

# IRIS PATIENT IDENTIFICATION SYSTEM

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Graham Blair, Angela Liu, Mark Tull

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with iRespond.org



# Problem





## 2 Part Problem

1. **Identification** of patients in developing world is very difficult.
2. **Medical Records** in developing world are poor or non-existent and difficult to access/use.



# Patient Identification

- Very difficult in developing countries
  - Lack of infrastructure
    - Lack of national accounting/tracking of citizenry (eg, USA SSN)
    - Lack of photo ID cards
      - means of authenticating cards...
  - Linguo-Cultural hurdles
    - Maybe not enough names in language/dialect to accommodate entire population



# Medical Records

- Often little or no records kept in developing world
  - (logistical issues)
- If records are kept, often of little use
  - Social Constraints
    - Similar to ID problems
      - (No national ID system, no photos, language, etc.)
    - Additionally:
      - Security/privacy concerns can cause poor record-keeping



# Medical Records (cont.)

- Paper medical records may be of low value
  - Nomadic populations, mobile providers
- Electronic Medical Records (EMRs) may be of low value (or not used) because
  - Access problems
    - poor connectivity (eg, rural areas)
  - Hardware/Software problems
    - no hardware
    - power problems
    - language input issues (keyboard, software language support)







# How is identification done now?

- Frequently, by recruiting locals to help ID people
  - Translators
  - Tribal/village elders, etc.
  - “Connectors” (to use Malcolm Gladwell’s term)
- Unfortunately
  - Expensive / Difficult / Not always available
- ...It’s done as best it can be per situation
  - Sadly, the results are often unsatisfactory



# Who needs this? Who will it affect?

- Healthcare Workers and Researchers in Developing World
  - Providers, Researchers
  - Analysts / Policymakers
    - BONUS: in developed world
- Funders
  - Governments, NGOs

