

## Business Process Reengineering in e-Governance: Maintenance of People Records with Implementation of Relational Database Management System

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**ABSTRACT:** Good governance has become a subject of interest in every day discussions among political social, economical and business circles. All governments are willing and trying hard to formulate new strategies for effective public service delivery. e-Governance is one of the strategies for good governance, which helps effective service delivery. But mere computerization or inclusion of ICT will not be helpful to serve the cause. Rather we need an overhauling of the entire system. The solution resides in the idea of BPRE: Business Process Reengineering. Indian government has started its journey by implementing the idea of UID which will further lead to the concept of one centralized database. The author visualizes the maintenance of centralized database which will come into existence after the complete execution of the idea of UID. The current paper aims at the maintenance of centralized database by fusing together e-governance with BPRE, with special reference to UID and applying the fundamental concepts of Relational Database Management System (RDBMS). In the current paper the author suggests the implementation of RDBMS by which this centralized database could be maintained keeping in mind different events which adds and modifies the details of this database. Finally author plans to discuss the benefits of the proposed system over the existing system.

**KEYWORDS:** e-Governance, Business Process Reengineering, Relational Database, Inventory, Management system.

### 1 INTRODUCTION

A.P.J. Abdul Kalam, former President of India visualizes e-governance as a transparent smart e-governance with seamless access, secure and authentic flow of information crossing the interdepartmental barrier and providing a fair and unbiased service to the citizen. Bringing the internet and governance together means bringing the greatest technology of our times to bear on the most fundamental concerns of our society. "E-governance is about redefining the vision and the scope of the entire relationship between citizen and government. It will enable us to specifically address some of the long stalemated issues in public affairs with appropriate conceptual breakthroughs. Government online as a concept is different from the traditional model of the Government" [1]. E-government just cannot be achieved only with computerizing the existing system and fusing it with ICT tools. We have to analyze the entire system, its input and outputs demanded at different levels. The overall change could be implemented only if we reengineer the entire system rather than just reformulating it.

Reengineering suggests that generally an organization is constructed by consolidating several sub units together into one. In this procedure units are defined and categorized by defining tasks separately, but it is observed that in such scenario these sub units are not taking responsibility for the overall performance of the organization. Reengineering observes that the overall performance of the organization can be improved only if we implement fundamental changes in the structuring of the organization.

#### 1.1 E-GOVERNANCE

In simple terms, E-governance refers to governance processes in which Information and Communication Technology (ICT) play an active and significant role. E-Governance (from electronic governance, also known as e-gov, digital governance,

online governance or in certain context transformational governance) refers to government's use of information technology to exchange information and services with citizens, businesses, and other arms of government [2]. But it is WRONG to equate Digital Governance with simply digitalization, or automation of governance services. It is much more than that. E-governance should not be just another facet of Governance or one more interface between citizen and government. E-governance must go far beyond mere computerization of back office operations. E-governance has to fundamentally change the operations of government and implies a new set of responsibilities to citizens and the government. E-governance is one of the strategies for good governance, which helps effective service delivery. Good governance has become a subject of interest in every day discussions among political social, economical and business circles. E-governance in its widest sense is the application of modern communication and information technologies for reengineering governing processes to make them more citizen-friendly, cost-effective and transparent.

Digital Governance has to be seen as a 'tool' for good governance and human development. E-Government may be applied by the legislature, judiciary, or administration, in order to improve internal efficiency, the delivery of public services, or processes of democratic governance.

## **1.2 BUSINESS PROCESS REENGINEERING (BPRE): A NOVEL APPROACH TO RADICAL IMPROVEMENT**

In 1990, Michael Hammer, a former professor of computer science at the Massachusetts Institute of Technology (MIT), published an article in the Harvard Business Review, in which he claimed that the major challenge for managers is to obliterate forms of work that do not add value, rather than using technology for automating it [3]. This statement implicitly accused managers of having focused on the wrong issues, namely that technology in general, and more specifically information technology, has been used primarily for automating existing processes rather than using it as an enabler for making non-value adding work obsolete.

