

Unique Identification Authority of India

Creating a
unique identity number
for every
resident in India

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Executive Summary

Overview

In India, an inability to prove identity is one of the biggest barriers preventing the poor from accessing benefits and subsidies. Public as well as private sector agencies across the country typically require proof of identity before providing individuals with services. But till date, there remains no nationally accepted, verified identity number that both residents and agencies can use with ease and confidence.

As a result, every time an individual tries to access a benefit or service, they must undergo a full cycle of identity verification. Different service providers also often have different requirements in the documents they demand, the forms that require filling out, and the information they collect on the individual.

Such duplication of effort and 'identity silos' increase overall costs of identification, and cause extreme inconvenience to the individual. This approach is especially unfair to India's poor and underprivileged residents, who usually lack documentation, and find it difficult to meet the costs of multiple verification processes.

There are clearly, immense benefits from a mechanism that uniquely identifies a person, and ensures instant identity verification. The need to prove identity only once will bring down transaction costs for the poor. A clear identity number would also transform the delivery of social welfare programs by making them more inclusive of communities now cut off from such benefits due to their lack of identification. It would enable the government to shift from indirect to direct benefits, and help verify whether the intended beneficiaries actually receive funds/subsidies.

A single, universal identity number will also be transformational in eliminating fraud and duplicate identities, since individuals will no longer be able to represent themselves differently to different agencies. This will result in significant savings to the state exchequer. As an example, the Ministry of Petroleum and Natural Gas can save over Rs.1200 crores a year in subsidies now reportedly lost on LPG cylinders registered under duplicate or ghost identities.

The UIDAI – evolving an approach to identity

The Government of India undertook an effort to provide a clear identity to residents first in 1993, with the issue of photo identity cards by the Election Commission. Subsequently in 2003, the Indian Government approved the Multipurpose National Identity Card (MNIC).

The Unique Identification Authority of India (UIDAI) was established in February 2009, attached to the Planning Commission. The purpose of the UIDAI is to issue a unique identification number (UID) to all Indian residents that is (a) robust enough to eliminate

duplicate and fake identities, and (b) can be verified and authenticated in an easy, cost-effective way. The UIDAI's approach will keep in mind the learnings from the government's previous efforts at issuing identity.

The UIDAI will be created as a statutory body under a separate legislation to fulfill its objectives. The law will also stipulate rules, regulations, processes and protocols to be followed by different agencies partnering with the Authority in issuing and verifying unique identity numbers.

Features of the UIDAI model

The UID number will only provide identity: The UIDAI's purview will be limited to the issue of unique identification numbers linked to a person's demographic and biometric information. The UID number will only guarantee identity, not rights, benefits or entitlements.

The UID will prove identity, not citizenship: All residents in the country can be issued a unique ID. The UID is proof of identity and does not confer citizenship.

A pro-poor approach: The UIDAI envisions full enrolment of residents, with a focus on enrolling India's poor and underprivileged communities. The Registrars that the Authority plans to partner with in its first phase – the NREGA, RSBY, and PDS – will help bring large numbers of the poor and underprivileged into the UID system. The UID method of authentication will also improve service delivery for the poor.

Enrolment of residents with proper verification: Existing identity databases in India are fraught with problems of fraud and duplicate/ghost beneficiaries. To prevent this from seeping into the UIDAI database, the Authority plans to enrol residents into its database with proper verification of their demographic and biometric information. This will ensure that the data collected is clean from the start of the program.

However, much of the poor and underserved population lack identity documents, and the UID may be the first form of identification they have access to. The Authority will ensure that the Know Your Resident (KYR) standards don't become a barrier for enrolling the poor, and will devise suitable procedures to ensure their inclusion without compromising the integrity of the data.

A partnership model: The UIDAI approach leverages the existing infrastructure of government and private agencies across India. The UIDAI will be the regulatory authority managing a Central ID Data Repository (CIDR), which will issue UID numbers, update resident information, and authenticate the identity of residents as required.

In addition, the Authority will partner with agencies such as central and state departments and private sector agencies who will be 'Registrars' for the UIDAI. Registrars will process UID applications, and connect to the CIDR to de-duplicate resident information and receive UID numbers. These Registrars can either be enrollers, or will appoint agencies as enrollers, who

will interface with people seeking UID numbers. The Authority will also partner with service providers for authentication.

The UIDAI will emphasize a flexible model for Registrars: The Registrars will retain significant flexibility in their processes, including issuing cards, pricing, expanding KYR (Know Your Resident) verification, collecting demographic data on residents for their specific requirements, and in authentication. The UIDAI will provide standards to enable Registrars maintain uniformity in collecting certain demographic and biometric information, and in basic KYR. These standards will be finalized by the KYR and biometric committees the Authority constitutes.

Enrolment will not be mandated: The UIDAI approach will be a demand-driven one, where the benefits and services that are linked to the UID will ensure demand for the number. This will not however, preclude governments or Registrars from mandating enrolment.

The UIDAI will issue a number, not a card: The Authority's role is limited to issuing the number. This number may be printed on the document/card that is issued by the Registrar.

The number will not contain intelligence: Loading intelligence into identity numbers makes them susceptible to fraud and theft. The UID will be a random number.

The Authority will only collect basic information on the resident: The UIDAI may seek the following demographic and biometric information in order to issue a UID number:

- Name
- Date of birth
- Gender
- Father's name¹
- Father's UID number (optional for adult residents)
- Mother's name
- Mother's UID number (optional for adult residents)
- Address (Permanent and Present)
- Expiry date
- Photograph
- Finger prints

Process to ensure no duplicates: Registrars will send the applicant's data to the CIDR for de-duplication. The CIDR will perform a search on key demographic fields and on the biometrics for each new enrolment, to ensure that no duplicates exist.

¹ Individuals with both parents deceased can provide a Guardian's name and UID number.

The incentives in the UID system are aligned towards a self-cleaning mechanism. The existing patchwork of multiple databases in India gives individuals the incentive to provide different personal information to different agencies. Since de-duplication in the UID system ensures that residents have only one chance to be in the database, individuals will provide accurate data. This incentive will become especially powerful as benefits and entitlements are linked to the UID.

Online authentication: The Authority will offer a strong form of online authentication, where agencies can compare demographic and biometric information of the resident with the record stored in the central database. The Authority will support Registrars and agencies in adopting the UID authentication process, and will help define the infrastructure and processes they need.

The UIDAI will not share resident data: The Authority envisions a balance between 'privacy and purpose' when it comes to the information it collects on residents. The agencies may store the information of residents they enrol if they are authorized to do so, but they will not have access to the information in the UID database. The UIDAI will answer requests to authenticate identity only through a 'Yes' or 'No' response. The Authority will also enter into contracts with Registrars to ensure the confidentiality of information they collect and store.

Technology will undergird the UIDAI system: Technology systems will have a major role across the UIDAI infrastructure. The UID database will be stored on a central server. Enrolment of the resident will be computerized, and information exchange between Registrars and the CIDR will be over a network. Authentication of the resident will be online. The Authority will also put systems in place for the security and safety of information.

Benefits

For residents: The UID will become the single source of identity verification. Once residents enrol, they can use the number multiple times – they would be spared the hassle of repeatedly providing supporting identity documents each time they wish to access services such as obtaining a bank account, passport, driving license, and so on.

By providing a clear proof of identity, the UID will also facilitate entry for poor and underprivileged residents into the formal banking system, and the opportunity to avail services provided by the government and the private sector. The UID will also give migrants mobility of identity.

For Registrars and enrollers: The UIDAI will only enrol residents after de-duplicating records. This will help Registrars clean out duplicates from their databases, enabling significant efficiencies and cost savings. For Registrars focused on cost, the UIDAI's verification processes will ensure lower KYR costs. For Registrars focused on social goals, a reliable identification number will enable them to broaden their reach into groups that till now, have been difficult to authenticate. The strong authentication that the UID number offers will improve services, leading to better resident satisfaction.

For Governments: Eliminating duplication under various schemes is expected to save the government exchequer upwards of Rs. 20,000 crores a year. It will also provide governments with accurate data on residents, enable direct benefit programs, and allow government departments to coordinate investments and share information.

Revenue model

By providing identity authentication, the UIDAI will be taking on a process that costs agencies and service providers hundreds of crores every year. The Authority will charge a fee for its authentication services, which will offset its long-term costs. Registrars and service providers will also be able to charge for the cards they issue residents with the UID number. Such pricing will be within UIDAI guidelines.

Timelines

The UIDAI will start issuing UIDs in 12-18 months, and the Authority plans to cover 600 million people within 4 years from the start of the project. This can be accelerated if more Registrars partner with the Authority for both enrolment and authentication. The adoption of UIDs is expected to gain momentum with time, as the number establishes itself as the most accepted identity proof in the country.

