



**Digital ID for benefits  
and service delivery to  
billion+ people**

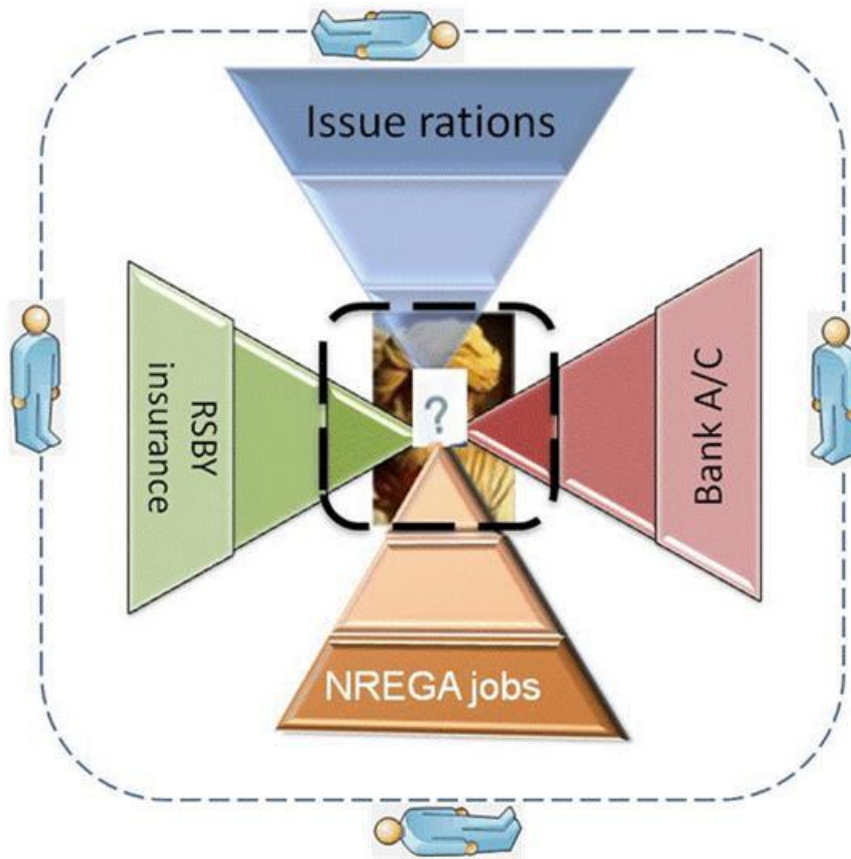


**Unique Identification Authority of India**

**[www.uidai.gov.in](http://www.uidai.gov.in)**

**IJCB-2014, Tampa, 30 September 2014**

# Establishing ID is a common challenge



**An individual typically accesses multiple service providers, at different times**

**Needs to repeatedly re-establish ID = problem for the poor**

Birth records ✗  
Address proof ✗

**= No or limited access to entitlements and opportunities**

# Context of Aadhaar

---

- Providing a formal digital identity proof to 1.2 billion population
- Digital identity to serve as a gateway to access benefits and services
- Need to streamline government expenditure – cut wastage and leakage
- Need for a transparent and accountable system of public expenditure
- Need for social inclusion and financial inclusion to ensure inclusive growth



# Vision...

---

To empower  
all residents with a unique digital identity  
and a digital platform  
to authenticate anytime, anywhere