Hammer's claim was simple: Most of the work being done does not add any value for customers, and this work should be removed, not accelerated through automation. Instead, companies should reconsider their processes in order to maximize customer value, while minimizing the consumption of resources required for delivering their product or service. A similar idea was advocated by Thomas H. Davenport and J. Short in 1990 [4] at that time a member of the Ernst & Young research center, in a paper published in the Sloan Management Review

## **2 GOVERNANCE IN INDIA: WITH A VISION OF TRANSFORMING INTO E-GOVERNANCE**

Collection of data about the populace is a very important and significant part of government functioning. From revenue collection to development schemes, all planning, execution and monitoring depends on availability of detailed and up to date data of the governed masses. This database is "dynamic" and the main challenge is of keeping it up to date. At present this challenge is met by frequent surveys/ enumerations .E-governance should necessarily look at this major and critical aspect of government function. BPRE (Business Process Re-Engineering) has been a major tool for improvement of governance processes. This paper applies the principles of BPRE to this aspect of governance. It also correlates this proposal with the UID project of the government by implementing a centralized database designed through RDBMS. The author collected details of all the data being maintained of different aspects of people in different sections from district collectorate Khargone.

### **2.1 EXISTING SYSTEM OF DATA COLLECTION AND MAINTENANCE OF CITIZENS INFORMATION USING AADHAR (UID)**

The Unique Identification Authority of India (UIDAI), is an agency of the Government of India responsible for implementing the AADHAAR scheme, a unique identification project. It was established in February 2009, and will own and operate the Unique Identification database. The authority aims to provide a unique id to all Indians. The authority will maintain a database of residents containing biometric and other data. But still this is not clear that whether this data will be stored in the form of a database consisting of several related tables or not. Till now, this UID authority of India is working for the collection of data only focusing on UID.

#### **2.1.1 SALIENT FEATURES OF AADHAAR**

AADHAAR is a 12-digit unique number which the Unique Identification Authority of India (UIDAI) will issue for all residents in India (on a voluntary basis). The number will be stored in a centralized database and linked to the basic demographics and biometric information – photograph, ten fingerprints and iris – of each individual. It is easily verifiable in an online, cost-effective way. It is unique and robust enough to eliminate the large number of duplicate and fake identities in government

and private databases. The random number generated will be devoid of any classification based on caste, creed, religion and geography [5].

Addressing illegal immigration into India and terrorist threats is another goal of the program. In January 2012, the government of India reiterated the goal of the UID project, "... is primarily aimed at ensuring inclusive growth by providing a form of identity to those who do not have any identity. It seeks to provide UID numbers to the marginalized sections of society and thus would strengthen equity. Apart from providing identity, the UID will enable better delivery of services and effective governance." National Population Registry (NPR) project, a distinctly separate initiative by the Home Ministry, is meant to issue national identity cards to enhance national security.

Most reports suggest that the plan is for each Indian resident to have a unique identification number with associated identifying biometric data and photographs by 2011. However, other reports claim that obtaining a unique number would be voluntary, but those that opt to stay out of the system "will find it very inconvenient: they will not have access to facilities that require you to cite your ID number."

Government distributed benefits are fragmented by purpose and region in India, which results in widespread bribery, denial of public services and loss of income, especially afflicting poor citizens. As the unique identity database comes into existence, the various identity databases (voter ID, passports, ration cards, licenses, fishing permits, border area ID cards) that already exist in India are planned to be linked to it. The Authority is liaising with various national, state and local government entities to begin this process. The Union Labor Ministry has offered its verified Employment Provident Fund (EPFO) database of 42 million citizens as the first database to be integrated into the unique ID system. Contrary to various previous reports, UIDAI does not use any existing databases citing problems of fraud and duplicate/ghost beneficiaries in the existing databases. Instead, it will enroll the entire population using its multi-registrar enrollment model using verification processes prescribed by the UIDAI. This will ensure that the data collected is clean right from the beginning 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 will have access to. The Authority will ensure that the Know Your Resident (KYR) standards do not become a barrier for enrolling the poor and has devised suitable procedures to ensure their inclusion without compromising the integrity of the data. The NPR is an important partner registrar in the enrollment process.