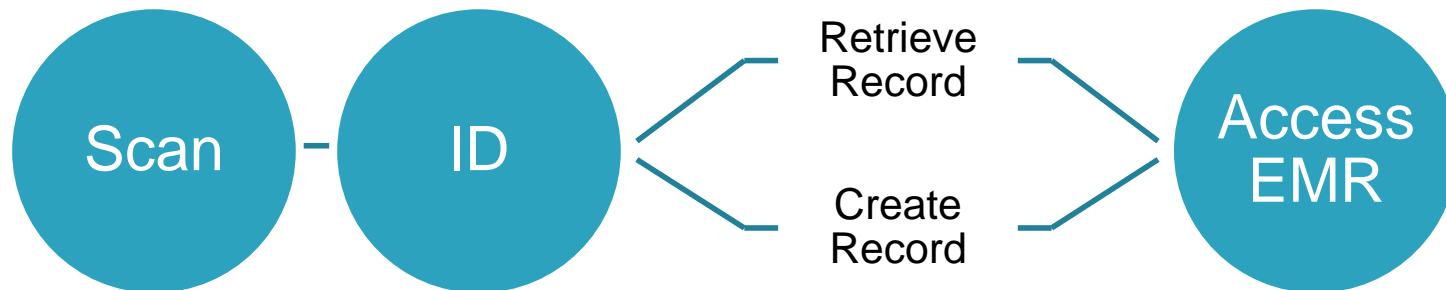


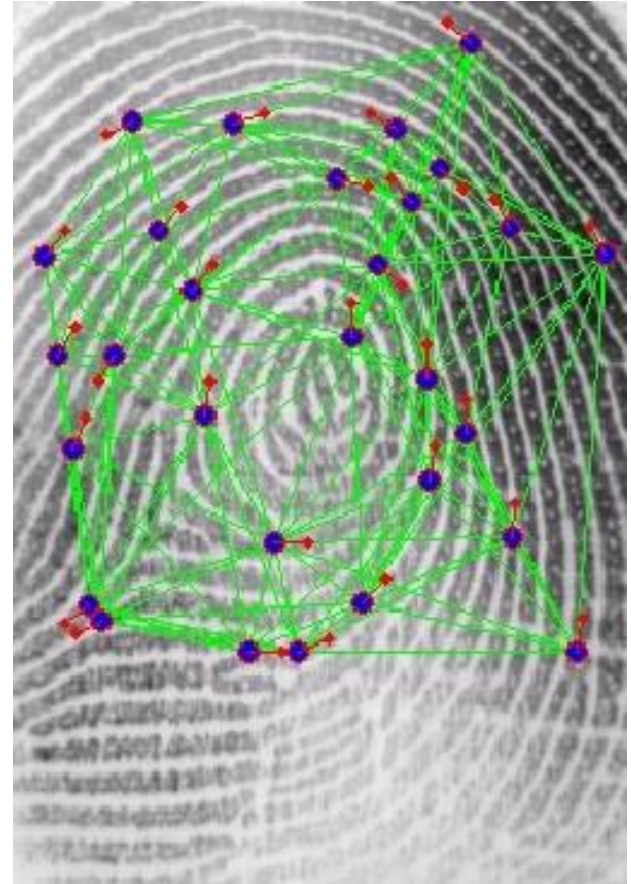
# Solution



# IRIS

## Biometric Patient ID and EMR system





# Project Description

## Major Components

- Device
  - Smartphone, etc.
- Fingerprint scanner
  - or other biometric
- Database
  - Cloud-based, primarily
    - Local: temporary, caching, etc.
    - Remote: (sometimes)



# Project Description

## Stakeholders

- iRespond
  - IRIS
    - preliminary testing of some elements
  - other systems
- Thailand
  - Ministry of Public Health
  - Two universities participating



# Design Challenges

- Device Agnostic
  - Browser-based
- Language Agnostic
  - Input only numerals (outside EMR)
  - Numeric-only SIDs
- Users may have <HS equivalent education
  - GUI
- Globally scalable
  - Numeric only SIDs (can't use alpha characters)
  - Length of SIDs





# Related Work

- ODK (Open Data Kit)
- India's UIDAI project
  - 2010: biometric backed UIDs
  - 600 million by 2016