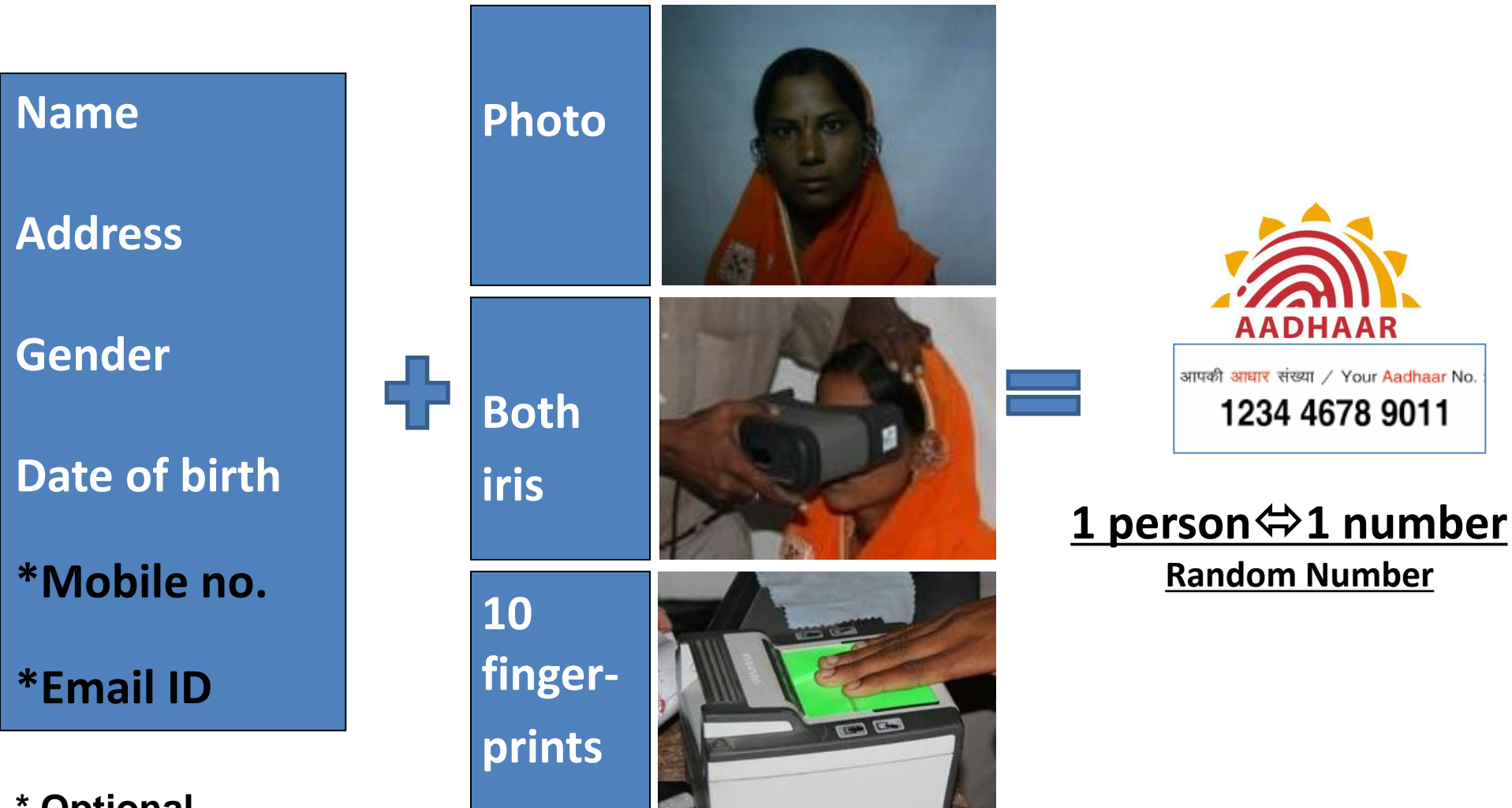
# Mandate...

---

- **Enrolment**- identify each individual using biometrics
- **Authentication**- Establish a digital platform that
  - uses state of the art technology
  - can be accessed anytime, anywhere
  - uses basic connectivity and a simple, inexpensive devices.
  - identifies individuals in a safe and secure manner.
- **Applications**
  - Establish standards/ protocols and provide technical assistance
  - facilitate usage of the digital ID and authentication platform by
    - Central and State Governments
    - service providers in the public and private sector.



