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Wimax Broad Band Connectivity Role In Case Of Transforming India in To Digital India

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ABSTRACT:
Government of India and public sector organizations around the country are facing to reform their public administration organizations and deliver more efficient , transparent and cost effective services, as well as better information and knowledge to their stakeholders using BSNL WiMAX broad band connectivity . E-governance is the effective use of Information and communication Technology (ICT) to improve the system of governance that is in place, and thus provide better services to the Citizens. E-Governance (EG) is considered as a high priority agenda in India, as it is taken into the consideration that each citizen should utilize the E services in number of sectors to transform India in to digital India In this paper we discuss about the WiMAX technology, media for rural development, present scenario in case of E.Governance in India. Problem in case of delivery of different E services to remote rural India and conclude with comment to transform India into digital India.

KEYWORDS: *digital India, E Governance, ICT, mobile communication, WiMAX, Wireless broad band connectivity, wireless communication*

I. INTRODUCTION ABOUT INDIA [2]:

According to censes 2011 ,India has population 1,210,569,573 with Literacy 72.99% . Out of that rural population about 72 .18 % and urban population about 27.82%. which Spread across 28 states and 7 union territories which is shown in **Fig 1 (a),** 640 districts, 5,767 tehsils, 7,933 towns and more than 600,000 villages .Table 1 shows the number of E transactions per 1000 population in India for the period from 1st Aug 2012 to 1st Aug 2013

Table 1 E. transactions from Year 1st Aug 2012- 1st Aug 13 [1]

Population	No of E transactions	No of E transactions per 1000 populations
1,17,49,99,444	1,28,24,39,054	43648.6

1.1 EG Infrastructure in India: EG India[3][4][5] is a group dedicated to promoting true EG in India, consisting of members from all walks of life from within INDIA and the World over. Many State Ministers and senior bureaucrats of India are members of this group and they have lawyers, social activists, freelance writers and journalists in the group. The focus of this group is true e-governance and use of open source technology in e-governance. To provide opportunities, information and easy access of the rural development Schemes to all citizens in rural India, several efforts at various levels(National, State, District , Block and Panchayat level) have been taken in the Ministry of Rural Development by way of strengthening the ICT infrastructure. The Ministry has its Internet portal (www.rural.nic.in) for public which is a single web access point for around 150 websites of rural domain. The portal provides details of all programmes of the Ministry, their physical / financial performance, guidelines and release of funds from Ministry of Rural Development. The portal also contains details of other activities of the Ministry viz. Socio Economic and Caste Census, Vigilance and Monitoring Committees, National Level Monitors etc. National Population Register [6] is one of the most useful data center. It is being prepared at the local (Village/sub-Town), sub-District, District, State and National level under provisions of the Citizenship Act 1955 and the Citizenship (Registration of Citizens and issue of National Identity Cards) Rules, 2003. It is mandatory for every usual resident of India to register in the NPR. The objective of the NPR is to create a comprehensive identity database of every usual resident in the country.

The **Fig 1(b)** shows environment of GI Cloud (MeghRaj) [7] consisting of cloud computing at the national and state levels termed as 'National Clouds' and 'State Clouds' respectively. The willing state clouds built on state data centres can also associate themselves with the GI Cloud and publish their services in the GI Cloud Services Directory. Services provided by National Clouds would include infrastructure (compute, storage and network), platform, backup and recovery, infrastructure scaling of the State Clouds, application development, migration and hosting etc. Over a period of time, other clouds at the national level could also provide remote infrastructure management for the State Clouds. This will become one of the most digital storage area for India.