Conclusion

India will be the first country to implement a biometric-based unique ID system for its residents on such a large scale. The UID will serve as a universal proof of identity, allowing residents to prove their credentials anywhere in the country. It will give the government a clear view of India's population, enabling it to target and deliver services effectively, achieve greater returns on social investments, and track money and resource flows across the country.

The timing of this initiative is encouraging – the creation of the UIDAI coincides with growing social investment in India, a shift in focus to direct benefits, and with the spread of IT and mobile phones, which has made the public receptive to technology-based solutions. The UIDAI is committed to making this project a success. An initiative of this magnitude will also require the active participation of central, state and local governments, as well as public and private sector agencies across the country. With their support, the project will help realize a larger vision of inclusion and development for India.

Introduction

A crucial factor that determines an individual's well-being in a country is whether their identity is recognized in the eyes of the government. Weak identity limits the power of the country's residents when it comes to claiming basic political and economic rights. The lack of identity is especially detrimental for the poor and the underprivileged, the people who live in India's "social, political and economic periphery". Agencies in both the public and private sector in India usually require a clear proof of identity to provide services. Since the poor often lack such documentation, they face enormous barriers in accessing benefits and subsidies.

For governments and individuals alike, strong identity for residents has real economic value. While weak identity systems cause the individual to miss out on benefits and services, it also makes it difficult for the government to account for money and resource flows across a country. In addition, it complicates government efforts to account for residents during emergencies and security threats.

However in India, the goal of issuing a universally used, unique identity number to each resident poses a significant challenge. A project of this scale has not been attempted anywhere in the world, and requires an innovative model, distinct from what we have witnessed in identity systems so far.

The UIDAI Approach

In 2007, [the Planning Commission](#) had recommended an approach to issuing unique identification numbers, where the enrolment into a Unique Identification (UID) database could be speeded up by using existing resident records in the databases of the Election Commission, PAN etc. This approach would speed up enrolment for those residents present in one of the aforementioned databases. These databases however, may contain inaccuracies.

The model envisioned by the [Unique Identification Authority of India \(UIDAI\)](#) takes into account the inputs of the Planning Commission, as well as learnings from the previous approaches to identity.

The structure of the UIDAI

The structure that the UIDAI envisions will have the reach and flexibility to enrol residents across the country.

The UIDAI, as a statutory body, will be responsible for creating, administering and enforcing policy. The Authority will prescribe guidelines on the biometric technology, the various processes around enrolment, and KYR verification. The UIDAI will also design and create the institutional microstructure to effectively implement the policy. This will include a Central ID Data Repository (CIDR), which will manage the central system, and a network of Registrars who will establish resident touch points through Enrolling Agencies.

The Central ID Data Repository (CIDR)

The CIDR will be the central data repository, and will function as a Managed Service Provider. It will implement the core services around the UID – it will store resident records, issue unique identification numbers, and verify, authenticate and amend resident data.

The CIDR will only hold the minimum information required to identify the resident and ensure no duplicates. This will include:

i) Unique Identity Number: The Unique ID or UID will be a numeric that is unique across all 1.2 billion residents in India.

The UID number will not contain intelligence. In older identity systems, it was customary to load the ID number with information related to the date of birth, as well as the location of the person. However this makes the number susceptible to fraud and theft, and migration of the resident quickly makes location details out of date. The UID will be a random number.

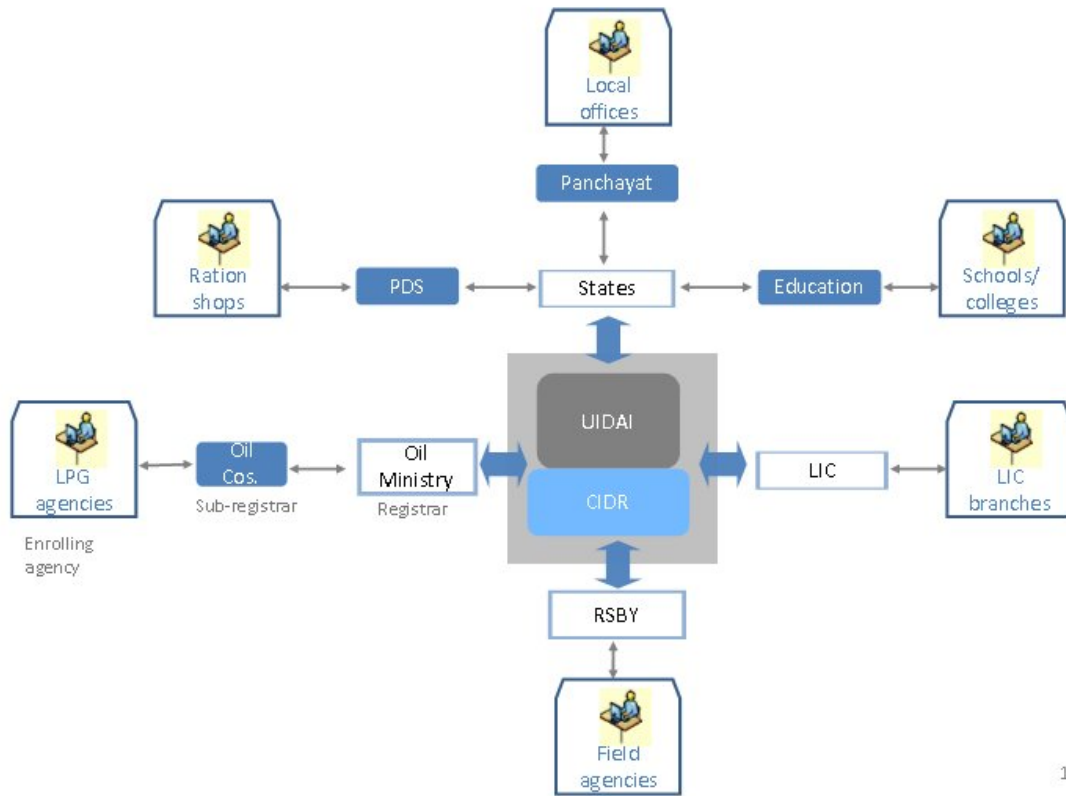
ii) Identity fields: The fields associated with the UID number will be:

- Name
- Date of birth
- Gender
- Father's name
- Father's UID number (optional for adult residents)
- Mother's name
- Mother's UID number (optional for adult residents)
- Address (Permanent and Present)

- Expiry date
- Photograph
- Finger prints

The UniqueID agencies

The UIDAI will partner with a variety of agencies and service providers to enrol residents for UID numbers and verify their identity.



The structure of these UID agencies will be as follows:

Registrars – Registrars will be state governments or central government agencies such as the Oil Ministry and LIC. Registrars may also be private sector participants such as banks and insurance firms.

The UIDAI will enter into agreements with individual Registrars, and enable their on-boarding into the UID system. The Registrars may need to make changes to their processes to be UID-ready. The UIDAI will support them in this, and in linking to the CIDR, connecting to the UID system, and adding UID fields to their databases.

The Registrar will take on the responsibility of ensuring that clean and correct data flows into the CIDR. Their key role in the system will be in aggregating enrolments from sub-registrars and enrolling agencies and forwarding it to the CIDR. Each Registrar will adopt UIDAI standards in the technology used for biometrics, as well as in collecting and verifying resident information, and submitting to audits.

The UIDAI will also enter into agreements with some Registrars for using the CIDR solely for authentication purposes. The service providers who will adopt the UID system for identity authentication during service delivery will follow certain processes and standards, and may need to re-engineer their internal processes.

Sub-Registrars – These will be the departments/entities that report to a specific Registrar. For instance, the line departments of the state government such as the RDPR (Rural Development and Panchayati Raj) department would be sub-registrars to the state government Registrar.

Enrolling Agencies – Enrolling agencies will directly interact with and enrol residents into the CIDR. For example, the hospital where a baby is born would be the 'enrolling agency' for the baby's UID, and would report to the municipality sub-registrar.

Outreach Groups – The UIDAI will also partner with civil society groups and community networks which will promote the UID number and provide information on enrolment for hard to reach populations such as rural women, tribals and others.

Enrolment into the UID

A critical aspect of the UID enrolment process is that enrolment will not be through a mandate, but will be demand driven. The momentum for the UID will come from residents enrolling in order to access the benefits and services associated with it.

The basic advantage of the UID that can drive this demand, which is to be communicated while promoting enrolment, is that the UID will be one number, which can be used to prove identity for life. Once the resident gets the unique ID, it may be accepted as identity proof across service providers.

