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CLOUD BASED INTEGRATED BHULEKH MODEL TRANSFORMING REVENUE ADMINISTRATION AND DIGITALLY EMPOWERING SOCIETY

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Abstract:-

Government aims to provide various citizen centric services in economical and transparent manner and to deliver these services, Government has to adopt innovative use and mix of latest state of art Technology and Process reengineered Models of integration of various stakeholder in service delivery. In this paper, we highlight the pervasive step taken by the Government of Uttar Pradesh and its modus operandi to transform Bhulekh 1.0 to Bhulekh 2.0 by using Cloud Based Integration of stakeholders in revenue administration i.e. Integration with Registry Office, Revenue Courts, Banks, Aadhar, e-District and CSC, which has setup a new standard of digital delivery of services and improvement in performance of Revenue Administration through MeghRaj Cloud. Thus, Cloud Powered Bhulekh 2.0 is making a sustained transformation towards digitally empowered society by providing services from anywhere at anytime in responsive manner.

Keywords:- *ROR/Khatouni, Cloud, Digital Signature, e - District, CSC, NIC, Revenue.*

I. INTRODUCTION

Government has rolled out various e-Governance initiatives like Bhulekh Ver1.0, e-District [1], Common Service Center (CSC) [2] to give thrust to change the style of the citizen centric services delivery life cycle in effective and efficient way to digitally empower the society and to create knowledge hub. Bhulekh Ver2.0 envisages CSCs for the generation and distribution of the Khatouni services to the citizens at their doorsteps. Under e-District Project, CSCs are the Government powered outlets which ensure the delivery of citizen services [3] like Khatouni, Caste, Income, Domicile, Death and Birth Certificates, UIDAI, PAN, NDLM, Jan Dhan services etc. The citizens are empowered to claim for related Government benefits/ schemes on the basis of these services/ certificates. Also, the Government may filter the valid claims by verifying these documentary proofs directly through created databases and various reports/ surveys may be executed which give idea to form new policies and schemes in public interest. These services are also the source of income to the Government. The relevant services issued to the citizens belong to various departments and the integration of these may resolve the issues which exist in information sharing and dissemination. The Integration of Bhulekh system with Bank, Registry, Revenue Court and Aadhar creates a digital model in which the citizen may get desired services through a single interface and without physical movement of records from one office to another. The required information would be available on single click and the relevant actions would be taken automatically without unnecessary delay. It saves time, paper and cost of all the stakeholders. Due to the various benefits, the concerned Department/ Government is required to transform the overall process to ensure the delivery of the services in transparent, affordable and time bound manner at the citizen's doorstep. These constraints create a sustained model of transformation in which the total participation of all the levels is required and which form the very basic of Total Government.

In connection with these parameters, India's Premier IT Organization, National Informatics Centre [4] (NICUP Unit), developed and implemented a Cloud Based Integrated Bhulekh Ver2.0 Software for Revenue Department of Uttar Pradesh Government to deliver the RORs/ Khatounis services by simplifying the cumbersome process life cycle. The USP of this project is to provide ROR services from anywhere at anytime basis through Net-Banking and CSCs. The purpose of this cloud based solution is to minimize the interaction of citizens to Government office, to make availability of updated RORs in public domain at runtime, ensure transparency, serve citizens at their doorstep, and integrate to various eGov Projects for the complete transformation of existing culture.

II. Literature survey on land record

Computerization

Initially, the RORs/ Khatounis delivery chain was not an easy task for the Revenue Department. It was due to the various reasons and limitations like lack of will power, infrastructure, technology, manpower and supportive environment. The overall process was time consuming, hectic and the technology was an alien.

The citizen had to visit Tehsil Office for Khatouni Services. He had to stand in a long queue and come to office again and again from remote villages. Sometimes, he had to bribe for required services to the mediators. At all the levels, he had to interact with govt officials and had to wait for his turn and unnecessarily time killing involved. They were exploited many places. Also, the officers were overloaded to deal huge number of citizen centric applications with limited manpower and within the time frame.