Based on the analysis, the UIDAI confirms that the enrollment system has proven to be reliable, accurate and scalable to meet the nation's need of providing unique 'Aadhaar' numbers to the entire population. It is asserted that the system will be able to scale to handle the entire population. The analysis resulting from such a large data set (8.4 crore enrollments) is empirically repeatable and statistically accurate.

## **2.2 FUSION OF BPRE AND E-GOVERNANCE WITH SPECIAL REFERENCE TO DATA COLLECTION OF CITIZENS:**

### **Creation of centralized database**

The government of India has concentrated on the idea of collecting information and issuing UID to every section of the society. But it is not yet revealed how the collected data will be maintained or how the collected information will be used in context with several departments issuing ID proofs to a single citizen.

The author wishes to suggest the idea of centralized database, having foundations on the UID and then maintaining that database using the concept of Relational Database Management System (RDBMS). In the current paper the author suggests that a centralized database should be created which can be modified by different events that occur in the life of a person like birth, death, marriage, migration etc.

Generally, the database includes several attributes which may be classified into four categories, as follows:

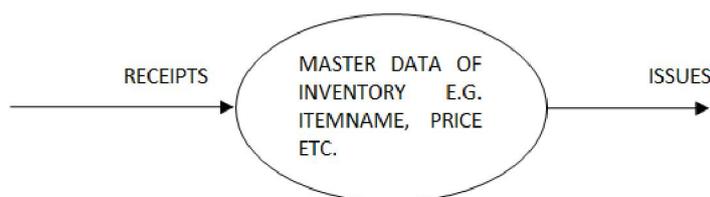
- a) Permanent data (like name, father's name etc.)
- b) Changing attributes which can be automatically updated (like age etc.)
- c) Changing attributes which can be updated by various processes in the collectorate (birth registration, death registration, marriage reg.)
- d) Data which cannot be updated by any of the processes.

Accordingly tables were designed by the principles of "master tables" and "transaction tables". The category 'd' attributes were further analyzed to probe if new processes need to be introduced for updation. It was found that it is possible to maintain a dynamic database without periodic surveys/enumerations by implementing principles of BPRE and introducing very few changes in the processes.

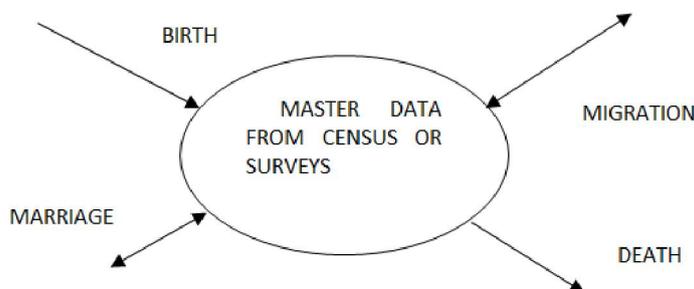
### 3 PROPOSED SYSTEM OF MAINTENANCE OF PEOPLE'S RECORD : (CREATION AND MAINTENANCE OF CENTRALIZED DATABASE)

Data about citizens and its statistical analysis has always been important for governing a country. In fact the word "statistic" has the same origin as statesman. This data has gradually grown in magnitude and complexity. Thus it was the complexity of 1890 US census which led the invention of punched card which later became a computer input device. In India also, district wise data is kept regarding many aspects of citizen's life. The data has been always collected through census or surveys. Since many of the attributes change over time, updation is necessary. Traditionally this updation has been done by subsequent surveys or census. However if we look at the problem of data updation ab initio, it is evident that many of the attributes can be updated automatically. Also the updation of the remaining attributes can be mostly done by "transactions" (like birth, death) which are already being processed by the same government machinery. But these are being done in isolation to the "census" activity.