3.1 The enrolment process

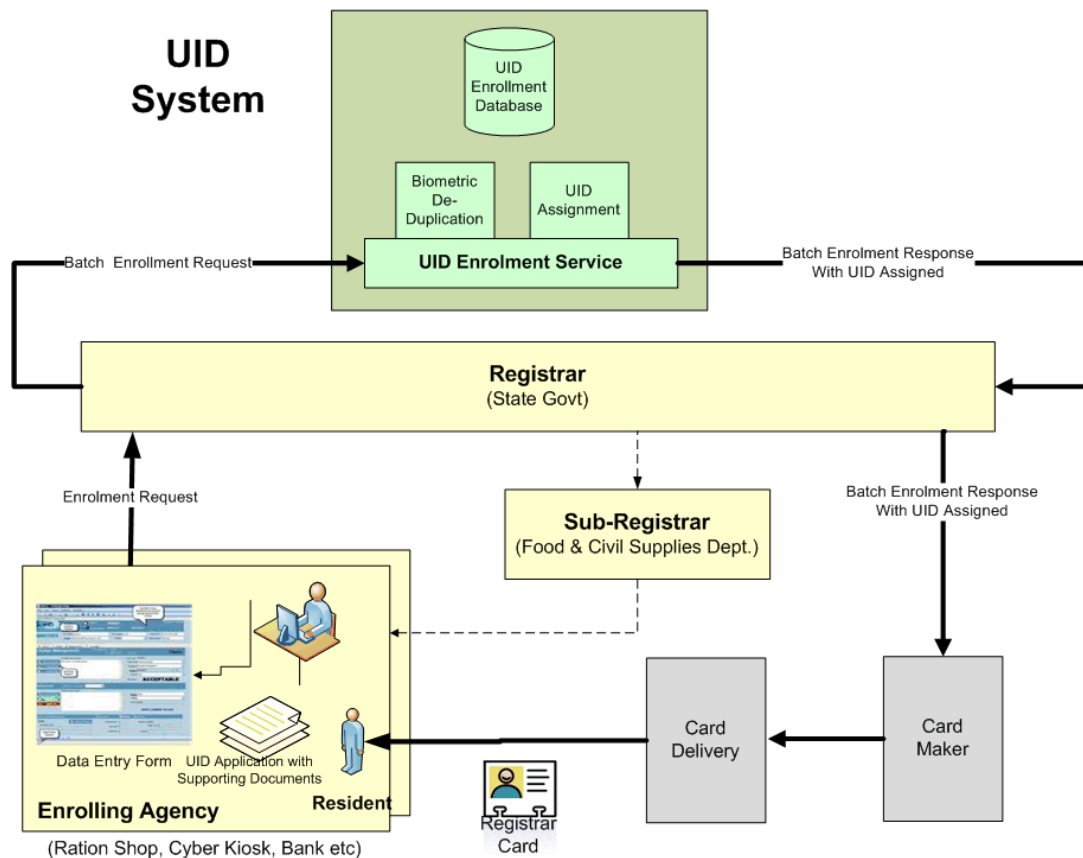
The enrolment process for the UID number will begin with a resident submitting his/her information to the enrolling agency with supporting documents. This information will be verified according to established Know Your Resident (KYR) standards. To make sure the poor are not excluded, the UIDAI will also prescribe guidelines for applicants without documents.

Once the enroller verifies the resident's information, it will submit the application request – either singly or in batches – through the Registrar to the CIDR. The CIDR will then run a de-duplication check, comparing the resident's biometric and demographic information to the records in the database to ensure that the resident is not already enrolled.

Owing to the large number of records in the database, the de-duplication may take place in two stages. De-duplication may first be carried out within a specific boundary of the data, such as within the local area (district/state) the resident lives in. If this check succeeds, a UID number is assigned to the resident, and the new record is added to the database. The localized check will also speed up the de-duplication process, which would allow Registrars to issue their cards with less turnaround time.

The system will however, after issuing the UID, continue to run a 1:N de-duplication check of the resident's demographic/biometric details against the entire database. If the resident already holds a UID number but has now received a second one, the older record will be discovered during this full search. In this case, the second UID number will be cancelled, and a dispute resolution mechanism will determine whether the duplication is because of fraud or technical error. If it is revealed to be fraud, the Authority may consider penal action.

Since the de-duplication also compares biometric records, it would catch individuals enrolling with a different set of demographic details. The fact that the UID system is both de-duplicated and universal will discourage residents from giving incorrect data at the time of enrolment.



Issuing the UID number

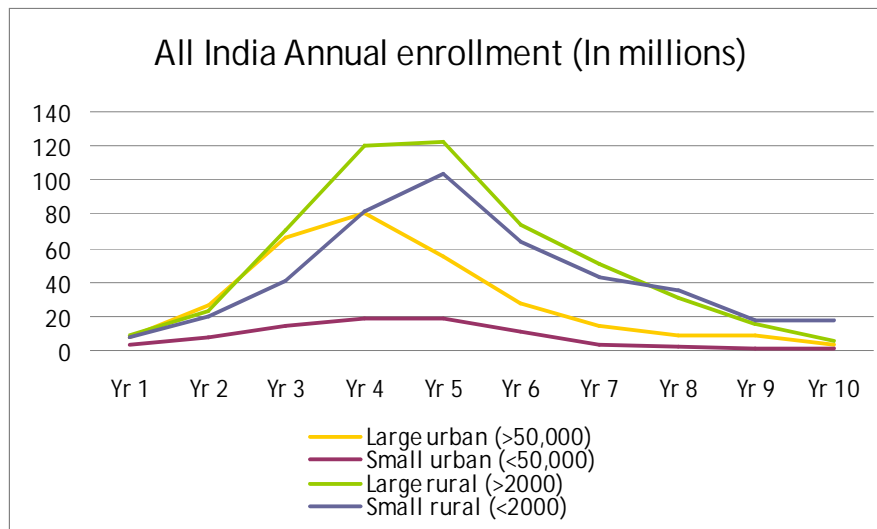
Once the UID number is assigned, the Authority will forward the resident a letter which contains his/her registered demographic and biometric details. This letter will also have a tearaway portion which has the UID number, name, photograph and a 2D barcode of the finger print minutiae digest. If there are any mistakes in the demographic details, the resident can contact the relevant Registrar/enrolling agency within 15 days.

If the Registrar issues a card to the resident, the UIDAI will recommend that the card contain the UID number, name and photograph. They will be free to add any more information related to their services (such as Customer ID by bank). They will also be free to print/ store the biometric collected from the applicant on the issued card. If more registrars store such biometric information in a single card format, the cards will become interoperable for offline verification. But the UIDAI will not insist on, audit or enforce this.

All data entry that the enrolling agencies take up on behalf of the Registrars will be done in English. It can then be converted into the local language using standard transliteration software, and verified for accuracy by the Registrar. The letter the UIDAI sends the resident will consequently contain all demographic details in English as well as the local language of the state in which the resident resides. In this regard, the UIDAI will follow the precedent set by the Election Commission of India.

3.2 UID enrolment strategy in rural and urban India

The approach of the UIDAI to enrolment will be a pro-rural/pro-poor one. The Registrars targeted for rural India – the NREGA, RSBY and PDS – will be government agencies with large rural networks and significant bases among the poor. As a result, the Authority expects initial enrolment to be fairly rapid in both large and small rural areas.



The enrolment strategy for urban India will include organizations which dominate services for urban residents, such as LIC and Passports. The table below summarizes the Registrars who are likely to contribute significantly to enrolment in the urban and rural areas.

	Primary Access ²	Additional Access ³	Potential Overlap	Effective Enrolment
UID Registrar	Crore Residents			
LPG (Oil PSU)	8.4 ⁴	16.8 ⁵	20%	20.2
LIC (Life Insurance)	13.5	13.5	50%	13.5
PAN Cards	4.0	-	75%	1.0
Passports	6.0	-	80%	1.2
Urban Enrolment				35.9
LIC (Life Insurance)	3.5	3.5	90%	0.7
NREGA	10.0	20.0	10%	27.0
BPL ration cards	7.0	21.0	60%	11.2
State BPL/APL	15.0	45.0	50%	30.0
Old Age Pensioners	1.5	1.0	70%	0.8
Women/Child welfare	1.0	2.0	70%	0.9
Social Welfare	1.0	2.0	70%	0.9
RSBY	0.5	1.0	70%	0.5
Rural Enrolment				72.0
Total Enrolment				107.9

In addition to these enrollers, the UIDAI will also partner with the Registrar General of India (RGI) – who will prepare the National Population Register through the Census 2011 – to reach as many residents as possible and enrol them into the UID database. This may require incorporating some additional procedures into the RGI data collection mechanism, in order to make it UID-ready.

3.3 A focused effort to enrol the poor and hard to reach groups

While the UIDAI intends to target Registrars that have large networks among the poor and rural communities in India, it will also emphasize multiple approaches to reach specific, frequently marginalized groups.

² These are residents who are part of the Registrar's customer / subsidiary beneficiary database and can be mandated to provide their UID

³ The residents under additional access are family members who can be easily covered while enrolling the primary residents. These can be all family members in the case of LPG connections and the nominees in case of LIC Policies.