# Enrolment for Aadhaar



**\* Optional**



# Features of Aadhaar

Only Numbers – No Smart Cards

Random Numbers – No Intelligence, No Profiling

All Residents enrolled– Including Children

Uniqueness – Ensured through biometric attributes

No Guarantees to Citizenship, Rights, Entitlements

Security and Privacy of personal information ensured

Ubiquitous Online Authentication – From No ID to Online ID



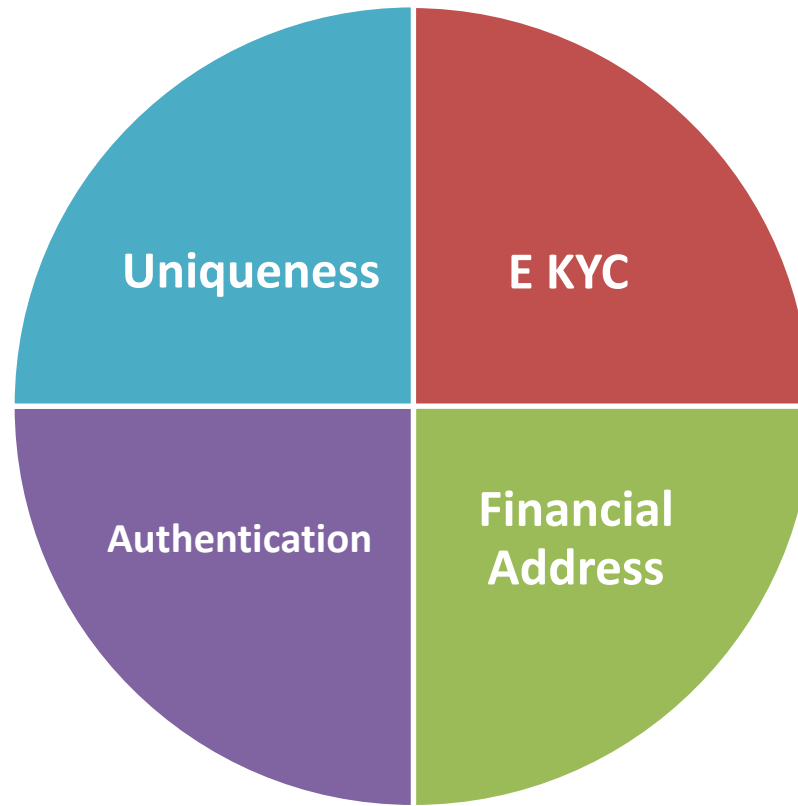
# Status as on 30 September 2014

Number of Aadhaar Generated	685 million
Maximum Number of Aadhaar generated on one particular day ( 22-Nov-2013)	1.89 million
Average no. of Aadhaar generated per month (April 2013 to March 2014)	25 million
Aadhaar saturation >80 %	13 States/ UTs
Aadhaar saturation 60-80 %	7 States/ UTs
Total Authentication Transaction since inception	258 million
Total e KYC Transaction since inception	1.9 million
Total number of Aadhaar linked bank accounts	82.4 million
Maximum number of bank accounts linked to Aadhaar in a day (29 September 2014)	2.48 million





# Value propositions of Aadhaar



# Uniqueness

***A random 12-digit number which can act as a primary identifier throughout the life of an individual***

***The Aadhaar platform using the world's most sophisticated technology ensures that every resident gets one and only one number. This is done to an accuracy of above 99.9%.***



# Benefits of Unique IDs

Reduces  
Leakages

- No Fakes
- No Duplicates

Provides  
Identities

- To the marginalized
- To the excluded

Benefits and  
Services

- Benefits only to genuine beneficiary
- Electronic delivery of services

# Uniqueness

- **Uniqueness ensures elimination of fake and duplicate entities.**
- **End to end transparency - all transactions auditable and trackable.**
- **Proper targeting possible – each beneficiary can be placed at his own level of entitlement.**



# Uniqueness – Benefits to stakeholders

## ➤ Benefits to Government:

- **Removes ghosts and duplicates** – Huge savings on account of leaner list
- **End-to-end-transparency** – audit trail shows the whole flow of G2P transaction
- **Reduces fraud and corruption** – the diversion of public resources can be eliminated
- **Targeting** – Will prevent beneficiaries from falsely claiming in-eligible claims. E.g. Income tax payee not claiming BPL benefits or a resident claiming both LPG and kerosene subsidy etc.

## ➤ Benefits to Resident:

- **Lifetime identity for every resident** – with less than 50% population having a birth certificate, Aadhaar give them a basic ID and empowerment. Hence, it is often referred to as the world's largest social inclusion project.
- **Nationwide portability** – the Aadhaar ID is valid throughout the country, thus it is very convenient and useful for migrant population moving between various geographies.



## Authentication (Online verification)

***Authentication means on-line verification of a person's identity anywhere in the country by various means (Biometric – Fingerprint and Iris, demographic, and One Time Password to registered mobile phone or email id).***



## 2 Aadhaar authentication supports multiple modes



Demographic  
Name, Gender, DOB,  
Address



**PIN**

YES

OR

NO

**Any or All**



## 2 Fingerprint authentication demo





# 2 Any Aadhaar enabled device can be used

## POS Terminals – Supporting PIN/Biometric Authentication



## Mobile phone with biometric scanner - Supports PIN/Biometric authentication



## Laptop with fingerprint scanner – Supports Demographic/Biometric/Pin based auth



# Authentication

- Ensures that only a genuine beneficiary claims the benefit.
- Wide reach – services can be provided anywhere, within mobile network reach.



# Authentication – benefits to stakeholders

## ➤ Benefits to Government:

- **Identification** - Can verify that a genuine beneficiary is claiming the benefit (at a Banking Correspondent for money or at a PDS outlet for grain).
- **Outreach** – Can provide services in every nook and corner of the country as long as connectivity is there.

## ➤ Benefits to Resident:

- **Convenience** – a resident can get access to services close to where they are.
- **Mobility** – a resident can access services throughout the country
- **Empowerment** – since the resident has a choice of outlets for a particular service (go to any BC to withdraw money or any PDS outlet to withdraw grain), the bargaining power shifts to the resident. This also reduces corruption.



