

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



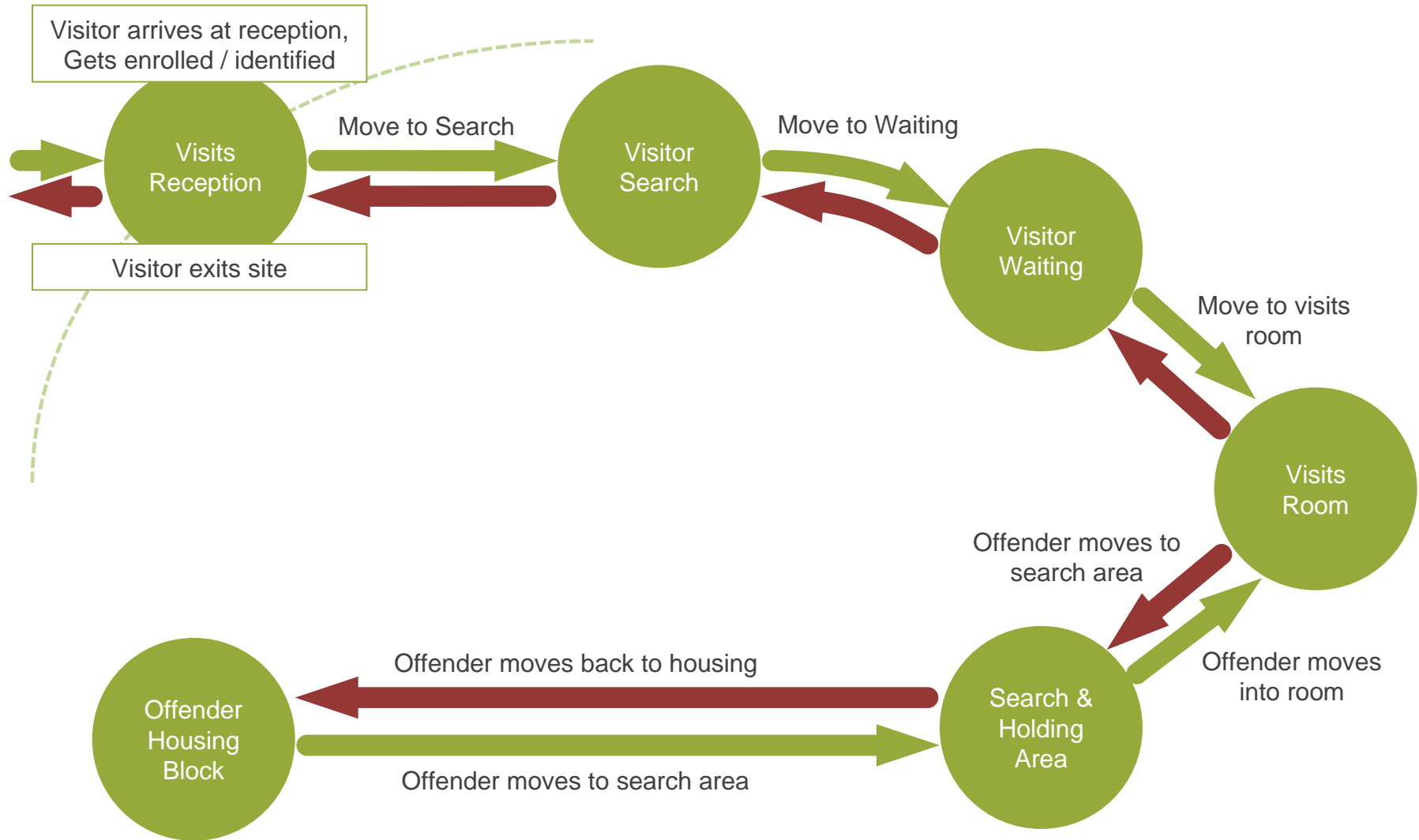
Offender Movement Aims

- 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