Miscreants take the advantage of Government's intricate system and grabbed the land property of weaker section. So the number of lawsuits, scuffles, illegal possession and other crimes increased [5]. To protect the Record of Rights of common man, the state governments of our country are evolving the various ideas. They are adopting the Information Technology as a tool to make a sustained model of Revenue Records. The centrally sponsored scheme on Computerization of Land Records was started as a pilot in eight states as follows: Assam, Andhra Pradesh, M.P., Gujrat, Orissa, Maharashtra, Rajasthan and Jharkhand. Project removed the culture of manual system maintenance and updation of land records to meet the requirements of stakeholders. Gradually, all the states of India also adopted the ICT mechanism for automation of Land Records. Karnataka implemented Bhoomi software [6]. Jharkhand implemented MIS portal to provide Jharkhand Land Record Details online to the citizen.

Jharkhand also implemented Vasudha Land Records System which provides Khatiyan and Revenue information to common citizens and land owners with all details of Khasra Naksha [7]. Bihar implemented Bhu-Abhilekh and Bhu-Sarekshan Software to capture and generate the various reports of land [8]. Goa set a milestone to use ICT in land record and registration [9]. Haryana implemented PATIS software to automate RORs, mutations, khasra girdawari, shajranasb and their integration. The major objective was to help the public by giving them updated copies of land records through computer in time and in a hassle-free manner. Haryana also took the lead in the execution of 'Digitization of Cadastral Maps' [11].West Bengal implemented Bhoomi in 1989, which has been continuously upgraded till date. There has been number of upgraded versions of the "BHUMI" so far in West Bengal with the most recent version being windows based "BHUCHITRA" [12]. The Government of India launched the Digital India Land Records Modernization Programme [13] (DILRMP) in 2008 with the aim to modernize the land records, minimize the scope of disputes, enhance transparency by computerizing all the land records including mutations, digitization of maps and integration of textual/spatial data, survey/re-survey and updating of all survey and settlement records including creation of original cadastral records wherever necessary, computerization of registration and its integration with the land records maintenance system, development of core Geospatial Information System (GIS) and capacity building.

An idea to computerize the Khatouni System in Uttar Pradesh was implemented in 1998. It was client server based model which speed up the khatouni generation and reporting process. Revenue of Rs. 268 Crores has been generated by distribution of 17.68 Crores of Record of Rights (RORs) through Tehsil Centres, Lokvani Kendra and CSC Centres making computerization plan Self Sustainable. The concerned staffs used work on clients to make and update RORs/ Khatounis, enter the relevant mutation orders, take backup from servers daily and upload the monthly data on central server after the complete dataset in ISFOC font is converted to Unicode so that the khatouni reports may be available in public domain. Banks used to visit online reporting portal to check the status of ROR so that they can serve the farmers. But still banks and others were not able get updated data due to the absence of runtime synchronization between local server and central reporting server. Hence, it was required to get the RORs verified from tehsil bhulekh office. It used to create rush in tehsils to check and verify the Khatounis for the concerned. There was no provision to preserve the old Fasli Khatounis. The integration with Revenue Court Management (RCMS), Bank, Registry Office, Aadhar, and SMS Module was still not there and an interoperable single sign on mechanism for these systems was awaited.

III. Cloud based solution of land record for uttar pradesh

Uttar Pradesh state has 75 districts and 345 Tehsils and 109957 Khatauni Villages. In view of the improved performance and concurrent transaction handling, and capacity to store huge number of confidential and sensitive records with high security, the Meghraj Cloud powered resources have been identified to meet the huge service demand in elastic manner. It is also required to properly implement the Quality of Service parameters like Reliability, Availability, Scalability, Performance, Security etc.