# E-KYC platform

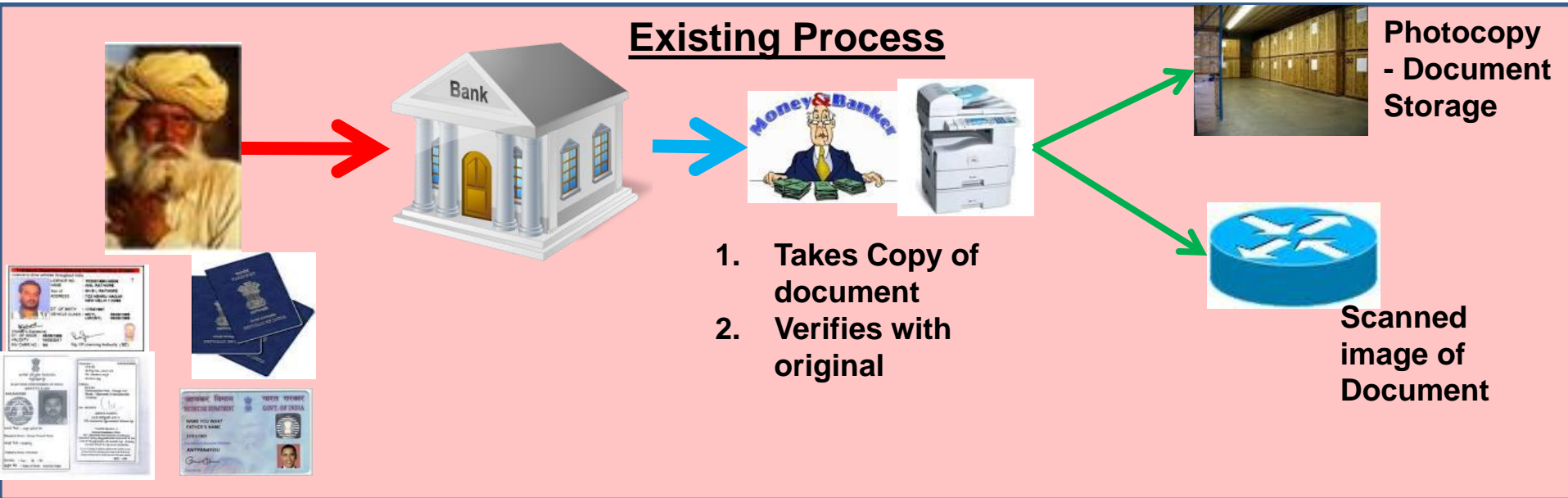
---

***e-KYC Services provide a platform for electronic verification of Identity and Address in electronic format for instant, efficient and secure service delivery***

:

# IV. Existing KYC Process vs. e-KYC Process

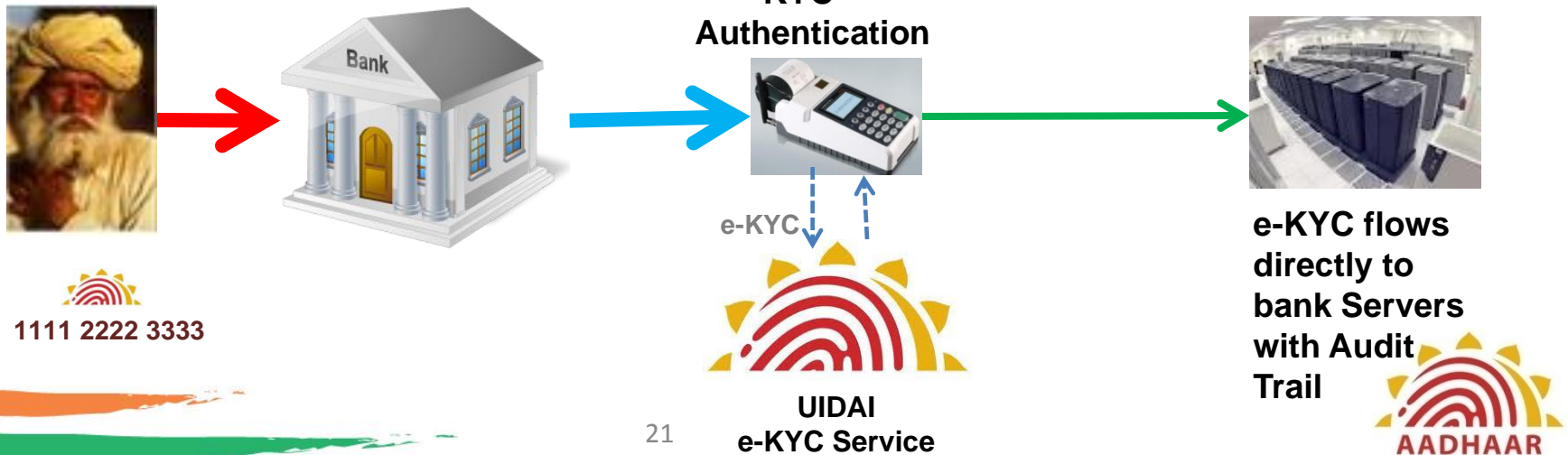
## Existing Process



## E-KYC Process

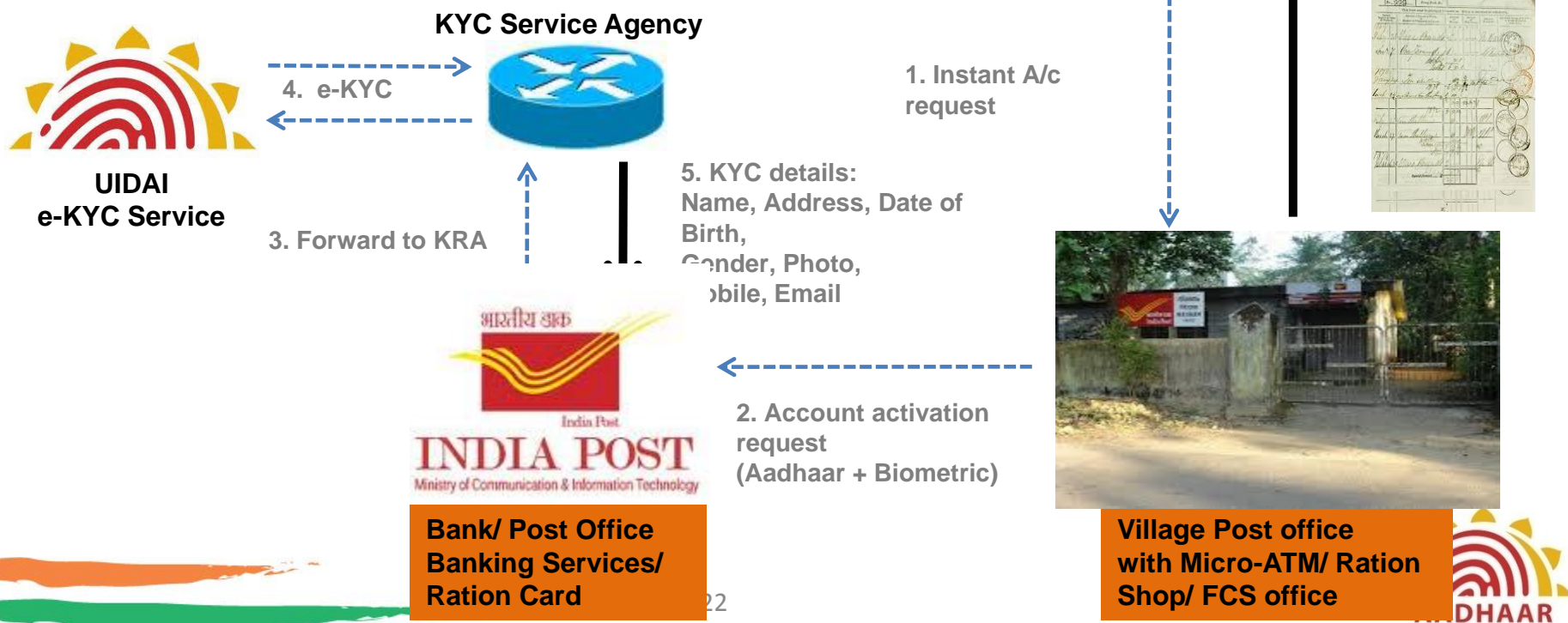
KYC –

Authentication



# IV. E-KYC – Use Cases

*An Instant Account / Ration card can be activated at any customer service point instantly*



# e KYC Platform

## Key features

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• <b>Compliant with IT Act</b></li><li>• <b>Scalable</b></li><li>• <b>Eliminates Document Forgery</b></li><li>• <b>Paperless</b></li><li>• <b>Consent Based</b></li></ul> | <ul style="list-style-type: none"><li>• <b>Digitally signed by UIDAI and thus non-repudiable</b></li><li>• <b>Instantaneous</b></li><li>• <b>Machine Readable</b></li><li>• <b>Inclusive</b></li><li>• <b>Low cost</b></li></ul> |
|---|--|

# E-KYC – benefits to stakeholders

## ➤ Benefits to Government:

- **Productivity** – Instant paperless provisioning of services has great impact and productivity benefit for the economy
- **Inclusion** – Can provide access to services like bank accounts and mobile connections anywhere easily
- **Audit Trail** – Every e-KYC request has a unique transaction code, cannot be repudiated, and can be easily investigated.