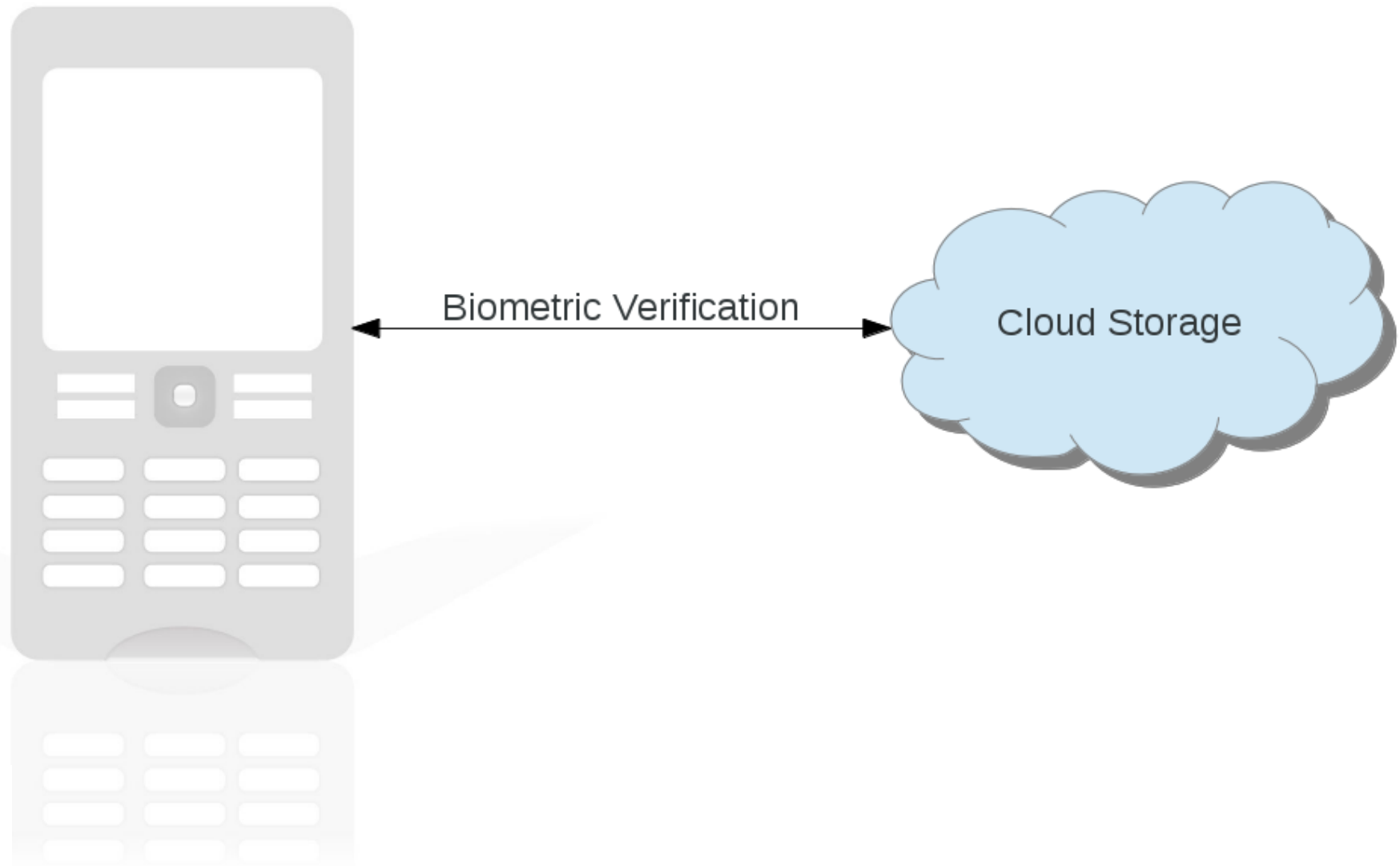


# Findings so far

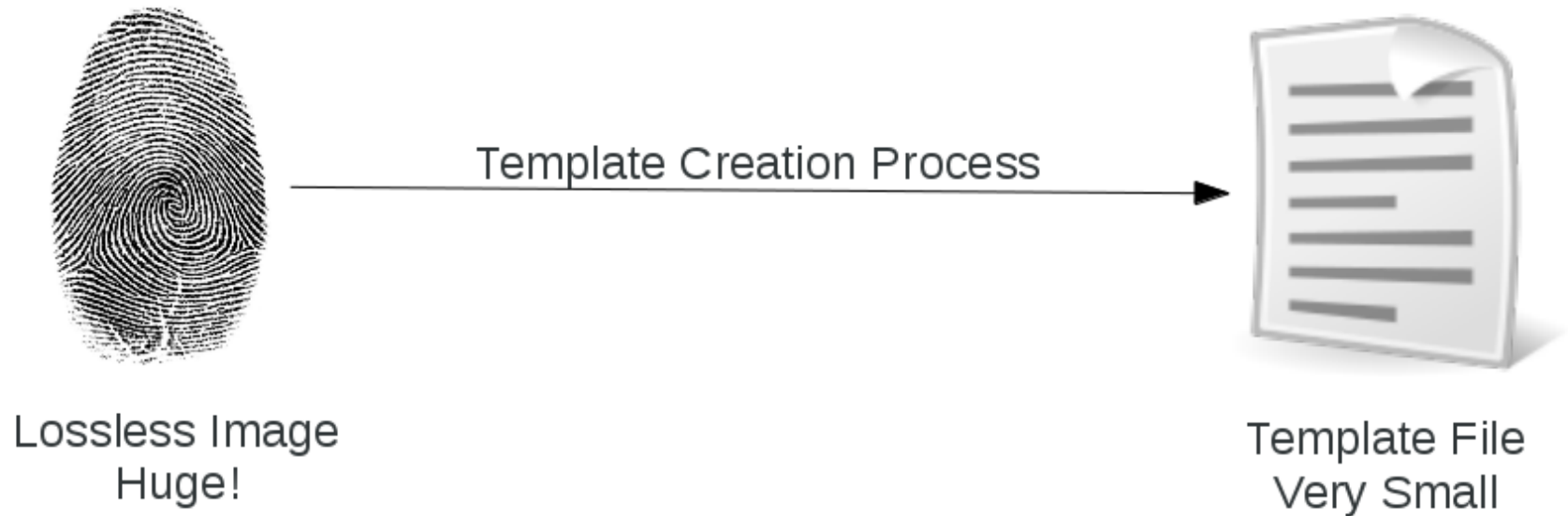
- Met with iRespond
  - Other biometrics possible in future
    - iris scanning, palm scanning , voice printing
- Planning architecture is complicated
  - security, anonymity, scalability
    - securely assign UIDs
- Designing UI is difficult
  - universality, language