⁴ The total number of gas connections is 10.51 crores, and this estimates that there are 20% ineligible connections

⁵ Assuming there are an average of three members in each family having a gas connection from an Oil PSU

Urban Poor

The urban poor are among the most ignored and disadvantaged people in India. The main challenges in enrolment here exist because this group consists mainly of migrant workers with temporary or seasonal jobs. The following may be ways to get them enrolled into the UID system.

Co-resident enrolment: Many of India's urban poor work as drivers, maids, or as workers associated with a family or a business. One approach to reach them could be for the head of the family or business to enable these members (who are co-residents/co-workers) to get enrolled into the UID with the same address proof the business or family uses. There can be a host of financial incentives offered to enrol such co-residents.

Financial institutions: The urban poor often borrow from micro-finance institutions and other sources and these could serve as enrolment points for them. There are established chit funds that can also act as enrolment points for the UID to improve coverage.

NGOs and Non-profits: There are several established non-profits working in urban slums in education, healthcare and social empowerment. They can be used to educate the poor on the benefits of the UID, for actual enrolment and to help endorse identity for people who lack documentation.

Children

India is a young country with over 400 million residents below the age of 18. While family-based government schemes will as Registrars, help enrol children, this population may need to be specifically targeted.

ICDS: ICDS is one of the world's largest integrated early childhood programs, with over 40,000 centers nationwide. The program covers over 5 million expectant and nursing mothers and 25 million children under the age of six. These centers can be information or enrolment points for non-school going children.

School admission: It may be mandated that at the time of joining school (first standard) it is necessary for children to have a UID or to enrol for one. This way the child can be tracked for progress and targeted for direct benefits.

The SSA program could also help enrol children in the 6-14 age group into the UID, which would also enable better child tracking and improvements in the mid-day meal schemes.

For children, the advantages from the UID would be significant. Child-related programs in India have relied on often inaccurate, aggregate data at school/cluster/block levels, making these programs ineffective. The concept of Universal Child Tracking – the ability to track every child and ensure their all round development – is gaining ground. An accurate database of children with UIDs would be immensely beneficial to programs within the Women and Child welfare as well as the Education departments, which track development in

anganwadis and progress of children in government schools, and work to eliminate child labor.

Women

Apart from enrollers that are family-based government services in both urban and rural India such as PDS, RSBY etc, there needs to be a strategy to cover women outside this net:

Financial institutions: Robust collectives of women exist within micro-finance institutions and self-help groups across the country. These would be important enrolment points for women.

Organizations like Mahila Samakhya in the 9 states of Karnataka, Kerala, Andhra Pradesh, Gujarat, Uttar Pradesh, Uttar Khand, Assam and Jharkhand. They work in several thousand villages to help women and can act as touch points for education or enrolment of women.

The National Commission for Women: This is the apex national level organization of India for protecting and promoting the interests of women. They have a massive outreach program that can reach out to disadvantaged women and get them to enrol. The UID can subsequently be used as a unique handle for a variety of services to be rendered to these women.

Differently-abled people

It is estimated that India has over 60 million differently-abled people, and identity for this population is a massive challenge. The Disability Act of 1995 mandates a certain percentage of employment for the differently-abled, but without the clear identification of such individuals, it is difficult to enforce the law. There is an obvious incentive for organizations like National Center for Promotion of Employment for Disabled People (NCPEDP) to promote the UID, and enable residents with disability to register for a range of benefits. The NGOs and rights groups associated with NCPEDP would also be good mechanisms to reach out to this section of the population.

Tribals

India has a significant tribal population of approximately 90 million tribals, mostly concentrated along a few states. The Government has many programs for the 697 notified tribes, which can be used for enrolment and information dissemination. In addition, NGOs and governments in states with high tribal populations can be Registrars for tribal groups.

The above mentioned approaches are merely indicative of the strategy that the UIDAI will follow to reach marginalized groups. In addition, the UIDAI will reach out to other marginalized groups such as homeless people, individuals in shelter homes, remand homes, asylums, etc.

3.4 Enrolment costs

Based on initial estimates, the enrolment of each resident may cost between Rs. 20 and Rs. 25, leading to a potential total enrolment cost of Rs. 3,000 crore. The enrolment strategy will explore the possibility of various beneficiaries funding the enrolment cost. The Registrars have the option here of charging for the cards they issue residents to offset enrolment costs. The UIDAI may issue guidelines around such pricing.

3.5 Ensuring clean enrolment data from Registrars

The UIDAI will periodically carry out a process audit of the information that comes in from the Registrars, to ensure data quality and that agencies are following guidelines recommended by the UIDAI. The audit would be on a random sample of residents, carried out either directly by the Authority or through appointed agencies. The audit might focus on:

Verification against scanned documents – The data contained in the resident records will be verified against the scanned documents.

Physical document verification – The physical documents that are held by the Registrar will be validated against the electronic copies.

Periodic process audits– Periodic audits will be carried out to at the enrolment sites, of the processes and software.

3.6 Updating UID details

Updating information with the UIDAI

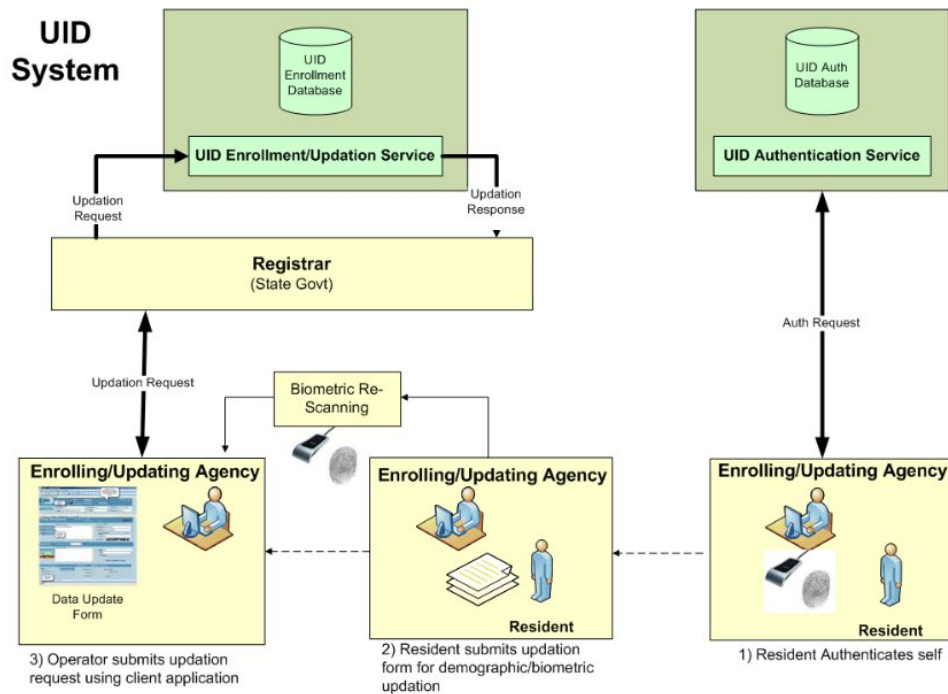
The UID number is a lifetime number, but the biometric information contained in the central database will have to be regularly updated. Children may have to update their biometric information every five years, while adults update their information every ten years.

From time to time, the demographic information that the CIDR holds on the resident may also become outdated. Fields that are susceptible to change could be the 'present address' field, as well as the resident's name (after marriage). There might also be an error in the fields that occurred during enrolment into the UID.

If a service provider authenticating or enrolling a resident finds, through its KYR process that the information provided by the resident (address, name, etc.) does not match with the UID record, or that the biometrics need to be renewed, it can ask the resident to update their information in the UID database. The service provider may make the update a condition for the resident to receive the service/benefit.

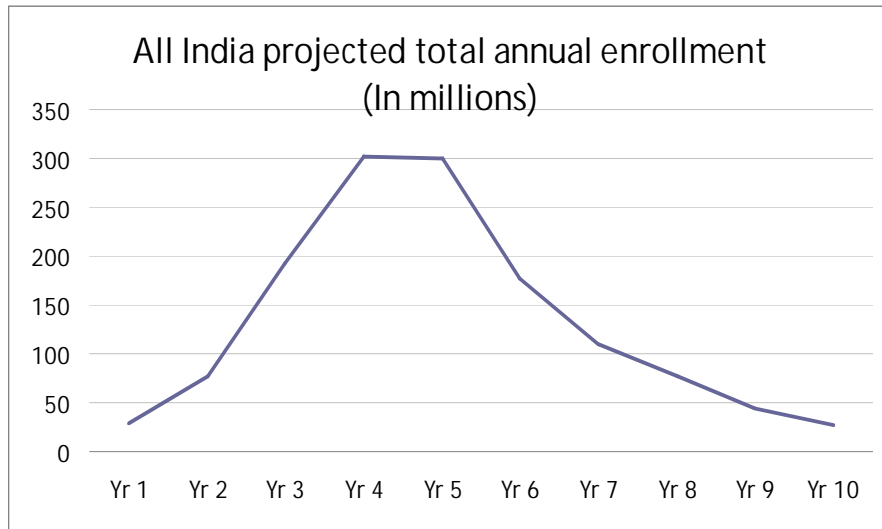
Enrolling agencies and Registrars can serve as points where the resident can update their UID fields. The resident will have to submit their new information at these updation points with

the required documentary evidence. This may also include a biometric authentication prior to processing the request.



