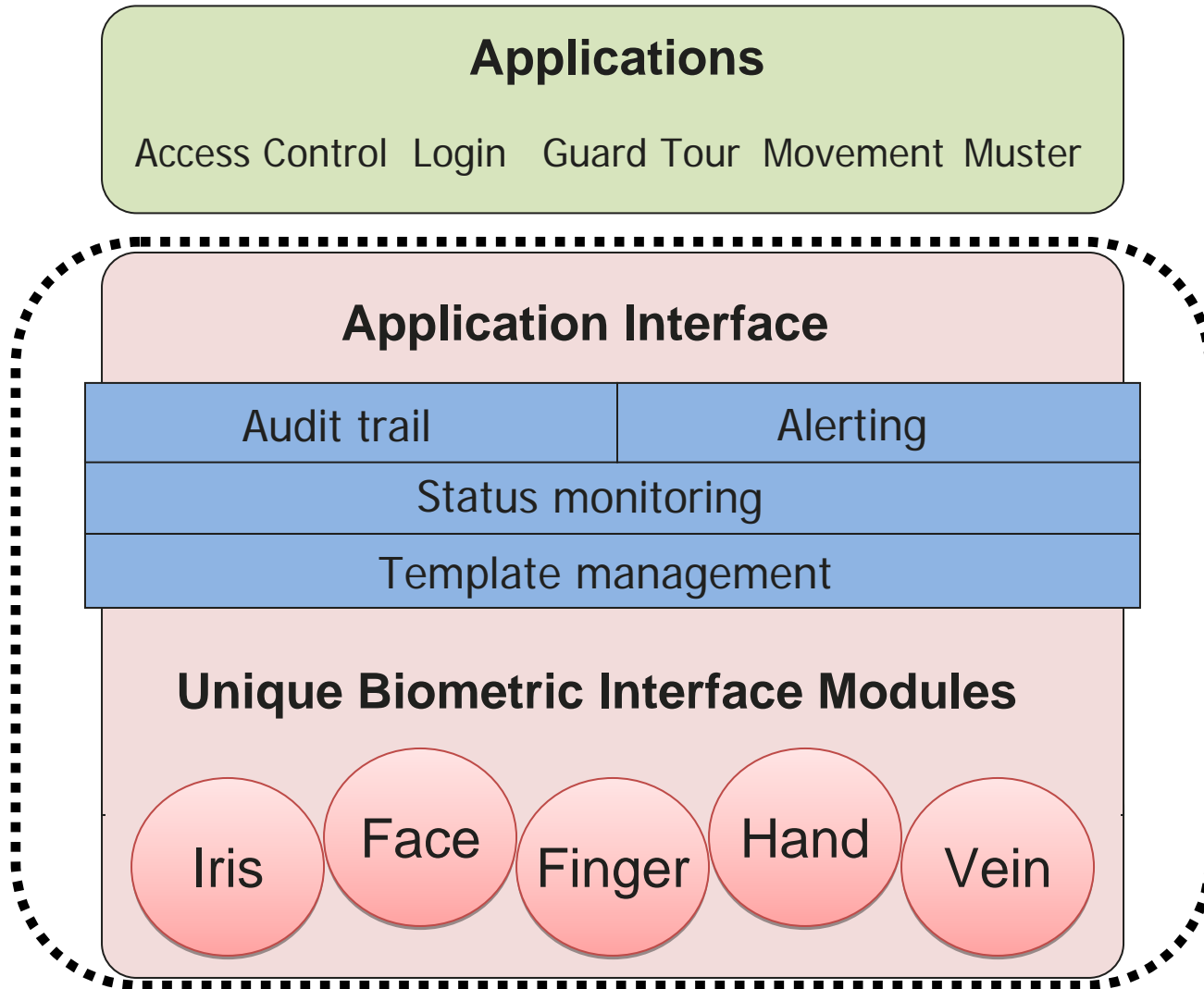
# Algorithm Choice

- High volume of templates >1 million
- Fast matching speed and scalable deployment
- Should cope with AFIS standards
- Should have some form of certification
- Chose MegaMatcher from NeuroTechnology