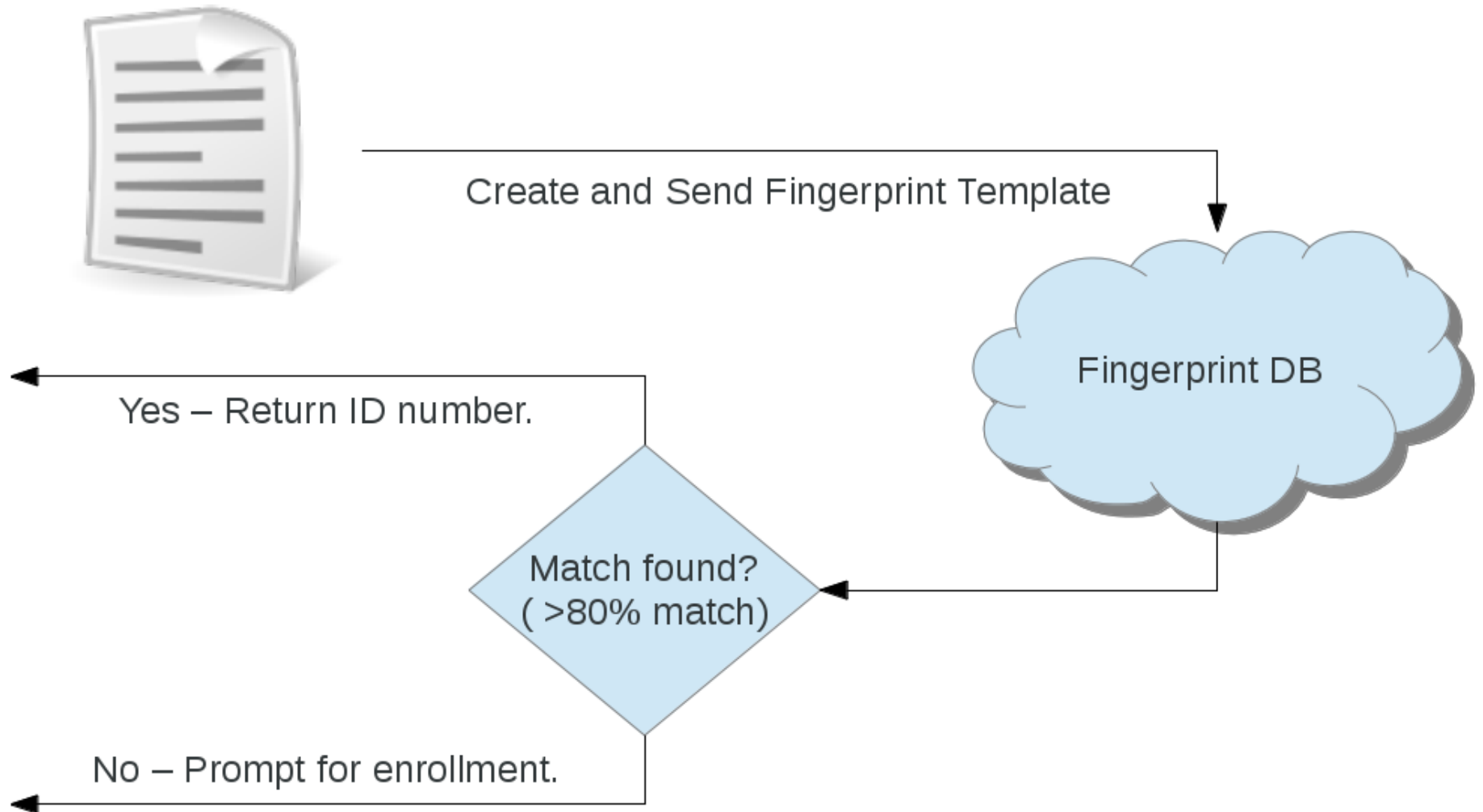
# Basic Scenario



# Architecture - Fingerprints



# Architecture - Verification



# Architecture - Storage

uid	template
853461885514	fingerprint
...	...
...	...

uid	name	dob
853461885514	John Doe	2012-12-21
...	...	...
...	...	...

8534 – 6188 – 5514

Eleven regular, random digits.