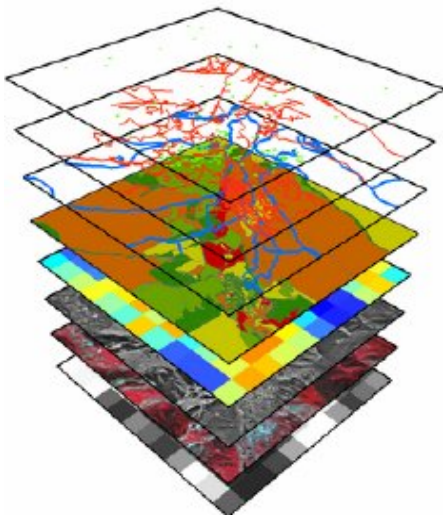
3.7 Reaching critical mass in enrolments

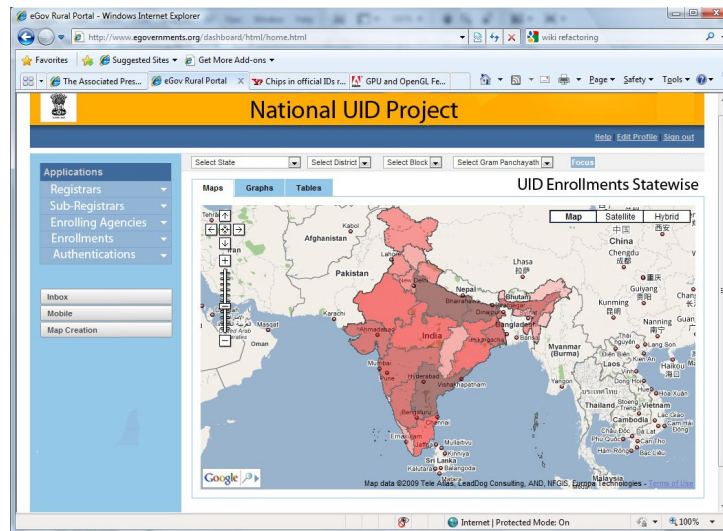
The Authority expects to start issuing UIDs in 12-18 months, and enrolment for the UID number is expected to reach a critical mass of around 200 million residents in two to three years. Until this point, the UIDAI will have to focus on generating demand from both Registrars and residents. However, once the critical mass is achieved, it will generate a network effect that drives demand and accelerates adoption among service providers and residents. And as more service providers across the country require the UID to dispense their services and benefits, adoption will ramp up rapidly. In four years, the Authority estimates that it will issue 600 million UID numbers.



3.8 Tracking enrolments across the country

The UIDAI will employ a GIS internet-based visual reporting system to track enrolment trends and patterns across India, as the project is rolled out across various Registrars and states.





The GIS system will show all UID enrolments by state, as well as by Registrar. The system will also be able to drill down within states and into districts.

3.9 Reaching a sustainable, steady-state in enrolment

A challenge for full enrolment is registering the approximately 60,000 babies that are born in the country every day. Over the next several years, the UIDAI expects to enrol close to the entire Indian population. Once that goal is achieved, enrolment will reach a steady state, where only births (and deaths) as well as immigrants need to be recorded.

There are however, some challenges in registering new births. First, since their biometrics is not stable, they have to be re-scanned at a later age. Second, names are often not given in India at the time of birth registration.

The UID in the birth certificate

One way to ensure that the UID number is used by all government and private agencies is by inserting it into the birth certificate of the infant. Since the birth certificate is the original identity document, it is likely that this number will then persist as the key identifier through the individual's various life events, such as joining school, immunizations, voting etc.

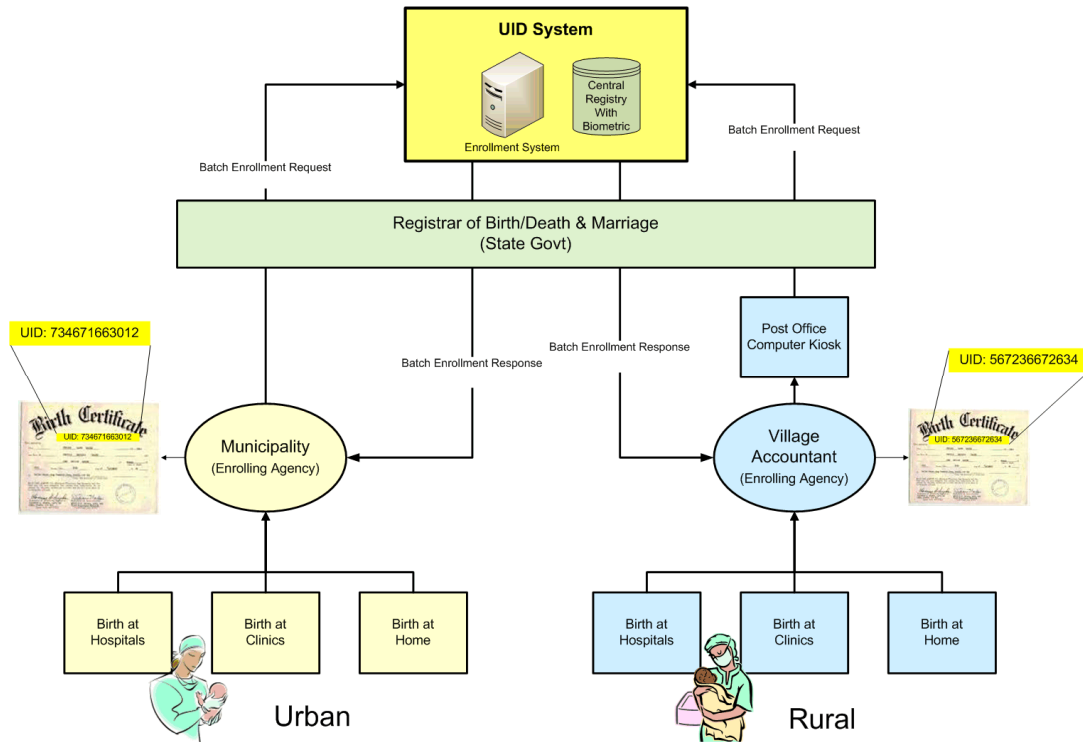
Since the name is a mandatory field in the UID database, it is essential that the child be given a name before applying for the UID number. This would ensure that the UID can also be allotted at birth.

In the case of urban births, the municipality will be the enrolling authority and the UID Registrar can be the 'Registrar of Births, Deaths and Marriage' at the state level.

In rural areas, births take place at district or block level hospitals, in health care centers and at homes in the village. The village accountant is the Registrar of rural



births, and he/she also issues the birth certificate and updates the information through an enrolling agency.



Biometrics and infants

The recording of unique individual biometrics in the UID database is a challenging one for infant records. The solution to this is to record the UID and biometric of the parents in the child's record.

The child's biometrics need to be taken at around 5 years of age, and updated in the UID system every 5 years until the age of 18 (the exact details will be specified by the biometric committee). This will be enforced by an expiry date attached to the UID number, which will become invalid after that date. Until the time the biometric of the child stabilizes, any one of the parents/guardian will need to provide their biometric information for authentication.

Recording deaths in the UID system

It is also necessary to record deaths in the country, and the birth and death registration act provides for such registration. The same institutions that record births can be in charge of updating deaths in the UID system. The UID system will not remove a record upon the person's death; it will simply mark it as 'deceased' and hence will render it inactive for the purposes of authentication.

Ensuring strong authentication, and what it means for the UIDAI

The real test of reliability for the UID system will be during identity authentication. Confirming 'you are who you say you are' remains the primary, often elusive goal of all identity systems.

The UIDAI approach – which will be online authentication, with biometric check – creates a very strong authentication system, and gives the UIDAI significant ability to confirm an individual's identity. The Authority will support the Registrars in building the infrastructure and systems necessary to authenticate residents in different parts of the country. This will be especially critical for Registrars working in rural areas and among the poor.

4.1 Enabling adoption of the UID for authentication

The speed of UID adoption in India depends on whether the number can help in eliminating poverty and marginalization, and in enabling greater transparency and efficiency in service delivery. If it succeeds in these goals, the number will become indispensable for residents in accessing services.

While the UID can provide the strongest form of pre-verification and identity authentication in the country, it cannot ensure that targeted benefit programs reach intended beneficiaries. The pro-poor impact of the UID, consequently, will not gain traction unless there is a mechanism to link the UID process with actual service delivery.