## ➤ Benefits to Resident:

- **Instant Access** – provides instant access to services just with his Aadhaar number. No need to carry any paper documents and photographs
- **Convenience** – these services can offered anywhere there is connectivity





# Aadhaar as a Financial Address

---

*An Aadhaar-linked Bank account that can receive money just with the Aadhaar number as the financial address (instead of IFSC code/ account number etc.)*



# Financial Address

A Bank account seeded with Aadhaar, and mapped on National Payment Corporation of India (NPCI) mapper (**APB**), makes Aadhaar a financial Address.

1. It is permanent.
2. Low cost.
3. Maintenance free.

**82.4 million Bank accounts linked to Aadhaar as on date.**



# Aadhaar platform for Banking

## Access

- Open Bank Accounts using Aadhaar – Sufficient KYC
- Existing Bank Account can be linked to Aadhaar number

## Address

- Transfer funds to Aadhaar Enabled Accounts
- Simplifies disbursement of funds – uses only one account for all disbursements – Convenience for the beneficiary

## Transactions

- Withdrawal and deposit, check balance
- End to end auditability and traceability
- Inter-operable, portable anytime anywhere
- Better than local, non-interoperable solutions that limit choice

# All direct cash transfers into one account

**Multiple  
Schemes**



**Aadhaar Payments Bridge**

**One  
Aadhaar  
linked  
account**



**APB Compatible with CPSMS**

# Aadhaar as Financial Address – benefits to stakeholders

---

## ➤ Benefit to Government:

- **Eliminate Fraud and corruption** – since money goes only to account of the genuine beneficiary
- **Empowerment** – the Government can decide that cash benefits to a family only go into the account of the senior female member of the household etc.

## ➤ Benefit to Resident:

- **Convenience** - convenient account for government to resident, business to resident and resident to resident financial transactions
- **Account portability** – customer can switch financial service provider without having to inform any of the Government department



# How Business processes may be reengineered(1/3)

- First and the foremost , Aadhaar numbers need to be seeded in beneficiaries data bases.
- Linking the Department with Central ID Data Repository (CIDR) of UIDAI through Aadhaar User Agency (AUA)/Aadhaar Service Agency (ASA).
- Data remains federated and any transfer from one silo to another will require approvals as per law.



# How Business processes may be reengineered(2/3)

- Development of department specific application, utilizing Aadhaar authentication service, which enables.
- Any action in respect of service delivery, gets triggered with authentication of Aadhaar numbers of agent who delivers service and the recipient of the service.
- Approval process within department may be triggered with Aadhaar Authentication, leading to transparent, accountable, electronic and environment friendly service delivery.



# How Business processes may be reengineered(3/3)

- Payment to vendors/ contractors may be done through Aadhaar Payment Bridge.
- Salary and other benefits to the employees may be paid through APB.