# System Architecture



# BioEngine



Us

Visits Operator


Enrolment Status | Multi Biometric Capture | Image Capture

**Enrolment Info**  
**Device Name:** RealScanner  
**Mode:** Finger and Photo

**Device Control**  
Start Capture Stop Capture

**Capture Control**  
Hand Select:  
 Left Hand  
 Right Hand  
Scan Type:  
 4 Finger  
 Two Thumbs  
Enrol Now

Capture Sensitivity:  
 Normal  
 Medium  
 High



**Left Hand Finger Segments**  
Excellent Average Excellent Excellent Good

**Right Hand Finger Segments**  
Good Good Excellent Excellent Good

**Captured Inmate Template**  
Skip Next

Single Biometric Capture

Enrolment Info

**Device Name:** Install Device

**Mode:** Identification

Device Control

Start Capture

Stop Capture



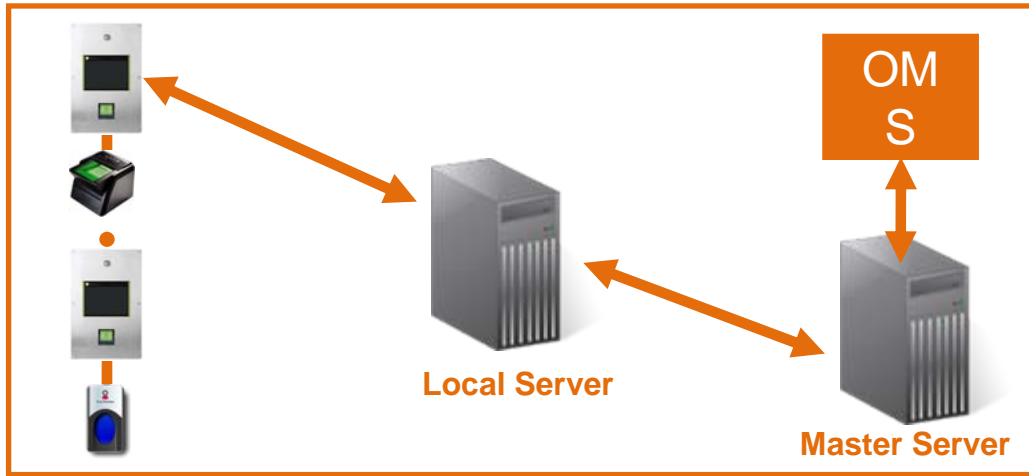
Cancel

Complete

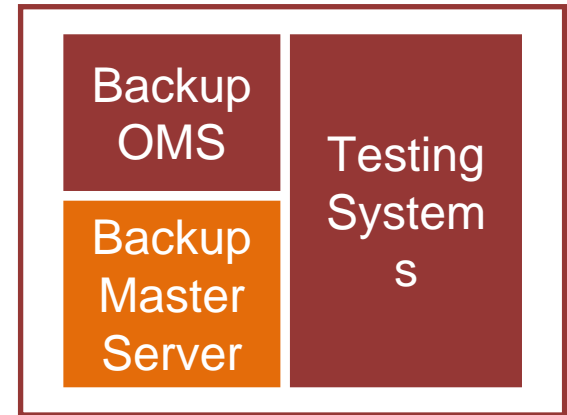


# Implementation

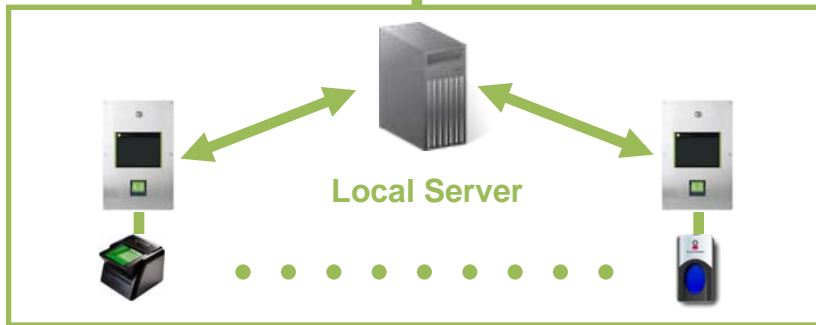
## SITE 1



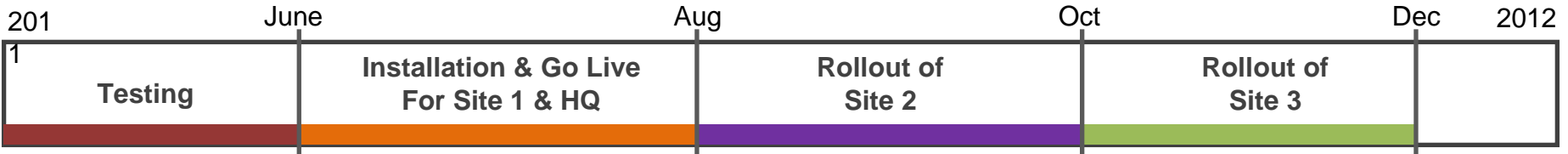
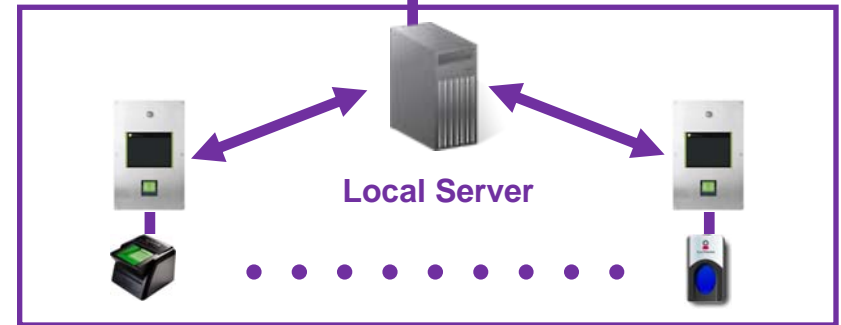
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## SITE 3



## SITE 2



# Matching performance

- Maximum expected template database of around 180,000 templates
- Current installation can match around 300,000 templates per second
- Matching speed of around 2 seconds for reception area
- Matching speed of around 0.5 second for movement stations
- Matching performance can be increased by
  - Adding more resources to servers
  - Adding more servers
  - Sorting templates or changing matching order

# Future Options

- Ability to import/export standard fingerprint images
- Addition of facial recognition as a primary or secondary identification for children
- Evaluation of gait recognition for offenders moving between housing areas and visits

# Conclusions

The strategic biometric architecture developed in this project presents many opportunities to;

- Improve return on investment
- Achieve operational cost savings by automating the identification process
- Improve security through centralized template management
- Improve data accuracy of offender location information
- Share the biometric data with other agencies
- Future proofing - ability to use other biometric technologies and link with other systems

# Contact Details

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