A clear adoption process can overcome this gap by helping introduce the UID method of authentication at every point of service delivery. To ensure this, the UIDAI will not only work with Registrars who do enrolment, but also with non-enrolling, service delivery agencies. Such agencies involved in the delivery of services and benefits will be encouraged to partner with the Authority for authentication. Once they authenticate a resident's identity against the UID database every time they carry out a service transaction, they will be able to deliver services far more effectively.

In order to accommodate this authentication, agencies may need to re-engineer their business processes to be UID-enabled. The most basic requirement for change will be in incorporating the UID method of authentication into their systems. Agencies will have to adhere to norms and procedures specified by the UIDAI for fingerprint capture and verification, and introduce a robust biometric authentication process at every point of sale.

There is tremendous value to be gained from widespread adoption of the UID for authentication, especially for residents. While enrolment in the UID database will ensure that residents are not denied access to fundamental services and rights because they cannot

present positive proof of identity, adoption in authentication could go one step further, and ensure that residents consistently receive these services. This can include a wide range of benefits such as education, health coverage, old-age pensions and subsidized food grains, thereby fulfilling the UIDAI's pro poor agenda.

The UIDAI is only in the identity business. The responsibility of tracking beneficiaries and the governance of service delivery will continue to remain with the respective agencies – the job of tracking distribution of food grains among BPL families for example, will remain with the state PDS department. The adoption of the UID will only ensure that the uniqueness and singularity of each resident is established and authenticated, thereby promoting equitable access to social services.

The adoption of the UID during authentication will also have a direct correlation with subsequent enrolment. Greater enrolment comes from the value a resident derives from the UID, which in turn depends on the rate of adoption. There is a positive cycle here, created from the relationship between adoption and enrolment – the greater the adoption, the faster the enrolment and vice versa. The twin approaches of enrolment and adoption will result in greater influence and traction for the UID among residents in the country, and establish the UIDAI as the only genuine identity authenticator in India.

4.2 Types of authentication

There are multiple forms of authentication that the UID authority can offer. Certain types of authentication would have low to medium assurance if there is the possibility that the card is forged. Here we summarize the main forms of authentication, depending on the situation and equipment available.

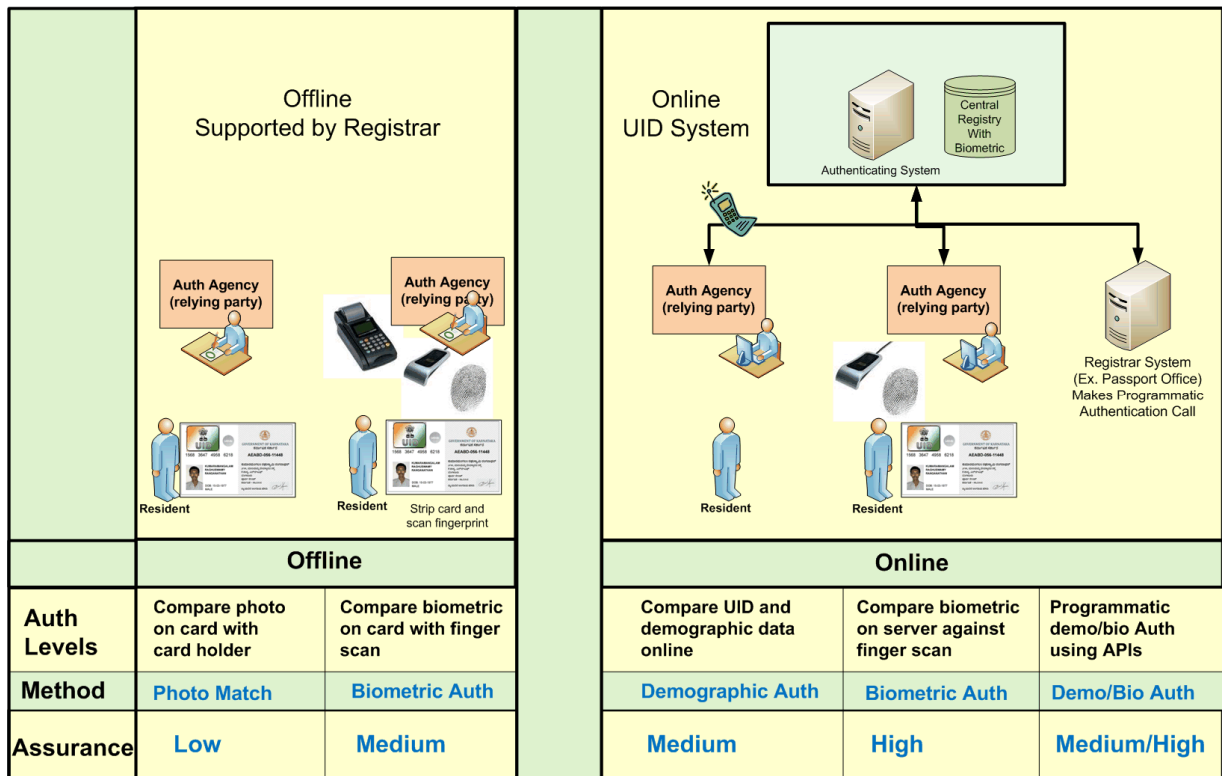
Online authentication is supported by the UID system. This can include

- Online demographic authentication where the authenticating agency compares the UID number and demographic information of the UID holder to the information stored in the UID database. The assurance level here is medium.
- Online biometric authentication where the biometrics of the UID holder, his UID and key demographic details are compared to the details in the CIDR. The assurance level in this case is high.
- Online demographic/biometric authentication with API where the Registrar's backend system makes a programmatic call to the authentication APIs exposed by the UID system to perform authentication. The assurance level here may be medium-high depending on whether the check used demographic or biometric inputs.

Offline authentication may be supported by the Registrar, and does not use the authenticating service provided by the UIDAI. This may come in two forms:

- Photo match authentication where the photo on the card is compared with the cardholder. This is the most basic form of authentication. The assurance level here is low.

- Offline biometric authentication compares the scanned fingerprint of the cardholder to the biometric stored on the Registrar-issued card. The assurance level here is medium.



4.3 Authentication and the UIDAI revenue model

The ability of the UIDAI to offer agencies across the country strong, reliable authentication is the key to its sustainability. The UIDAI will offer resident authentication services for a fee to governments and private sector firms.

The agencies which request a resident authentication service will have to be registered with the UIDAI and follow strict guidelines in using the service as well as in managing resident information.

Basic identity confirmation

Basic identity confirmation from the UIDAI would be free. In this transaction, the authenticator will provide the UID number, name and one other parameter such as date of birth of the person, and the central database will confirm the identity as a 'Yes' or 'No' response.

This type of transaction will be carried out in large numbers and will need quick response times. An example of this is an airline check-in.

Chargeable authentication services can be of two types:

Address verification

For security purposes, government agencies as well as private sector firms require address proof from Indian residents before providing them with benefits and services. However, agencies often complain of the difficulty of address verification – “you try to verify an address in India, and you enter a labyrinth”. The service provider usually verifies address through a physical visit, as well as an enquiry to confirm the other information provided. This process is expensive and costs between Rs. 100 and Rs. 500 per verification.

The address authentication service the UIDAI will offer these entities would consequently be a valuable one. In the proposed transaction with the UID Authority, the agency will submit the UID, name and address of the resident to the CIDR, which will confirm the address. As a result, the agency will not have to do physical address verification.

Biometrics confirmation

Services such as issuing a credit card or granting a loan need the confirmation of the resident’s identity. This process for the resident involves the submission of photographs and other documentation confirming their identity. In the proposed transaction with the UID Authority, the agency can send the scanned photograph or fingerprint (based on the security level required) together with other demographic details to confirm the identity of the person.

Revenue projections from authentication services

The following revenue model for the UIDAI is an illustrative one. It has been designed while keeping in mind the value the agency requesting authentication would derive from the service. The table below summarizes the kind of transaction, potential user agencies and the proposed transaction fee. Government agencies could be provided these services from the UIDAI at a subsidized rate.

SL	Transaction Type	Transaction Fee	Potential User Agencies
1	Basic ID Confirmation	Free	Airlines during passenger check-in
2	Address Verification	Rs. 5	Banks for account opening
3	Biometrics Confirmation	Rs. 10	Credit cards issue process

The authentication service from the UIDAI can begin after the initial bulk on-boarding of Registrars. The revenue estimates for the UIDAI below are based on the current expenditure of various agencies on KYR processes, which would be replaced by the Authority’s authentication services. It also takes into account expected growth in demand for mobile connections, bank accounts, etc.