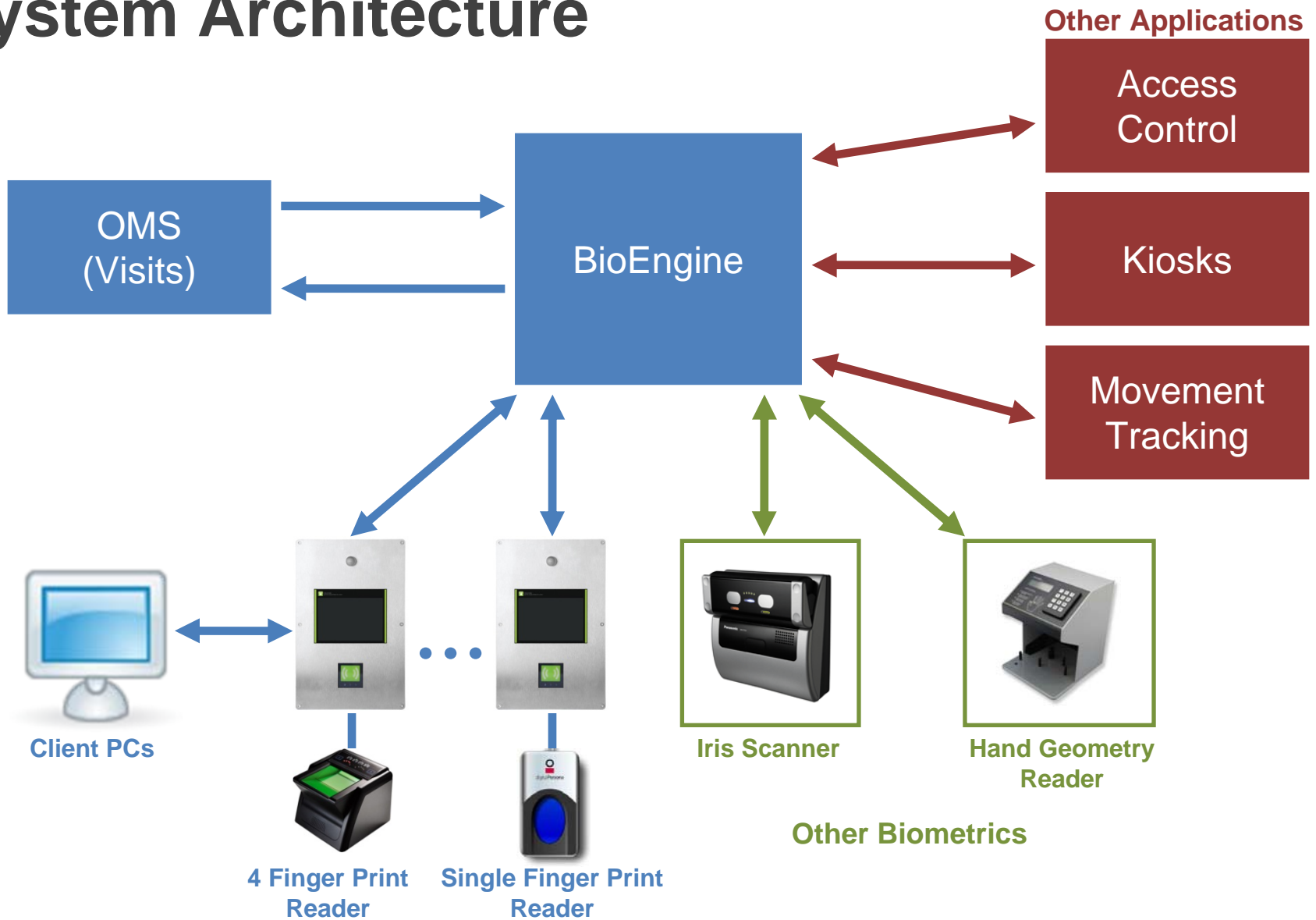
- Mixture of sensors
 - 4 finger scanners
 - Speed of capture for all fingers
 - High resolution images
 - 1 finger scanners
 - Cost