Meghraj is technically known as GI Cloud. It is a recently launched project by Government of India to harness the benefits of Cloud Computing. It would ensure optimum utilization of the infrastructure and speed up the development and deployment of eGovernance applications. It provides services like Software as a Service (SaaS), Platform as a Service (PaaS), Infrstructure as a Service (IaaS) and Storage as a Service (STaaS) to the user department. The Bhulekh Team burnt the midnight oil for analysis, logic development, implementation strategy, testing, maintenance strategy and all other process related activities to transform the existing system into the Cloud [14] based solution of Integrated Bhulekh System. Thus, a complete process reengineered bhulekh model to simplify the ROR/ Khatouni delivery life cycle was created which is completely online and provides ROR services to the tenants directly through Net-Banking/ Common Service Centers (CSC)/ Lokwani Centers, using Bhulekh Project or e-District Project which is providing various e-governance services to the citizens at their doorsteps.

Initially, this project was started on Pilot Districts: Aligarh, Lalitpur, Bijnore, Auraiya and JP Nagar, then in next phase it is replicated in other districts using the largest CSCs network setup in Uttar Pradesh comprising of 44,999 CSCs in Gram Panchayats, second being Maharashtra (34,873) and Gujarat (15,877) in the year 2015-16, to ease the service delivery process. These CSCs are the milestone in the direction of efficient and effective delivery of services. In other words, they are mini tehsil office at Village Panchayats for various e-Governance services. The Bhu- Naksha is also linked to view the Shajra geographically with nearby plot details over the internet. It is very useful to avoid the disputes associated with the land parcels.

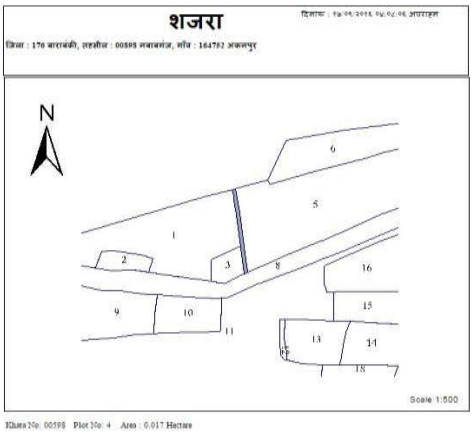

Figure 1: Bhu-Naksha in Public Domain

The integration of the Bhulekh software with CSCs/ Lokvan is transforms the ROR delivery system. Now villagers don't need to go to Tehsil office and bother for services. They just go to enabled CSC or logon to Online Citizen Services' Portal and pay the recommended fee through Net-Banking to get the digitally signed updated ROR immediately. The ROR delivery through CSCs or Net-Banking increases the revenue of government also because there is no investment of tehsil in terms of creating infrastructure to issue ROR while getting revenue as share from every ROR delivery. Also, the RORs available in public domain, and citizens/banks/ others may check updated ROR details from upbhulekh.gov.in over the internet to reduce the cases of fraud in loans.

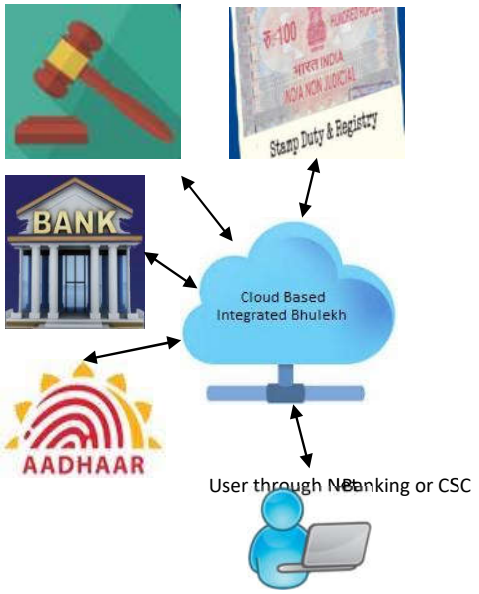

Figure 2: Integration Model of Cloud based Bhulekh

Figure 2 describes the Integration model of Bhulekh system. The system is integrated with Revenue Court Computerization Management System (RCCMS),

Registry Office and UIDAI Web Service. If a person is interested to sell his property, now all the ROR records are available to registry office. Registry office automatically sends a copy to Revenue Court Cases Monitoring System (RCCMS). RCCMS issues a notice to receive objection. If no objection is received within 30 days then mutation order would be issued automatically and ROR is updated without any manual intervention in the respective Khata/Plot. Registrar Kanoongo would only digitally sign the mutation order to make updated ROR available over the internet. Banks may sanction loan to the applicant by immediately checking the updated Khatouni status. The banks may also transfer the subsidy and financial aid to the eligible candidate because ROR Khatedar is integrated with bank. It is very useful for densely populated state Uttar Pradesh.