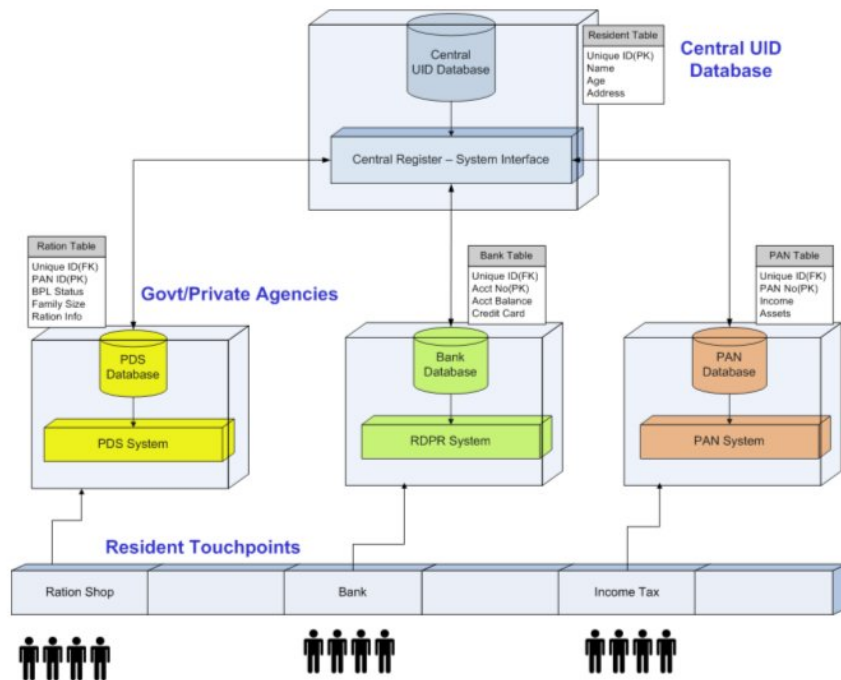
UID Revenue Projection (Steady State Estimates)	Transaction Type	
	Address	Biometrics
New Mobile Connections	19.59	-
PAN Cards	-	1.20
Gas Connections by PSU	-	1.50
Passports	0.06	-
LIC New Policies	-	10.16
Credit Cards	0.70	-
Bank Accounts	11.55	-
Airline Check-in	-	-
Projected Total Transactions	31.91	12.86
Proposed Transaction Rate	5	10
Transaction Revenue	159.55	128.60
Estimated total annual revenue at steady state (Rs. Crores)		288.15

Technology architecture of the UIDAI

The technical architecture of the UIDAI is at this point, based on high-level assumptions. The architecture has been structured to ensure clear data verification, authentication and de-duplication, while ensuring a high level of privacy and information security.

5.1 System architecture

The Central ID Data Repository will be the central database of all residents, containing the minimal set of fields sufficient to confirm identity. The federated set of databases belonging to the Registrars may contain additional information about the resident, and can use the resident's UID as the key.



The key technology components of the UID system are:

- **The UID Server**, which provides the enrolment and the authentication service. These services will be available over the network for the various Registrars and their authenticating agencies to use. The backend servers need to be architected for the

high demands of the 1:N biometric de-duplication as well as the large peak loads from authentication requests.

- **The Biometric sub-system** is central to the UID system for enrolling as well as authenticating residents. It is likely that a multi-modal biometric solution will be used to achieve a high level of assurance. The 1:N de-duplication envisioned will be by far the most computing-intensive operation of the UID system. Innovative techniques of hashing, indexing, distributed processing, and in-memory databases using multiple-biometric-modes need to be employed to get acceptable performance.
- **The Enrolment client** application will capture and validate demographic and biometric data. This client needs to work in an offline mode in the village setting when there is no internet connectivity, and upload batch files to the server for processing. The client application will be deployed on a standard enrolment workstation.
- **The Network** is a critical aspect of the system, since all UID enrolment and authentication services will be available online. UID services could work over secure WAN networks, the vanilla internet or over mobile SMS channels. It could also potentially work over existing networks such as credit-card POS (point-of-service) devices.
- **The Security design** secures all the above components from logical/physical attack. This includes
 - Server Security – firewall, intrusion prevention and detection systems (IPS, IDS)
 - Network, Client Security – Encryption, PKI etc
- **The Administration system** will help administer the UIDAI's operations. This includes
 - Account setup – creation/modification of Registrar, enrolling and authenticating agency accounts.
 - Role based access control – Assign rights over UID resources based on role.
 - Audit trailing – track every access to the UID system.
 - Fraud detection – detect identity theft and cyber crimes using audit trails
 - Reporting and Analytics – Visual decision support tools – GIS, Charting etc.

6

Legal framework

The Constitution of India, through the Directive Principles of State Policy⁶ mandates that the state shall strive to minimize inequalities of income and endeavor to eliminate inequalities in status amongst individuals. The objective of the UIDAI is to solve the key problem of identity that individuals face and enable better and efficient delivery of services to the poor and marginalized so as to eliminate inequalities of income and status. It is therefore, imperative to have a proper legal structure in place to ensure the smooth functioning of the UIDAI. This section provides an overview of the legal and policy framework.

The Unique Identification Authority of India (UIDAI) will be set up as a statutory body by an Act of Parliament. The UIDAI will be authorized:

- To collect the following identity information from any person voluntarily seeking a unique identity number:
 - Name
 - Date of Birth
 - Gender
 - Father's name and UID number
 - Mother's name and UID number
 - Address (Permanent and Present)
 - Expiry date
 - Photograph
 - Finger prints

38. (1) The State shall strive to promote the welfare of the people by securing and protecting as effectively as it may a social order in which justice, social, economic and political, shall inform all the institutions of the national life.

(2) The State shall, in particular, strive to minimise the inequalities in income, and endeavour to eliminate inequalities in status, facilities and opportunities, not only amongst individuals but also amongst groups of people residing in different areas or engaged in different vocations.

The law will contain a prescription against collecting any other information than the information permitted, with specific prohibitions against collection of information regarding religion, race, ethnicity, caste and other similar matters, and for the facilitation of analysis of the data for anyone or to engage in profiling or any similar activity.

- To issue a unique identity number to the person who has provided the necessary information and fulfilled the requirements as laid down in rules prescribed by the UIDAI.
- To verify the identity of any person at the time of the provision of information, the issuance of a unique identity number or at any other time per the UIDAI database or other possible means, as laid down in rules prescribed by the UIDAI.
- To permit the UIDAI to set up or facilitate the infrastructure by which third parties can authenticate the identity of persons who have provided information to the UIDAI and the circumstances and conditions they can seek such verification. The information on the database will be used only to authenticate identity.
- To establish or appoint a Central ID Data Repository (CIDR) for the purposes of collecting, managing and securing the database and to outsource any such functions.
- To permit the appointment of Registrars in accordance with criteria laid down by the UIDAI to enrol people that seek unique identity numbers directly or indirectly through enrolling agencies.
- To allow for the appointment of other service providers in accordance with criteria laid down by the UIDAI, as the UIDAI may deem fit to further its objectives and to ensure efficiency.
- To prescribe regulations for the regulation and functioning of the CIDR, Registrars, enrolling agencies and other service providers. Such regulations will include the following matters:
 - Procedure for applying for a unique identity number including formats of application forms, the nature of supporting documents, timeframes for issuance of unique identity numbers.
 - Prescribe data management and security protocols, internal control mechanisms and other technology safeguards to preserve and protect information provided.
 - Prescribe standards including biometric standards to be followed by Registrars and enrolling agencies for performing their functions and duties in connection with the work of the UIDAI.

- Infrastructure requirements, processes and service level standards
 - Verification of information and documents
 - Maintenance of confidentiality and privacy
 - Procedure for amendment of information
 - Specifications for preservation of information and maintenance of the information database and records
 - Methodology to address the special needs of the “differently abled” or marginalized groups such as the homeless
 - Enter into contracts and service level agreements
 - Consequences on the death of the individual who has provided information to the UIDAI
 - Information to be visible on the card to be issued by the Registrar, as well as the look and feel of the card.
- To call for information and records, conduct inspections, inquiries and audit of the CIDR, Registrars, enrolling agencies and service providers
 - To enter into all necessary contracts and arrangements in order to fulfill the objectives of the UIDAI
 - To set up mechanisms for grievance redressal with the public
 - To set up a monitoring framework to improve implementation, create safeguards as required and study the impact of the UID
 - To hire the necessary technical and professional personnel necessary for executing the mandate and fulfill the objectives of the UIDAI.

The law will also contain

- Penal provisions against persons employed by, or associated directly or indirectly with, the CIDR, Registrars, enrolling agencies and other service providers for failing to comply with the directions issued under the Act
- Penal provisions against persons employed by, or associated directly or indirectly with the UIDAI, CIDR, Registrars, enrolling agencies and other service providers for breach of certain key sections of the legislation – including the specific prohibitions on profiling, the disclosure of information and maintenance of confidentiality etc.

- Penal provision for persons who intentionally or fraudulently provide wrong information, attempt to obtain a second unique identity number, steal the identity of any living or dead person, etc. In this context, there will be no liability on the part of the UIDAI or persons employed by, or associated directly or indirectly with the UIDAI, CIDR, Registrars, enrolling agencies and other service providers for providing a unique identity number to a person who intentionally or fraudulently obtains such number.