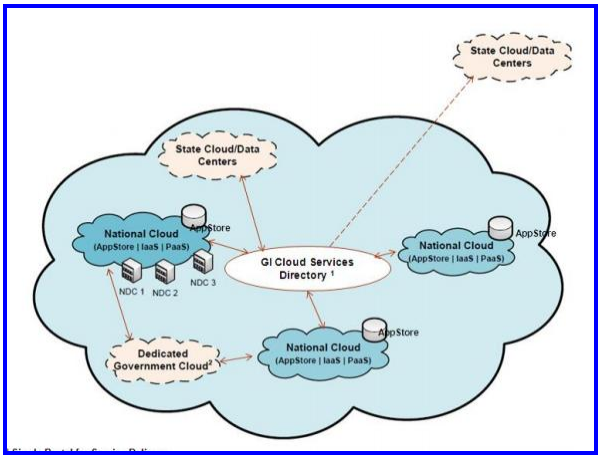


Fig 1 (a) State and union territories in map [19] Fig1 (b) GI Cloud Environment [7]

1.1.1 National e- Govennance plan (NeGP) [7][8]:NeGP takes a holistic view of e-Governance initiatives across the country, integrating them into a collective vision, a shared cause. Around this idea, a massive countrywide infrastructure reaching down to the remotest of villages is evolving, and large scale digitization of records is taking place to enable easy, reliable access over the internet. In order to promote e-Governance in a holistic manner, various policy initiatives and projects have been undertaken to develop core and support infrastructure.

The major core infrastructure components are

1. State Data Centres (SDCs),
2. State Wide Area Networks (S.W.A.N),
3. Common Services Centres (CSCs)
4. National e-Governance Service Delivery Gateway (NSDG),
5. State e-Governance Service Delivery Gateway (SSDG),
6. Mobile e-Governance Service Delivery Gateway (MSDG).

1 State Data Centre (SDC) :It has been identified as one of the important element of the core infrastructure for supporting e-Governance initiatives of National eGovernance Plan (NeGP).

Under NeGP, it is proposed to create State Data Centres for the States to consolidate services, applications and infrastructure to provide efficient electronic delivery of G2G, G2C and G2B services. These services can be rendered by the States through common delivery platform seamlessly supported by core Connectivity. 19 SDCs have been declared Operational Tamil Nadu, Puducherry, West Bengal, Andhra Pradesh, Meghalaya, Karnataka, Manipur, Orissa, Sikkim, Haryana, Kerala, Maharashtra Gujarat, Tripura, Rajasthan, Nagaland, Uttar Pradesh, Andaman & Nicobar Islands, and Madhya Pradesh other are in implementation stage . SDCs would provide better operation & management control and minimize overall cost of Data Management, IT Resource Management, Deployment and other costs. This project is in implementation stage and not reached in Remote rural area . The SDC architecture is shown in **Fig 2** which provide efficient G2C, G2G and G2B services.

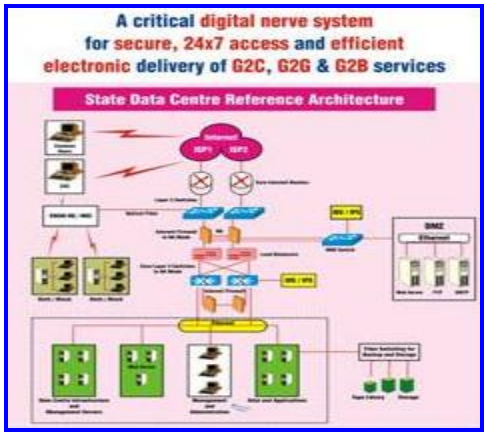


Fig2 SDC Architecture [8]

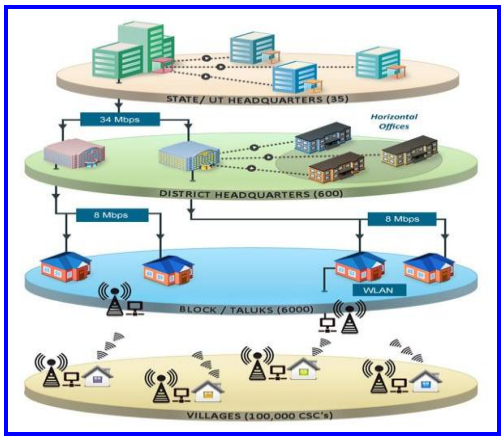


Fig 3 SWAN Model [8]