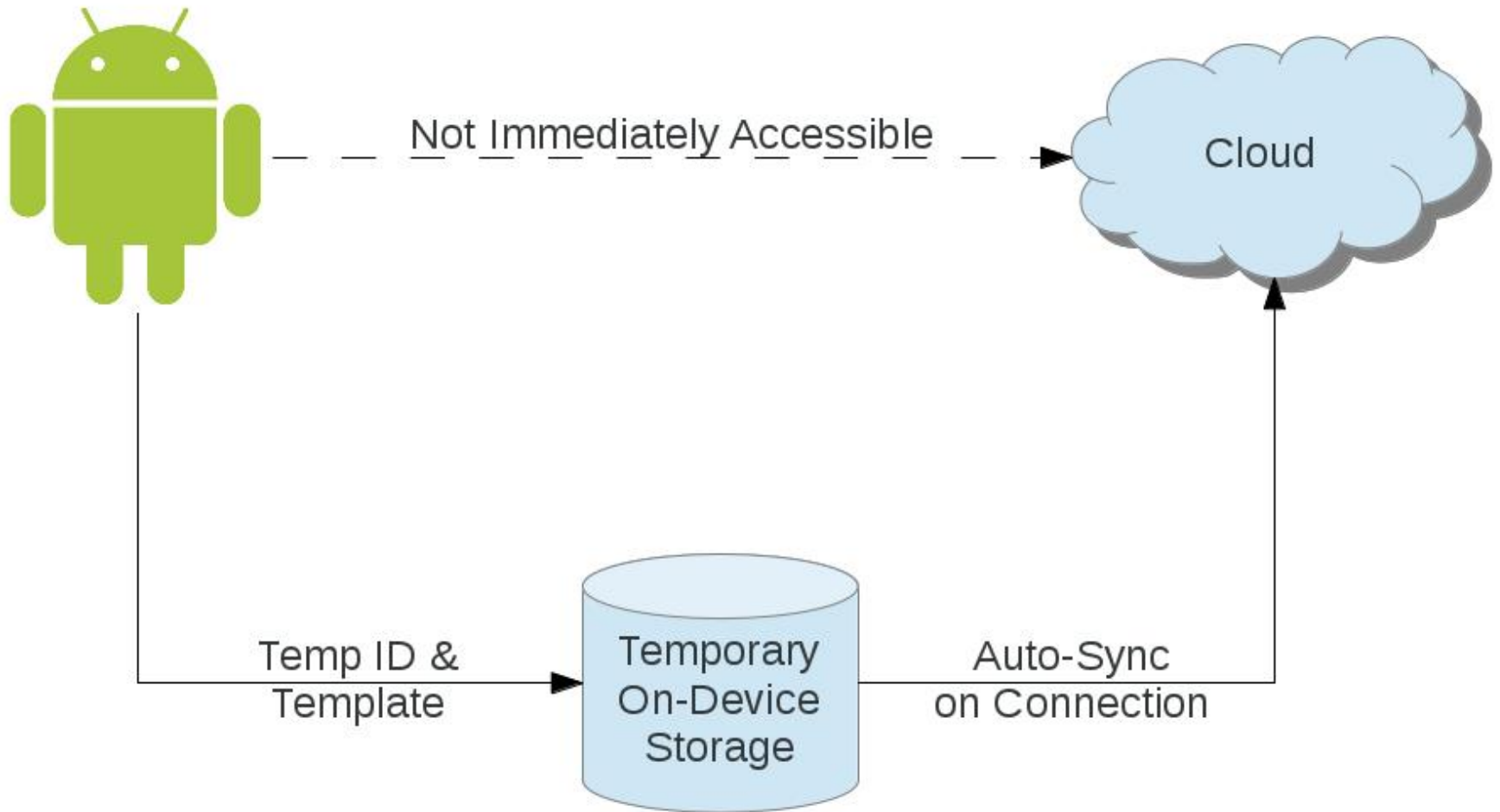
$$10^{11} = 100000000000$$

Different possible ID numbers.

Verhoeff Check Digit



# Architecture - Localization



# Design and Evaluation

- Prototype/UI iteration:
  - iRespond feedback
- Evaluate
  - User testing
    - locally
    - field by iRespond staff
  - Criteria
    - success/failure of functions
    - used or avoided
    - effect on work





# Plan for Next Quarter



# Next quarter (rough plan)

- **First**

- Finish Backend Development
  - Database, interaction with fingerprint scanner, etc.
- Finish UI Design
  - Test paper prototypes in laboratory

- **Second**

- Local testing of system
  - Evaluation, iteration
- Execute Field Testing

- **Third**

- Write-up / Present





# Questions?



This presentation was on the IRIS system by iRespond.

We are **Graham Blair**, **Angela Liu**, and **Mark Tull**.

Thank you for your time.