Protecting privacy and confidentiality

The information that the UIDAI is seeking is already available with several agencies (public and private) in the country, the additional information being sought by the UIDAI are the finger prints. However, the UIDAI recognizes that the right of privacy must be protected, and that people are sensitive to the idea of giving out their personal information, particularly the idea of information being stored in a central database to be used for authentication. UIDAI will protect the right to privacy of the person seeking the unique identity number. The information on the database will be used only to authenticate identity. In order to protect the right to privacy and confidentiality the UIDAI will do the following:

- The person seeking the unique id number must provide the information with the knowledge that it will be part of a central database and will be used for identity authentication.
- UIDAI will enter into contracts with Registrars to ensure confidentiality of the information they collect through the enrolling agencies
- UIDAI will set in place protocols for information gathering and storage to be followed by the Registrars and Enrolling agencies.

Offences under the UIDAI Act

The UID database will be susceptible to attacks and leaks at various levels. The UIDAI must have enough teeth to be able to address and deal with these issues effectively. It will be an offence under the UIDAI Act to engage in the following activities:

- Unauthorized disclosure of information by anyone in the UIDAI, Registrar or the Enrolling agency
- Disclosure of information violating the protocols set in place by the UIDAI
- Sharing any of the data on the database with anyone.
- Engaging in or facilitating analysis of the data for anyone.
- Engaging in or facilitating profiling of any nature for anyone or providing information for profiling of any nature for anyone.

- All offences under the Information Technology Act shall be deemed to be offences under the UIDAI if directed against the UIDAI or its database.

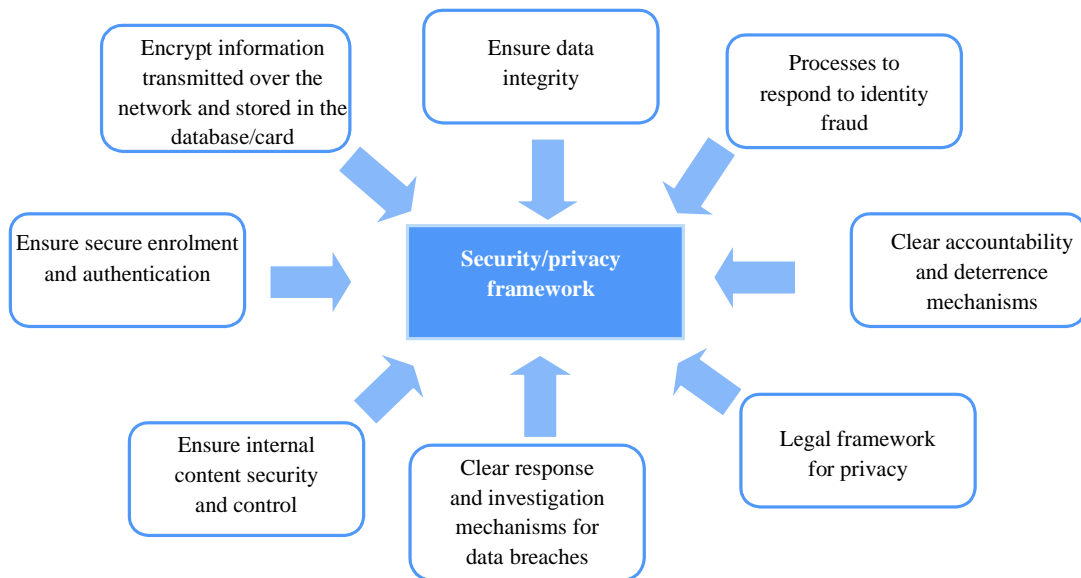
7.1 Protecting personal information of residents

Even as the UIDAI stores resident information and confirms identity to authenticating agencies, it will have to ensure the security and privacy of such information.

By linking an individual's personal, identifying information to a UID, the UIDAI will be creating a transaction identity for each resident that is both verified and reliable. This means that the resident's identity will possess value, and enable the transfer of money and resources.

The UIDAI envisions storing basic personal information, as well as certain biometrics. However, limiting its scope to this, and not linking this information to financial/other details does not make the resident records in the database non-sensitive. Biometric information for example, is often linked to banking, social security and passport records. Basic personal information such as date of birth is used to verify owners of credit card/bank accounts and online accounts. Such information will therefore, have to be protected. Loss of this information risks the resident's financial and other assets, as well as reputation, when the resident is a victim of identity theft.

In the federated system that the UIDAI envisions, we must consequently have processes in place to ensure a fair level of data security.



7.2 Fraud scenarios

The Authority will concern itself only with identity fraud, which is distinct from document fraud. Document fraud – the use of counterfeited/misleading documents to enter incorrect personal information – will be the responsibility of the Registrar enrolling the resident. The

Authority will have clear response mechanisms in place for identity fraud, where an individual deliberately impersonates someone else, either real or fictitious.

Since the CIDR will store the biometric of residents, identity fraud will be easier to control. The only form of fraud that may go undetected in the UID system is if a person registers his/her details and biometrics under an entirely different name, with forged supporting documents. However, the person will have to exist under this name across systems, in the lifetime of his/her interaction with the government, private agencies and service providers. Such instances are therefore, likely to be rare.

Some of the potential fraud scenarios are:

Scenario	Response
Person applies for a UID number and presents wrong information under their name	The verification process returns application to the applicant and presents the reasons for not issuing number
Person applies to get a second card in another name	Application returned, with reason provided. If person's name was fraudulent the first time, he has the option of applying to change his demographic fields. if this fraud is attempted again, person is added to watch list/ legal action
Person appears as himself, and applies for a second UID number	Application returned, with reason provided. If attempted more than three times person added to watch list
Person appears as another existing person, registering the second person's information under his fingerprint	The victim can report identity theft to the UIDAI's grievance office. The UIDAI will undertake an investigation, and take appropriate action if theft is confirmed
Impersonation of a deceased individual, with fake supporting documents	If the applicant passes the verification process, then he may be able to take on the stolen identity. However, he will not be able to change his demographic fields over his lifetime without due process.
De-duplication works incorrectly and returns false positive for a new UID applicant	Person can request check against face biometrics as well as re-verification by Registrar

8

Project execution

One of the unique challenges in executing the UID project is its scale. Due to the size of India's population, the UIDAI is undertaking what is perhaps the largest governance-related exercise in the world. We must ensure that all aspects of the project – enrolment, de-duplication, and authentication – function effectively even as the number of records approaches a billion.

8.1 Addressing challenges of scale

The UIDAI can expect its enrolment run-rate to have a peak load of one million enrolments per day in the very first year of operation. Every sub-system and component of the UID system will need to scale quickly and significantly. This will include:

- 1) The ability to onboard Registrars from different sectors and handle their constituencies of residents.
- 2) The legal framework of contracts needs to support the variety and spread of stakeholders as their numbers grow exponentially across the country.
- 3) The biometric de-duplication algorithm needs to scale towards checking a fingerprint against every one of 1.2 billion people to ensure uniqueness.
- 4) The authenticating service, which may be used by tens of thousands of points across the country, needs to scale to handle hundreds of thousands of transactions per second.

9

Project risks

The UID project does face certain risks in its implementation, which have to be addressed through its architecture and the design of its incentives. Some of these risks include:

- 1) Adoption risks: There will have to be sufficient, early demand from residents for the UID number. Without critical mass among key demographic groups (the rural and the poor) the number will not be successful in the long term. To ensure this, the UIDAI will have to model de-duplication and authentication to be both effective and viable for participating agencies and service providers.
- 2) Political risks: The UID project will require support from state governments across India. The project will also require sufficient support from individual government departments, especially in linking public services to the UID, and from service providers joining as Registrars.
- 3) Enrolment risks: The project will have to be carefully designed to address risks of low enrolment – such as creating sufficient touch points in rural areas, enabling and motivating Registrars, ensuring that documentary requirements don't derail enrolment in disadvantaged communities – as well as managing difficulties in address verification, name standards, lack of information on date of birth, and hard to record fingerprints.
- 4) Risks of scale: The project will have to handle records that approach one billion in number. This creates significant risks in biometric de-duplication as well as in administration, storage, and continued expansion of infrastructure.
- 5) Technology risks: Technology is a key part of the UID program, and this is the first time in the world that storage, authentication and de-duplication of biometrics are being attempted on this scale. The authority will have to address the risks carefully – by choosing the right technology in the architecture, biometrics, and data management tools; managing obsolescence and data quality; designing the transaction services model and innovating towards the best possible result.
- 6) Privacy and security risks: The UIDAI will have to ensure that resident data is not shared or compromised.
- 7) Sustainability risks: The economic model for the UIDAI will have to be designed to be sustainable in the long-term, and ensure that the project can adhere to the standards mandated by the Authority.