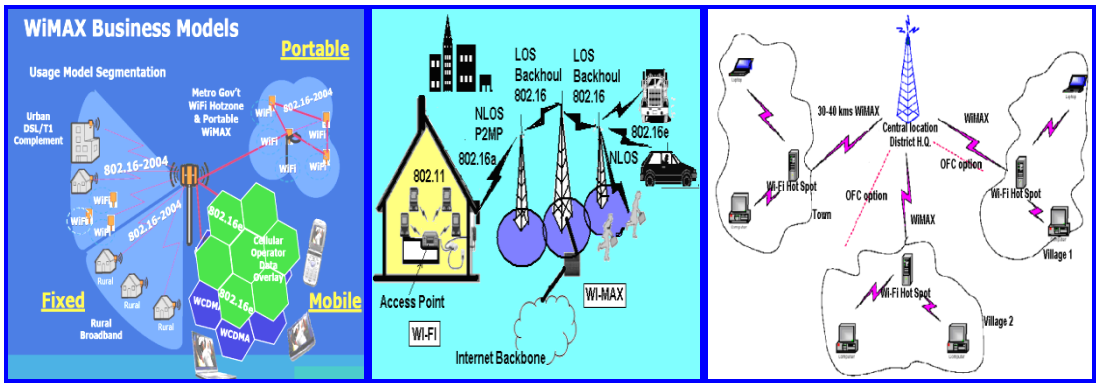
2 **State Wide Area Networks (SWANs):** The SWAN model shown in **Fig 3** .The Government has approved the Scheme for establishing State Wide Area Networks (SWANs) across the country, in March, 2005 and it is in implementation process in 31 states . SWANs connect all State/UT Headquarters up to the Block level via District/ sub-Divisional Headquarters, in a vertical hierarchical structure with a minimum bandwidth capacity of 2 Mbps per link. Each of the State / UT can enhance the bandwidth up to 34 Mbps between SHQ and DHQ and upto 8 Mbps between DHQ and BHQ depending upon the utilization. Steps have been initiated to integrate all SWANs using the National Knowledge Network (NKN).
Four States namely Gujrat, Tamilnadu, Karnataka and Andhra Pradesh have been integrated using NKN.SWAN is envisaged as the converged backbone network for data, voice and video communications throughout a State/UT with the following salient features:
• One PoP at each State / District / Block Headquarter
• Each PoP has Configurable Aggregation Equipment to enable vertical & horizontal connectivity

3 Common service center (CSC): The Government has approved CSC Scheme for establishing more than 1 lakh CSCs, in the rural areas of country . The CSCs would provide high quality and cost-effective video, voice and data content and services, in the areas of e-governance, education, health, telemedicine, entertainment as well as other private services. A highlight of the CSCs is that it will offer web-enabled e-governance services in rural areas, including application forms, certificates, and utility payments such as electricity, telephone and water bills. In addition to the universe of G2C services
4 Mobile e-governance Service Delivery Gateway(MSDG): The MSDG delivers Government services over mobile devices using mobile applications installed on the user's mobile handsets. MSDG provides different set of mobile based services to the backend departments and citizen.

5 The National e-Governance Service Delivery Gateway (NSDG) and State e-Governance Service Delivery Gateway (SSDG) : These are an attempt to reduce such point to point connections between departments and provide a standardized interfacing, messaging and routing switch through which various players such as departments, front-end service access providers and back-end service providers can make their applications and data inter-operable. NSDG and SSDG aims to achieve a high order of interoperability among autonomous and heterogeneous entities of the Government (in the Centre, States or Local bodies), based on a framework of e-Governance Standards.