Taking an industrial analogy, there may be millions of items in the inventory of a large, complex engineering enterprise. Yet their enumeration is not done by frequent census. Rather a master data, once entered, is as frequently updated as any transaction takes place.



Similarly, the population data can be started as "master" on a particular date, say a census, and then updated.



In the proposed system, the database is designed in order to store all the relevant information about citizen. Unlike the existing way of storing data in district collectorates, this is an integrated centralized database. Also it is dynamic in the sense that the attributes are updated regularly with events like births, deaths, marriages, emigration, and immigration. These events are treated as "transactions" and the "master records" are updated with the help of these. Births introduce new records in the populace. Deaths mark certain records as deleted.

#### 3.1 DOMAIN OF ATTRIBUTES USED IN EXISTING SYSTEM

At present, the following attributes are used and stored in a database by the district government for different purposes:

- Family id
- Name
- Gender
- Caste
- Date of birth
- Father's name
- Mother's name
- Spouse name
- Country of birth
- Citizenship
- Permanent address

- Age
- Duration of stay
- Marital status
- Relationship with head of the family
- Land ownership
- Drinking water
- Present address ( including village, block, district, state)
- New family id
- Educational qualification
- Job/profession
- Average monthly income

#### **4 PROPOSED SYSTEM**

The proposed system identifies and categorizes the attributes as permanent, updatable automatically, updatable by government processes, updatable by just one new process proposed (immigration/emigration) and finally those few which do require surveys, as follows:

##### **4.1 PERMANENT ATTRIBUTES**

- Family id
- Name
- Gender
- Caste
- Date of birth
- Father's name
- Mother's name
- Country of birth
- Citizenship
- Permanent address

##### **4.2 AUTOMATICALLY UPDATED ATTRIBUTES**

- Age
- Duration of stay

##### **4.3 ATTRIBUTES UPDATED BY GOVERNMENT PROCESSES**

- Marital status
- Spouse name
- Relationship with head of the family
- Land ownership
- Drinking water
- Additional processes (emigration/immigration):
- Present address( including village, block, district, state)
- New family id

##### **4.4 REMAINING ATTRIBUTES TO BE SURVEYED**

- Educational qualification
- Job/profession
- Average monthly income

It is, thus, found that lot of updation can be done without frequent surveys.

## 5 DATABASE DESIGN WITH CONCEPTS OF RDBMS: CODD’S RULES AND NORMALIZATION

The fundamental idea behind the relational database design is that we need very little effort to maintain a large set of information stored in it. This can be achieved by creating a database by implementing Codd’s Rules and performing Normalization. The idea of normalization will focus on minimum of redundancy and data anomalies in the database [6]. Updation in the database can be done with the help of small queries which provides facilities to database administrator and users, for instance searching information, adding and deleting information, updation of stored information and many more. The query can be one line statement to do large tasks in databases without giving much pain to the end user.

Following tables are designed to store above mentioned data in normalized form:

**Table 1. Populace table**

populace : Table	
Field Name	Data Type
villagecode	Text
Familyid	Text
caste	Text
Member_Id	Number
Member_Name	Text
gender	Number
Age	Number
Relation_Code	Number
Education_Code	Number
dob	Date/Time
incomecode	Text

This is THE MASTER table which holds the general information about citizen, like his village, family, name, relation with head of the family. This table is updated with events like birth, marriage, death and migration etc. It refers to various master tables for codes of village, block, district, state on the one hand and codes of relation, education and income, on the other.

**Table 2. Birth table**

births : Table	
Field Name	Data Type
districtcode	Text
birthregcode	AutoNumber
Familyid	Text
dob	Date/Time
gender	Number
memidfather	Number
memidmother	Number
relationcode	Number

Birth table is a transaction table which carries the attributes to store the details of a new born. It carries the information of a child with reference to his family, parents etc. with the help of some attributes like familyid, memberidfather, memberidmother etc. With every new birth, a record is added in the table which ultimately updates the master table populace which holds the data of citizens.