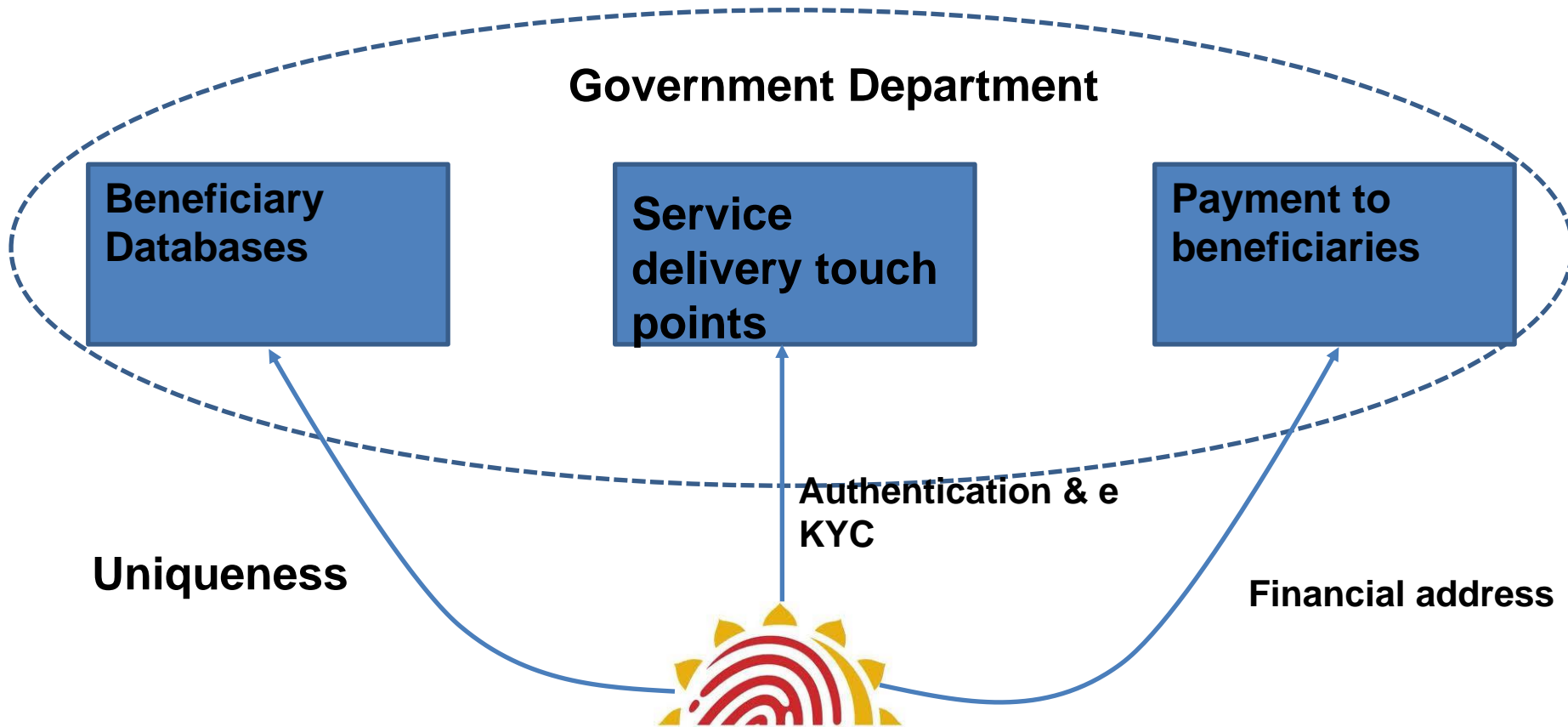


# Mega trends making 'Digital Governance' Effective in India

Aadhaar	12 Digit , Unique ID
Ubiquitous broadband connectivity	Government of India has launched a mega project to provide broadband connectivity to every nook & corner of the country.
Better Hardware	Smaller, thinner, lighter and large screens
End of Keyboard	Touch interfaces, biometric recognition.
Low cost	Huge volumes, commodity chips and software and fab less chip design rapidly driving down cost.



# Aadhaar: For improving service delivery



# Positive feedback loop for better expenditure management

**Budget Allocation to Ministry/Department**

**Ministry/Department maintains Aadhaar seeded beneficiary databases and disburse subsidy/benefits through Aadhaar enabled platform**

**Reduced Actual Expenditure**



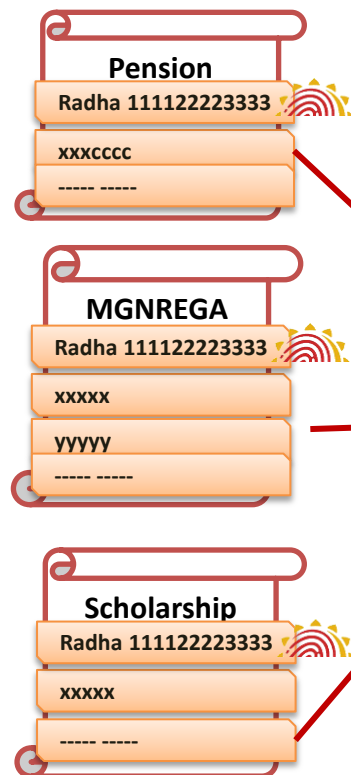
# Other benefits

- Aadhaar Platform helps in real time monitoring of performance of any Government department with country wide area of operation, Like Public Distribution System(PDS) & Telecom.
- Service can be delivered, effectively, from anywhere in real time.
- Huge saving expected from efficient operation of Public Distribution Service, and efficient management of fertilizer & cooking gas subsidies.



# End-to-End Direct Benefit Transfer Enabled by Aadhaar

## 1. Unique Aadhaar to de-duplicate databases



## Aadhaar Payment Bridge

## 2. Aadhaar as a payment destination

- Bank Account portability
- Many schemes, one Aadhaar linked SB account



**3. Transact from any MicroATM – Aadhaar Authentication**  
Secure and Convenient

## 4. Auditability and traceability of transaction



# Thank You



# Preparatory Studies and Findings

# Aadhaar Biometric Authentication Journey

## Fingerprint Authentication

- Proof of Concept (PoC) studies conducted (2011 to 2012) established:
  - Technical feasibility to use fingerprint to authenticate a resident in 98.13% of the population
  - An accuracy of 96.5% can be achieved using the best finger with up to three attempts, and
  - An accuracy of 99.3% can be achieved using two fingers (fusion attempt) with up to three attempts
  - Accuracy could be further improved by using second modality such as iris or additional factors such as one-time-pin(OTP)
  - NFIQ score captured by devices ensure s capture of quality images



# Aadhaar Biometric Authentication Journey

## Iris Authentication

- A PoC study was carried out to assess the feasibility of using iris for on-line biometric authentication between May 27<sup>th</sup> and July 30<sup>th</sup> 2012
- The PoC used KIND 2 compressed image of size 15 KB, a challenge, as the image size is a dominant factor in network latency for mobile networks
- The results of the studies are summarized in the next slide.