Pre-Implementation Preparation

At pre-implementation level, the project's main challenge was to curb the negative approach towards new idea and another challenge was to stop the monopoly of few stakeholders who were not interested in losing their destructive power in process life cycle of conversion and integration. Thus, Lekhpals and Registrar Kanoongo were trained on new technology as it was a revolutionary adaptation to them, but the positive spirit led down all the negative forces and to begin, following steps were initiated.

- Mapping of all the Revenue Village Codes with Census Codes 2011 for uniformity of codes for all 109957 Khatauni villages.
- Verification of Mapped Villages for all 345 Tehsils of UP.
- Correction of Tehsil/ Pargana/Village Names.
- Flagging of Chakbandi/ Survey/ Revenue Villages (merging of parts of Revenue Village into a single Revenue Village).

The pre-implementation preparation has been completed with the collaboration and cooperation of Revenue Officials and all the villages have been mapped precisely which was the most herculean task for conversion of distributed architecture of Bhulekh to Integrated Cloud based architecture.

Implementation Strategy

To bring a tehsil in cloud based integrated Bhulekh Model, following steps are initiated:

- The data conversion and new table structure created in PostgreSQL Database is prepared by executing an ISFOC to Unicode Conversion Script which makes the data compatible and ready to start actual conversion. Successful execution of the script creates up_lrc and u_lrc named new databases. This is done in view of changed technology and fonts used in distributed model ie VB6 and ISFOC respectively.
- The ISFOC to Unicode Conversion process begins with providing local SQL server credential to the upbhulekh web portal and 16 steps are run to complete the conversion process successfully.
- Converted Unicode Datasets of up_lrc database are now uploaded to Centralize SQL server using Export/Import option of SQL server.

- Data uploaded on centralize SQL Server is now uploaded to PostgreSQL (PG) Server on Cloud though 07 steps provided by upbhulekh portal. Before uploading data on PostgreSQL Database, the logic associated with these steps make the data compatible to the PostgreSQL server for successful migration to the PG Cloud Server.
- Uploading status/ reports of local server, Centralize SQL server and PG Cloud are verified once to ensure logically desired outputs. From now onward everything is available on the internet for a particular tehsil.

Technical Aspects

- Frontend Technology- Struts 2
- Backend Technology- PostgreSQL 9.5
- Server End Scripting Language- AJAX Client End Scripting Language- HTML/ JSP
- Deployed on Meghraj Cloud
- Recommended Browser- Mozilla Firefox
- Web Server- Apache Tomcat
- Web Address- http://upbhulekh.gov.in/