**Table 3. Death table**

deaths : Table	
Field Name	Data Type
deathregn	AutoNumber
familyid	Text
memerid	Number
dod	Date/Time
newheadid	Number

Death is an important event which modifies the family structure especially if the person is head of the family. This table store and records the details of every death in district which ultimately modifies the populace table. It stores the details of Death and if the dead person was head of the family, then id of the family member who becomes the new head. Other attributes like familyid, memberid, date of death are also recorded.

**Table 4. Marriage table**

marriage : Table		Paste
Field Name	Data Type	
marriageid	AutoNumber	
familyid	Text	
memberid	Number	
dom	Date/Time	
nameofwife	Text	
familyidiflocal	Text	
dob	Date/Time	
educationcode	Number	
relationcode	Number	

Marriage is an important event which changes the structure of family. So, it is mandatory to modify the details. Marriage table is designed as a transaction table which is updated every time with the event of marriage in a family. It carries details like date of marriage, spouse name and id etc.

**Table 5. Migration table**

migration : Table	
Field Name	Data Type
familyid	Text
memberid	Text
name	Text
olddistrict	Text
newdistrict	Text

This is THE NEW DATA BASED ON A NEW PROCESS BEING PROPOSED. It is proposed to take the district as a “closed store” in which “receipts” and “issues” take place by births, death, marriages and immigration/emigration. It is proposed to introduce the process of registration of immigration. It may be voluntary but, like UID, mandatory for all government transactions.

**Table 6. BPL table**

bpl : Table	
Field Name	Data Type
familyid	Text
bplscore	Number
dateofsurvey	Date/Time
incomecode	Text

BPL table is a transaction table, created to store information about citizens who are listed under below poverty line. For the benefit of poor, government has a provision of survey to enlist poor, after an evaluation. The score obtained by the citizen decides whether he should be treated as poor or not. All these information are stored in this table with the help of attributes like, bplscore, income etc.

**Table 7. Relation table**

Relation_code : Table	
Field Name	Data Type
Relation_Code	Number
Relation	Text

This is a master table which defines various relations with their codes.

**Table 8. Education table**

Education_code : Table	
Field Name	Data Type
Education_Code	Number
Education	Text

This is a master table which holds the information of educational status. It carries only two attributes education code which is of numeric type to hold the unique code assigned to different qualifications and education, of type character to describe the educational status. This table is not supposed to be modied frequently and other tables can only refer to this table to get the information about education.

**Table 9. Village code table**

villagecode : Table	
Field Name	Data Type
Village_Code	Text
villagename	Text

This table is a master table which carries the master data about village. It only defines the code of the village and name of the village. This information is used by many transaction tables where village name is to be used.

**Table 10. Panchayatdistrict 13**

Panchytsdist13 : Table	
Field Name	Data Type
Panchayat_Code	Text
Panchayat_Name	Text
Panchayat_Or_Others	Text

This is a master table about panchayats of an example district number 13. It defines all the panchayats in a district with the help of attributes like panchayat code, panchayat name etc. whenever any information is required about panchayats of district number 13 then this table can be referred.

**Table 11. Nationblocks table**

nationblocks : Table	
Field Name	Data Type
block_code	Text
Block_Name	Text
BlockHQName	Text
noofvillages	Number
noofpanchayats	Number

This is a master table which holds the details of blocks in a district. It carries all the relevant information of a block i.e. Block code, block name, block headquarter name, number of villages in a block etc. Different tables refer to this table to get the information about blocks.

**Table 12. Nationdistrict table**

nationdist : Table	
Field Name	Data Type
district_code	Text
district_name	Text
districthqname	Text
noofblocks	Number
noofvillages	Number
noofpanchayats	Number
url	Text

Like block master, this is also a master table which carries the information about districts. It stores information like district name, district code, number of blocks in a district etc. Different tables are connected to this table to get the information about districts of nation.