II. WIAMX BROAD BAND CONNECTIVITY ROLE:

State Wide Area Networks (SWANs) works on WiMAX broad band connectivity which is provided by BSNL . According to overall survey on the Internet, in India, Alcatel is doing R & D for WiMAX . Since year 2009 BSNL is planning to connect 1,000 WiMAX BTS in 1,000 remote blocks to provide connectivity to SWAN[9] . And are also in the process to procure 7,000 more WiMAX BTS to provide connectivity to the government initiated Common Service Centre (CSC) across India. And had plan to complete all WiMAX installations in India . WiMAX is best solution for rural area because WiMAX base stations has coverage range of 50 kilometers. In most of rural area people does not have motor transport so mobility is not big issue in rural area .In rural areas ,the application which is major importance is voice .The Fig 4(a) shows the scenario of WiMAX business model and Fig 4(b) shows the links and corresponding applicable protocols and Fig 4(c) shows the WiMAX rural area application



(a) (b) (c)

Fig.4 (a) WiMAX Business Model, (b) links and corresponding applicable IEEE Protocol, (c) WiMAX rural area application

2.1 Reasons for Selecting WiMAX [10][11][12]:

WiMAX IEEE 802.16e exhibits the latest OFDM based system with all multiuser considerations. WiMAX IEEE 802.16e MIMO-OFDM based physical link- air interface is introduced to combat the channel problems by using space diversity. The introduction is in order to support mobile wireless broadband access in fast vehicular mobility condition may be up to 120 km/hr which is the latest requirement of time. Mobility of receivers and those especially related to vehicular mobility with considerable speed requires much attention because of Doppler effect and still the research work is going on in this direction**.**

III. E SERVICE ISSUES IN INDIA

Countries like India most of the people are living in rural area to cultivate their agricultural land because India has major potential of agriculture land But because of unstable weather continued from many years the farming business under threat . due that rural poverty , leaving standard , rural economic status , rural development and management is under challenge There is only one way which is to provide E services in agriculture sector, education , health , On line help portals, Disaster management , etc to bring change in rural scenario. Already most of the urban area of India has become digitalized .Most of the states and their districts are utilizing E services through number of E governance project which are designed and maintained by national information center of India but only problem is in rural area . The infrastructures are not up to the mark. Maintenance problem , venders are not willing to reach at remote rural area Under such condition it becomes very difficult to provide E services to rural people.

Table 2 Differences in 'typical' rural, peri-urban and urban areas based on characteristics [13] :

1 LIVELIHOOD

Rural	Peri-urban	Urban
Engaged in mixed livelihoods activities often based primarily on agriculture but increasingly combined with non farm activities. Limited opportunities for earning cash income.	Usually very mixed, including agriculture, small industry and work on large industrial developments. Agriculture may be profitable serving urban consumers but land availability may be threatened by urban expansion and rising prices	Mainly based on activities in urbanlabour markets (formal and informal) including making and selling goods and services.

2 CHANGING DEPENDENCE ON NATURAL RESOURCES AND CASH

Rural	Peri-urban	Urban
High dependence on access to common property resources, including water, land, forests and others.	Increasing access to cash incomes, but access to 'free' common property resources is often reduced.	Highly dependent on cash to pay for essential items such as food, rent, school, energy, transport, water, and sanitation

3 LOCATION AND HOUSING

Rural	Peri-urban	Urban
Isolation, due to distance from urban centres, poor quality or no roads, and weak physical infrastructure. Accessto housing is rarely a problem.	Rapid growth of new informal settlements, which emerge because the poor cannot afford to buy land,gain secure tenure, or pay foradequate housing.	Limited access to adequate and affordable housing. Huge numbers live in slums with insecure tenure

4 ACCESS TO SERVICES

Rural	Peri-urban	Urban
Limited access to services, including healthcare and education mainly due to distance.	Limited access to basic services despite increasing environmental health risks as population density increases, industrial activities expand without regulation, and adequate infrastructure is not provided.	Limited or no access to services to mitigate the effects of disease, environmental hazards, and violence. This is due to cost and lack of delivery to poor areas.