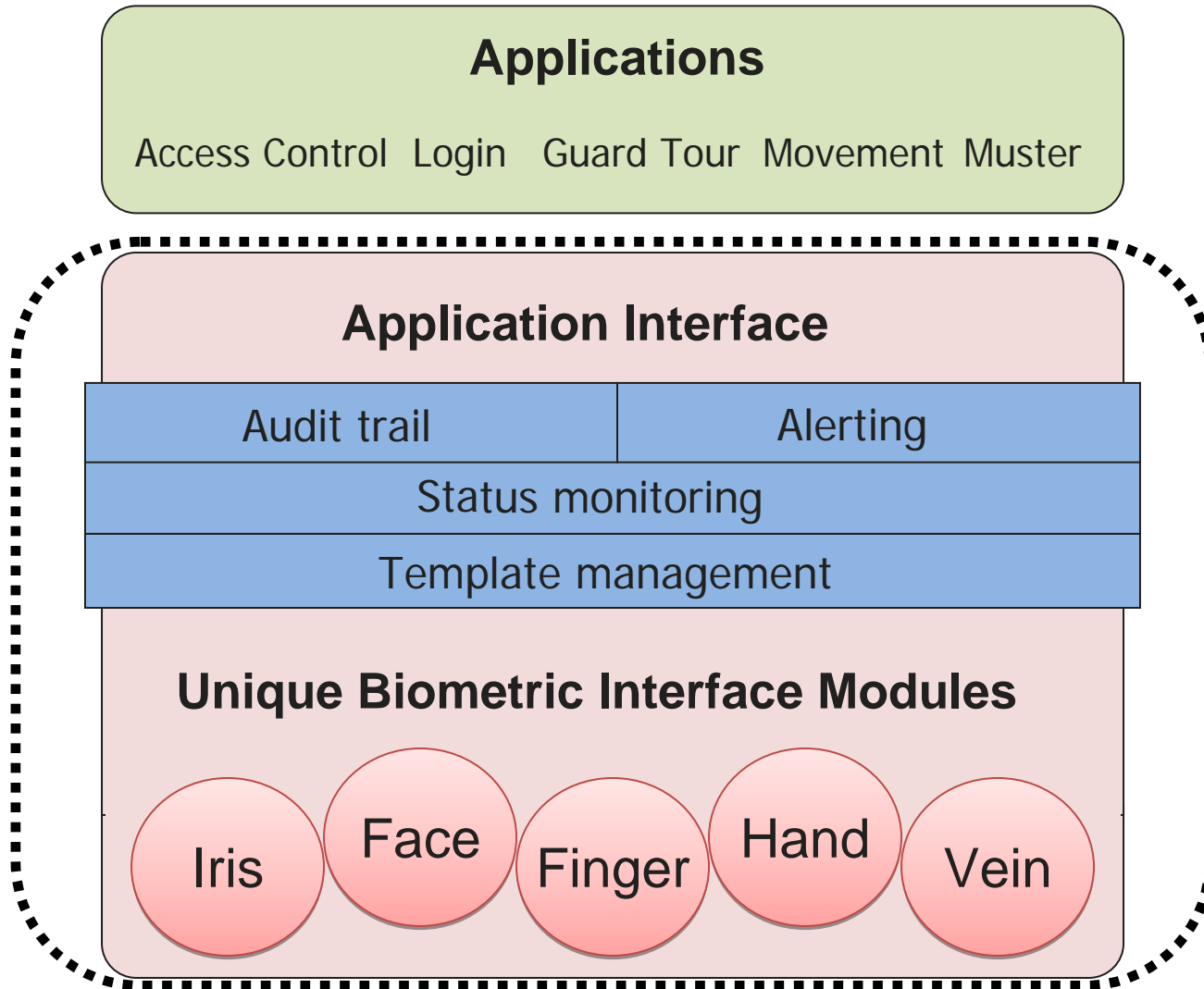
Algorithm Choice

- 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

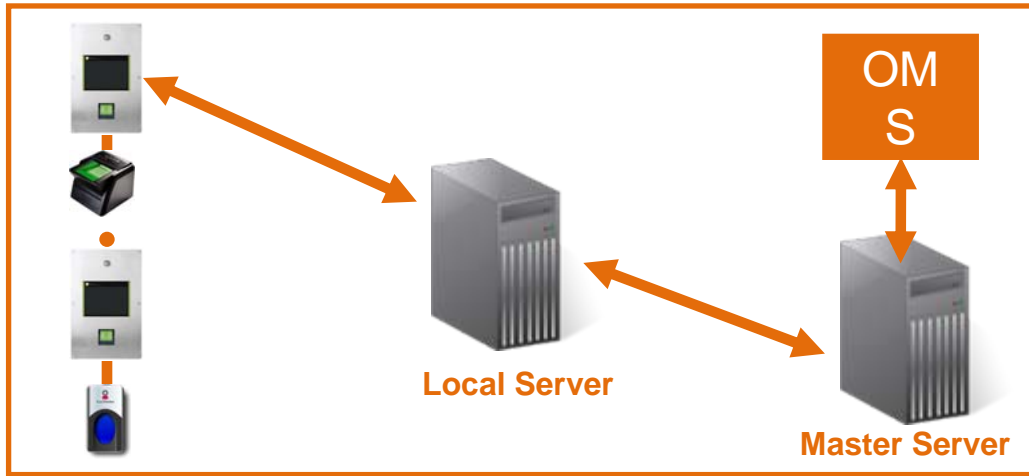


Cancel

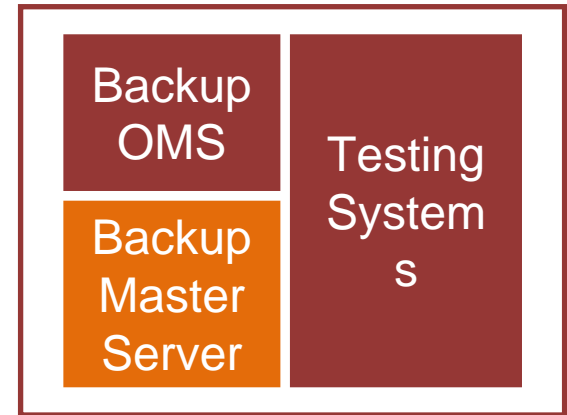
Complete

Implementation

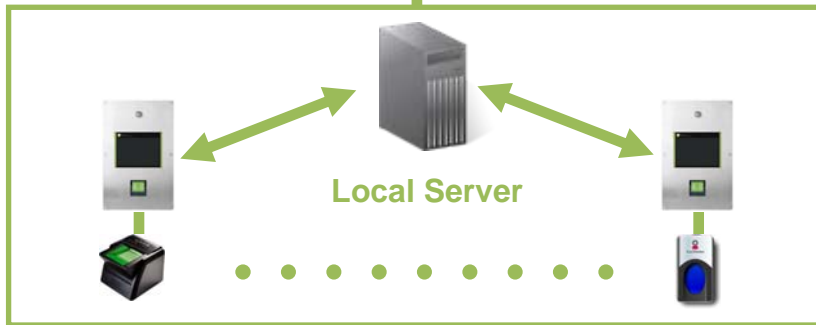
