E-Governance and its Implementation in India

Vivek Mishra

Asst. Professor, Madhav Law College, Gwalior.

ABSTRACT

Online working of a government or providing its services online to its citizens at their door step is known as E-Governance. E-Governance is E-Commerce technology means online availability of government services. The technology and the methods used in E-Governance project provide a roadmap for efficient delivery of services at the door step. In today's time the development of any country depends on the uses of E-Governance and also their penetration. Development of any country can be judge by the scope of E-Governance in that country. Moreover, today's government has also full faith in E-Governance and its widespread network across the world proves it. Due to widespread demand of E-governance and exponentially increasing size of data, new technologies like Open source solutions and cloud computing are being incorporated. In this paper, we have presented an exhaustive list of E-Governance projects, technological infrastructure and have concluded that E-Governance has made the working of government more efficient and more transparent to its citizens.

E-Governance

Electronic Governance means government providing services electronically to its citizens. With the advent and ubiquitous availability of internet, online availability of government services can also be a form of E-Governance. The use of Information and Communication Technology in E-Governance facilitates efficient delivery of services at the door step. Government of India has effectively incorporated ICT in its ambitious and flagship projects like Digital India, Aadhar, Skill India and many other programs. This paper discusses various E-Governance initiatives by Indian government, Information Communication Technology platforms, models, limitations and challenges.

Such use of ICTs by government agencies for any or all of the following reasons:

• Information Exchange with public, corporates or other government entities

• Swifter efficient public services delivery

• Efficiency improvement or refining quality of services

• Reducing costs / increasing revenue

• Re-structuring administrative processes

As per World Bank, *e-Governance refers to the use by government agencies of Information Technologies (such as Wide Area Networks, the Internet and mobile computing) that have the ability to transform relations with citizens, businesses, and various arms of government resulting in better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management.*

e-Governance services can be broadly categorized into three categories

• Information sharing
• Improving processing efficiency
• Enabling transactions.

Out of the above, information sharing is the simplest but the degree of complexities significantly increases as we move from

information to transactions. It is the second and the third category of services that provide maximum convenience to the citizens. The challenge is to cover such services.

Six Pillars for e-Government

There are six pillars for connected government:

1) Citizen Centricity: This is the central pillar of e-Government i.e. putting the citizen at the heart of public services. Governments need to focus on three things to reach this goal:

    a. Develop the capacity to act as a single enterprise so citizens feel they are being served by one Organisation.

    b. Organize themselves around citizens' demands and expectations.

    c. Develop flexible organizational structures

2) Standardized Common Infrastructures: Reaching full integration through the creation of information and communication technology (ICT) networks requires standardization. Given the complexity of government structures and processes, which have evolved with different, poorly coordinated legacy systems, few governments can afford to take the steps taken by the private sector towards a consistent standardization of ICT. Most national e-government strategies concentrate on achieving inter-operability between systems, processes, software and networks

3) Back-Office Reorganization: Closely connected to this pillar is the reorganization of the back-office such as

automating many routine administrative processes, freeing staff to focus more on the delivery of services. A study of the European public sector, Net Impact 2004, shows that governments achieve significant cost reduction only when they reorganize their back-office processes before bringing services online

4) Governance: Earlier, power and responsibility for steering a strategy for national e-government was shared by certain ministries or agencies. This often resulted in lack of co-ordination and inter-operable systems, and a duplication of solutions. Now governments have realized that they need appropriate governance on a national level and they are taking steps to address this like the appointment of chief information officers similar to their role in the business world.

5) New Organizational Models: This is about creating networked virtual organizations, i.e. joining multiple organizations to achieve results that a single organization could not achieve alone. This also involves breaking down traditional/ functional structures and working flexibly and innovatively across boundaries to deliver better value to the citizen

6) Social Inclusion: All governments admit that broadband access enables the gap between the digital haves and have-nots to shrink. To this end, all e-government strategies address the issue of digital divide and try to establish social inclusion. In South Korea, the Information Network Village project helps people in remote areas benefit from free PCs and broadband, allowing access

to rich media content, on topics including education and agricultural skills

From Government to E-Government

The United Nations Online Network in Public Administration and Finance (UNPAN) [33] outlines five stages of E-government development:

1) Emerging web presence – static online information about public services, contact persons, working hours, contact details, frequently asked questions, etc.

2) Enhanced web presence – access to updated information, links to various connected organizations, availability of newsletters, posting of comments, etc.

3) Interactive web presence – downloading of forms, submission of online applications, secured access for searching database, etc.

4) Transactional web presence – secured two-way transaction, use of authentic digital signatures, one-stop portals at local/regional level for tax payment, obtaining birth/death certificates, etc.

5) Seamless or Fully integrated web presence – universal portals connected to each and every department of government nationally/globally, etc.