5 GOVERNMENT

Rural	Peri-urban	Urban
Limited government presence.	Administrative boundaries and the division of responsibilities between rural and urban authorities are often unclear	Vulnerable to the misapplication of bureaucratic rules, for example mass evictions and harassment of street vendors.

3.1 Challenges in case of E services [14][15][16][18] :

1 Poverty: Internet access is too expensive for the poor in India. Installing the necessary telephone lines or wireless broad band connectivity needed for internet or email access is equally unaffordable in most poor countries. In India, each telephone connection may cost as much as Rs30,000 in urban areas and Rs70,000–80,000 in villages, which is unaffordable by most low income families. It is also very expensive to gain internet access in India. it may cost about Rs25 per hour in cities and Rs30 per hour in rural areas which is expensive in comparison of their income

2 Technical illiteracy: There is general lack of technical literacy as well as literacy in countries like India, the correlation between education level and use of ICT or Internet and other modern digital technology

3 Language Dominance: The dominance of English on the internet constrains the access of non-English-speaking population. It is found that of all the web pages in the world, about 84 percent are in In the case of India, 95 percent of the population does not speak English . Due to such overwhelming dominance of English over these communication channels, computers and the internet are quite useless in Indian villages, and the use of local or regional languages does little to alleviate the problem

4 Unawareness: There is general lack of awareness regarding benefits of e-governance as well as the process involved in implementing successful G-C, G-G and G-B projects. The administrative structure is not geared for maintaining, storing and retrieving the governance information electronically at rural level .

5 Lack of Participations of Society, Public and Private sectors*:* Designing of any application requires a very close interaction between the govt. department and the agency developing the solutions. At present the users in govt. departments in rural area do not contribute enough to design and development of E governance projects . Unsatisfied response from government department, rural community is in fear to participates .

6 Inequality: Inequality in gaining access to public sector services between various sections of citizens, especially between urban and rural communities, between the educated and illiterate, and between the rich and poor.

7 Infrastructure: Lack of necessary infrastructure like electricity, internet, ICT infrastructure and ways of communications affect the speed which delays the implementation. Less number common service centre (CSC) are working in India which are not sufficient for rural and urban area

8 Lack of correct understanding of capacity building requirements: There is hardly any support to departments and implementing agencies for Project Preparation and Planning. This activity starts with sanction of money for the project, which is done on the basis of a skimpy Project Document (Expenditure and Finance Committee Memo)which hardly talks about governance issues, services and services levels, expected outcomes for the project

9 Lack of information on the Human resource requirements to support the central and state e-Governance mission: Many projects fail because the project team and its key stakeholders do not have a common view, with shared measures of success, of what the project is trying to do. A strong business case, driven by a clear set of benefits owned be the key stakeholders, should be an essential pre-condition of any public sector ICT investment. Unfortunately this is not always the case, and too many projects are driven by "what the technology can do", not "what the organization needs

10 Lack of proper policy to fill the gap through sourcing from private sector: Most ICT enabled change projects in the public sector involve complex sets of stakeholders , users, suppliers, delivery partners elsewhere in the public, private and voluntary sector, politician and the media. Failure to manage this complexity significantly increases risk of failure, and yet stakeholder management is typically an activity which gets squeezed when project timescales or budgets get tight

11 Lack of power and Daily load shedding about 4 hr: The Shortage of power is major problem in rural area due to this the E governance project has some limitation and speed of work becomes slow in rural area

12 Computer equipment problem: Computer equipment problem is due to power failure Due to this failure the breakdown in continuous process of uploading the files , data, and other services **.** There is risk to crash the back up at server level

a. Battery back up less than 4 hrs.
b. Computer restarts on power failure despite UPS.
c. Mother Board failure (Inside warranty period).
d. Mouse, Key board, webcam failure (Inside warranty period)