# Aadhaar Biometric Authentication Journey

## Feasibility of Iris based on-line Authentication

The empirical results clearly demonstrate iris authentication to be viable in Indian context.

Findings	% of Residents	
	Single-eye cameras	Dual-eye cameras
Authenticated in first try	95.89	99.29
Authenticated in multiple tries	99.21	99.40
Failed authentication (FRR+FTC)	0.79	0.60

**Device Readiness:** Six different devices with a variety of form and function are available to form competitive vendor eco-system.

**System Readiness:** Median time for end-to-end authentication was less than **one minute** over GPRS mobile network in semi-rural setting.

# Aadhaar Biometric Authentication Journey

- Another PoC was conducted to study the feasibility of using KIND7, size ~2-5KB, iris images for on-line biometric authentication between April 5<sup>th</sup> and April 12<sup>th</sup> 2013
- In scenario testing, 101663 online authentication transactions were performed
- In all, 131863 iris images were capture during this process
- The report [IRIS Kind-7 Authentication Accuracy- PoC Report](#) is published on <http://uidai.gov.in>
- Summary of results is given in the next slide



# Aadhaar Biometric Authentication Journey

## Feasibility of KIND7 Iris for -line Authentication

The empirical results clearly demonstrate KIND7 iris images of size over 2.5KB is viable in Indian context for online authentication.

Accuracy	Kind 2	KIND7 ( Size ~1.5KB)	KIND7 (Size ~ 2.5KB)	KIND7 ( Size ~ 3.5KB)	KIND7 ( Size ~ 5KB)
True Accept rate*	99.30%	97.93%	99.13%	99.53%	99.36%

\*100-(FTC+FRR)

**Device Readiness:** Six different devices with a variety of form and function are available to form competitive vendor eco-system.

**System Readiness:** Median time for end-to-end authentication was little over **one minute** over shared internet in urban setting.



# Aadhaar Biometric Authentication Pilots

- **Aadhaar enabled Public Distribution System (PDS) delivery by Food and Civil Supplies (F&CS) department in Andhra Pradesh**
- **Covers**
  - 100 Fair Price Shops (FPS) in Gollaprollu Mandal of East Godavari
  - 50 FPS in Hyderabad district
  - 90,000 ration cards which translates to about 360,000 residents
  - Over 1,000,000 transactions have been done since start of the pilot



# Aadhaar Biometric Authentication Pilots

- **Aadhaar enabled Payment system for Pensions and wages by Dept of Post Andhra Pradesh Circle**
- **Covers**
  - 1286 Post Offices in Chittoor district
  - 10 Post Offices in East Godavari (One Mandal)
  - 500,000 transactions have been made since start of the pilot
  - About Rs 400,000,000 disbursed for pension payments and wages



# Aadhaar Biometric Authentication Pilots

- Aadhaar enabled Payment system for Pensions and MNREGA by Dept of Post Andhra Pradesh Circle





# Aadhaar Biometric Authentication Pilots

- Aadhaar enabled Payment system for Pensions and MNREGA by Dept of Post Andhra Pradesh Circle





# Aadhaar Biometric Authentication Pilots

**Key Learning's** - essentially to overcome *challenges (mentioned below)* in area such as

- Operator's training
  - Usage of non-best finger for authentication
  - Usage of dirty, dry, cracked fingers
  - Usage of same finger in two finger authentication
- Device Ergonomics
  - Placement of sensor in a slot in a particular device model did not allow certain Aadhaar holders to use their best finger (Index) having big finger nails that were grown as part of their religious believes



# Aadhaar Biometric Authentication Pilots

- FPS owners, usually, in a village setup have low seating arrangement which makes a beneficiary to exert more pressure (due to body weight in a bend body posture) on the sensor and device
- Authentication User Agency (F&CS, DOP etc) Systems and Processes
  - Software release process and mechanisms on hand-held device
  - Significant number of seeding (UID-Domain identifier mapping) issues
  - Lack of Compliant Management System to address and resolve the issues
  - Process gaps in exception handling