IV. Salient features of cloud based bhulekh over old system

- Quick Response (QR) Code printed on ROR contains the complete information about the Record of Rights (ROR), it makes ROR more secure and tamper-proof. QR code may be read by mobiles to verify the legitimacy of RORs.
- Mobile solution for obtaining ROR is an innovative feature added as a part of m Governance.
- All RORs are digitally signed [15], now inked signature not required on RORs. The order and remark is buffered and not reflected in ROR until they are digitally signed. No change is permitted in RORs without a digitally signed order.
- Updated RORs are availabe in public domain immediately. Therefore, Real Time Distribution of Record of Rights to Public through Net Banking, Tehsil Centers, Jan Suvidha Kendra and Lokvani Kendra now available.
- Locking of Chakbandi and Survey Grams is done which was a source of corruption earlier.
- Old Fasli khatoun is are preserved in pdf format and also stored in database in encrypted format.
- Beta version of Bhu-Naksha is also integrated, which would facilitate to locate the particular land parcel geographically. Barabanki is the first pilot district of the state. It is being replicated in all other districts.
- Computer IP/MAC and User detail is logged to trace out the ROR generation source.
- Data Synchronization with PG Cloud is immediate without any delay.
- No server maintenance, data uploading and backups are required from tehsils/ districts being facilitated by MeghRaj cloud.
- The system satisfies the QoS parameters like Scalability, Reliability, Availability, Security, Throughput and Interoperability etc. which make it a sustained, secured and trustworthy model.
- Census 2011 Village coding pattern is followed to achieve the standardization of codes.
- Online Bhulekh Software is completely developed in Open Source Technology. Therefore, no cost is involved in purchasing software packages and its licences thus saving public exchequer.
- This project created an environment in which a citizen can get ROR with total transparency, in real time, without any extra bucks, without approaching tehsil offices and officials can work with lesser load because earlier the tehsil was full of applicants.

V. Features in pipeline

- Integration with Registry office has been successfully tested and it would help to provide the registry of land by verifying ROR from Bhulekh data and automatically a copy would be sent to Revenue Court Computerization Management System (RCCMS). Then, revenue officials may issue a notice to receive objections. If there is no objection is received within 30 days then mutation order would be automatically issued using web service and new ROR may be generated by bhulekh and corresponding R-06 entry would be generated with Buyer, Seller and Land Detail else case may be registered in Revenue Court. The registry status of this particular land would be updated against the ROR. The Technology is tested and verified, and the government order is to be issued for this integration.
- Form RC-09 Module is being designed so that the legal heir cases having no disputes may be entered through CSC/Lokwani etc. The same would be verified by Lekhpal and Registrar Kanoongo and orders are issued automatically to transfer succession rights to legal heir.
- Seeding of Mobile and Aadhar numbers and Bank Account number of Land Owners so that subsidies and compensations may be transferred directly to beneficiaries, if granted. Aadhar number is required for Land Registration. It would facilitate to track all the previous transactions. The Black Money investment in property may be bridled and captured.
- Linking of Land Owners with Bank account number so the Government may transfer monetary aid for Fasal Beema and Krishak Beema.
- SMS broadcasting to land owners as well as other concerned regarding weather conditions and other farmers advisories.
- Integration of Banks with Dynamic Portal of UP Bhulekh for generating Charge/ Discharge Certificates to Land Owners in real time reducing fraudulent cases.
- Farmer Registration module would be available to integrate with Agriculture Department so that subsidies for farm equipment's like Tractor, Trolley and Harrow may be transferred directly to beneficiaries' accounts.

VI. CONCLUSION

Digital India Land Record Modernization program is aimed to transform the Land Record System throughout the country. To achieve this, Cloud based Integrated Bhulekh System of Uttar Pradesh is innovative model of Cloud Technology with Process engineered model of Land Records to disseminate and consolidate the relevant information regarding Land, the biggest cause of disputes resulting court cases. The Bhulekh System integration with CSCs also ensures the low level service delivery with transparency, and integration with Registry Department, Bank, Bhu-Naksha and UIDAI, digitally empowers the society. Availability of RORs on mobile is another evolution in khatouni system in the form of m-Governance.

Using this model the corrupt practices and harassment of citizens are minimized due to the automation of entire process flow and integration with other systems. Thus, the cloud based Bhulekh also makes an effective and efficient delivery of associated services like Registry, Subsidy, Loan, Financial Aid, Fasal Beema, Kisan Beema services etc. Now, all the stakeholders appreciate Cloud Based Integrated Bhulekh Software as an evolutionary model of transformation through e-Governance and m-Governance for socio-economic development, enhanced transparency and efficiency, and effective delivery of various deliverables at citizens' doorstep in a jiffy. Thus, it is inferred that MeghRaj based integrated Bhulekh has transformed the working of Revenue Administration and digitally empowered the society.

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