(Number of kiosks reporting the problem: 6 status many days to respond from vendor**)**

13 Internet connectivity breaks down rate is high : The wireless broad band is not available in remote rural area . The BSNL is providing major role to provide interment connectivity in rural area . But internet connectivity breaks down many time**.** Due this it becomes difficult to complete the task**.**

14 Government has limitation to support to private sector: Due the Government policy and laws the government has limitation to support to private sectors in such type of project

15 Kiosk Operator's dissatisfaction with n-Logue/ Computer Vendor on account of high response times for kiosk equipment maintenance: Due to the wide gap between the government , operators, citizens and lack of resources related to maintenance, the response from operators/vendor is very poor in rural area

16No networking and coordination of all stake holders in rural area : The NGOs are actively working in rural and urban area but resources are not enough at NGO due to that no direct interface with rural area and also many private sectors are involved in EG sectors but still not enough support.

IV . INFORMATION ENABLING TECHNOLOGIES[17]:

In many cases it is not the technology which is important, but how the technology is being used for positive and pragmatic applications. There are also cases where the bad applications of good technology have lead to more problems than solutions. The technologies that are to be harnessed (of course after printing) and strengthened, especially in connection with the dissemination of information, for Rural Development include:

Radio: Apart from programmes meant for agriculture and news, there should be more programmes on rural welfare, health, rural vocation, option for government funding and subsidies, motivating case studies, on how other villages created better infrastructure and houses using local materials and voluntary labor, question-answer sessions with government officials, Rural Development experts, NGOs on specific problems of rural people, information about what sort of help is available where on specific tasks, etc.

Television and Cable: Visual media is stronger than radio as images speak more loudly than words. The present fair of advertisement and emotional entertainment needs to be pruned to find space for viewer friendly programmes.

Computer and Information Technology: Electronic information, of interest to rural people locally created as well as purchased from publishers and providers, may be disseminated through the application of computer, communication and information technologies. Some of the major tools and techniques for disseminating information in the computerized environment

include websites, e- mail, list servers, chat forums, social networking sites etc., as they provide wide variety of potions to store, display, interact and communicate information of interest to single or multiple users.

Mobile Phones: Information at your fingertips is slowly being replaced from the desk to your hand with major improvements in mobile technology and the arrival of economical products and solutions from wide variety of providers. Seeing the penetration of this technology than other technologies such as TV and PC, it appears that we have to base on accessing information through mobile technologies rather than through the desktop PC to take the benefits of information in electronic form to a large mass of population. Video call , chat on , what's app could play major roll to exchange the knowledge and motivate the community to use e services . This becomes especially significant for rural areas with no electricity and land lines where mobile technology through wireless mode enable us to reach those not reached otherwise

V. CONCLUSIONS:

Make all Government services accessible to the common man in his locality, through common service delivery outlets, and ensure efficiency, transparency, and reliability of such services at affordable costs to realize the basic needs of the common man.

The ultimate objective is to bring public services closer home to citizens, as articulated in the Vision Statement of NeGP. Need to increase the more number of CSC with high speed broad band connectivity to increase the efficiency of work with low cost Whereas mobile WiMAX has evolved from a broadband data-centric vision, other mobile cellular technologies have evolved from an initial focus on voice services. Although the initial drivers differ, there is a growing convergence as WiMAX technology pushes for greater mobility and terminal portability and mobile operators push for more value-added services requiring higher data rates. As this trend continues there will be less and less to distinguish between these two technologies which arise from two fundamentally different backgrounds. Could provide Better connectivity for EG project in India

Data centers are required for different sectors to do analysis , research to provide proper service to proper communities to improve overall rural scenario .The data center in case of Pet Animal population , agricultural land ,industrial land , forest land , annual crop production , water resources and management , electricity usage, Health service etc are suggested .which helps to transform India in digital from .

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