**Table 13. States table**

Field Name	Data Type
state_code	Text
State_name	Text
short_name	Text
Region	Text
State_Capital	Text
State_Address1	Text
State_Address2	Text
State_Address3	Text
State_Address4	Text
State_Address5	Text
State_URL	Text
status	Text

This is a master table which holds the details of states of nation. All the states were listed in this table and for any interstate transaction, details of state is necessary, for example state name, state code, state capital etc. so these and other attributes are listed and hence used by other transaction tables.

## 6 UPDATION IN DATABASE

Here the author has given some sample queries to show how simple queries can maintain a large database of population of a district. The author has included some fundamental tasks like, addition of a record in populace table on the event of birth, deletion of a record from populace table on the event of death, updation of information of a family on the event of marriage etc.

### QUERY 1: Appending a Record in Populace on Birth

```
INSERT INTO populace ( dob, gender, familyid )SELECT births.dob, births.gender, births.familyid FROM births;
```

This is a query which fetches information from birth table like dob, gender and familyid of a new born and insert into populace table.

### QUERY 2: Updating Record in Populace Table

```
UPDATE populace SET populace.dob = Date()-populace!Age*365;
```

This is an update query which modifies the date of birth from populace table

### QUERY 3: Update on Marriage:

```
UPDATE populace SET populace.familyid = trim(Str(populace!villagecode))+Trim(Str(populace!NewFamily_id));
```

This query will update populace table on marriage by updating the information of familyid attribute.

### QUERY 4: Delete On Death :

```
DELETE populace!familyid AS Expr1, populace!dob AS Expr2, [populace]![familyid], [populace]![dob], * FROM populace WHERE ((([populace]![familyid])="17130030010113") AND (([populace]![dob])=CDate("6/Nov/2009")));
```

This query deletes a record from populace table on death of a citizen. One has to enter the familyid and date of death of the citizen.

## 7 BENEFITS OF THE PROPOSED SYSTEM

The design and implementation of the above mentioned database in the present administrative scenario may bring about a revolutionary change. Because it not only eradicates the need of frequent surveys but also simplifies the tedious job of storing complex information of a nation having population more than a billion. The benefits of this new change are numerous if implemented properly in coordination with training of the staff who handles the job. Following are some of the major advantages:

- Less surveys will be required to collect and modify the information about citizen
- Time, money and effort will be saved as the creation and maintenance of centralized database will minimize the need of surveys and data collection and different levels.
- Searching process of information will be simplified because the entire set of data will be maintained in a centralized database maintained through some query language.
- If the concept of centralized database is implemented, then there will be no need of having different registration processes for certificates like, birth, marriage, caste, license, passport, death etc. only UID will be given and rest of the details will be available through the centralized database

The entire scenario of the government processes and administration will be changed by having e-governance implemented with the ideas and mechanism of BPRE.

## 8 CONCLUSION

The paper proposes maintenance of people records based on the model of industrial inventory with “receipts” being births, marriages, immigrations and “issues” being deaths and emigration. It is proposed to take the district as a “closed store” in which these “transactions” take place. At present processes of births, deaths and marriages are mandatorily registered. It is proposed to introduce the process of registration of immigration also. It may be voluntary but, like UID, mandatory for all government transactions.

Some changes which cannot be trapped by the system are:

- Change in educational qualification
- Change in profession/job
- Change in income

These may require periodic surveys but they will be more specific, less frequent and easier. Once the UID scheme of central government is implemented, some of these may also be possible to do within the system. UID may be included in all personnel databases in all organizations and that may help updation of all attributes.

The new process of registration of immigration/emigration may be made voluntary on the lines of UID. However, like UID, it may be mandatory for all registration with the government. This rider will make it popularly accepted.

## ACKNOWLEDGEMENTS

The author wishes to thank Mr. R. K. Anand, Retd.-Head Computer Centre, RDVV, Jabalpur, for his help in developing the concept which emerged during discussions with him. MS Excel & MS Access are the Intellectual property of Microsoft Corp. The author is thankful to Computer Centre RDVV for providing the official versions of these softwares for our analyses.

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