SITE 1



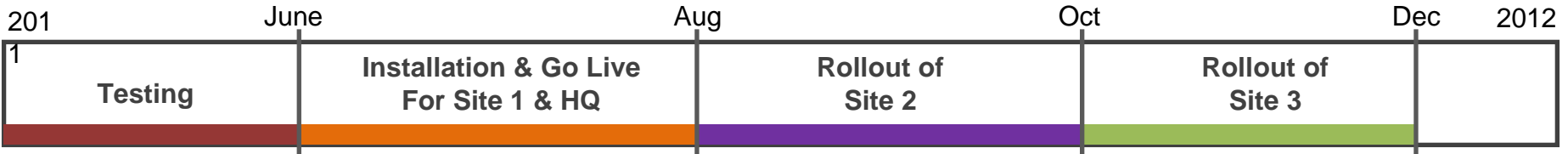
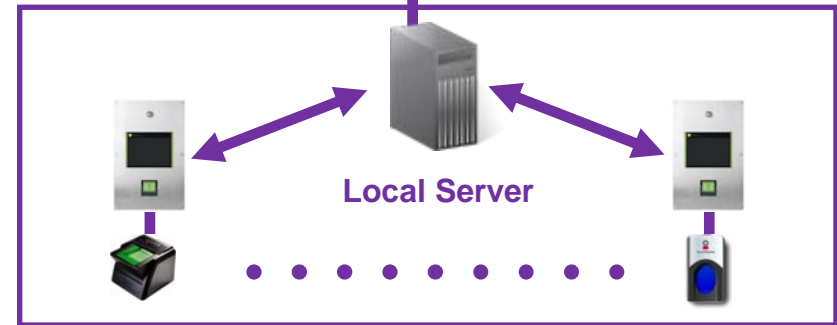
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SITE 3



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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