Stages of e-Governance

- Computerization: with the availability of personal computers, a large number of Government offices get equipped with computers.

- Networking: In this phase, units of government organizations gradually connect with a hub and start sharing of information and data between different government entities.

- On-line presence: With the advent and proliferation of internet, it's imperative to maintain a presence on the web. This resulted in government departments and entities start maintaining websites.

- On-line interactivity: On-line presence paves the way for opening up of communication channels between government entities and the citizens, civil society organizations etc.

Types of Interactions in e-Governance

- G2G (Government to Government) : It involves the use of ICT to increase the flow of information and services within and between different entities apart from restructuring the governmental processes involved in the functioning of government entities.

- G2C (Government to Citizens) – In this case, there is a creation of interface between government and citizens enabling the citizens to benefit from efficient delivery of a large range of public services.

- G2B (Government to Business) – This type of interaction involves usage of e-Governance tools to aid the business community and providers of goods and services to interact seamlessly with the government.

- G2E (Government to Employees) – This category of interaction is between Government and its employees for various needs. Government remains the largest employer and like any

organization, needs to interact with its employees on a regular basis.

Benefits of e-Governance

- Improved access to information and quality services for citizens:
    - o timely and reliable information on various aspects of governance.
    - o information would be made available with respect to simple aspects of governance such as forms, laws, rules, procedures etc later extending to detailed information including reports (including performance reports), public database, decision making processes

- Simplicity, efficiency and accountability in the government:
    - o simplification of complicated processes, weeding out of redundant processes, simplification in structures and changes in statutes and regulations.
    - o simplification of the functioning of government, enhanced decision making abilities and increased efficiency across government – all contributing to an overall environment of a more accountable government machinery.
    - o enhanced productivity and efficiency in all sectors.

- Expanded reach of governance:
    - o bringing government machinery to the doorsteps of the citizens.

- o enable better participation of citizens in the process of governance.

Barriers of E-Government

While transforming conventional service-delivery government into digital (e-government), potential barriers faced are grouped under five dimensions:

1) Organizational: Organizational culture plays an important role in successful transition to e-Governance. Personnel at different levels and in different departments may resist change or adapt new technology slowly after great deliberation. E-Governance deployment should include organizational development to accommodate internal cultural changes.

2) Digital Divide: The term digital divide refers to the gap between those who have access to the Internet and those who do not. In the case of the digital divide, not all citizens currently have equal access to computers and Internet, whether due to a lack of financial resources, necessary skills, or other reasons and those who do not have access to the Internet will be unable to benefit from online services. In fact, some level of computer literacy is required for people to be able to take advantage of e-government applications. Government should train its employees and citizens in basic skills of dealing with the computer and Internet in order to let them participate in e-government development applications.

3) Policy and Regulatory Issues: To ensure privacy, security and legal recognition of

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electronic interactions and electronic signatures, legal reforms and a policy framework is essential having a holistic view, one that is not just focused on technology.

4) Security & Integrity of information: Security can be categorized into two parts: network security and documents/ information security. Network security should include maintenance and e infrastructure protection in the form of firewalls and limits on those who have access to data. Governmental organizations, being responsible for the collection, maintenance, and distribution of sensitive or confidential and personal information, should develop and deploy methods of providing security for collected information as well as for their web sites. Thus, a body of security professionals should be setup to respond to threats and breaches.

5) Technological: The implementation of e-government initiatives confront some technological challenges like lack of shared standards and compatible infrastructure among departments and agencies. ICT infrastructure is identified as one of the main challenges for e-government. Seamless sharing of information require internetworking and opening up new channels for communication and delivery of new services. An architecture providing a uniform guiding set of principles, models and standards is mandatory for a smooth transition to electronic government. Development of an effective

telecommunication infrastructure is essential to deliver e government services.

M-Governance

M-Governance, is the availability and usage of e-Governance applications on **M**obile wirelessly "anytime, anywhere". It is not a replacement for e-Governance, rather it complements e-Governance. It has potential of using mobile phones as input devices in certain areas where last mile connectivity becomes issues for simple data inputs of critical importance for decision making in government departments.

Recent thrust to m-governance is being provided through USSD Services. Unstructured Supplementary Services Data (USSD) is a session based service unlike sms which is store and forward service. It can be used by the user to send command to an application in text format. USSD acts as a trigger for the application[1]

Benefit of m-Governance

- Cost Saving
- Proficiency
- Transformation/modernization of public sector organizations
- Added convenience and flexibility
- Better services to the citizens
- Access
- Adoption
- Easy interaction

E-Governance in India

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[1] Government Schemes, Missions, Campaigns and Programmes In India By Team Prabhat Prakashan

In today's world of change and revolution the things which are not dynamic are considered as mortal. With the advent of World wide web in nineties, there has been a gradual global shift towards increased deployment of IT by governments. with the advent of the World Wide Web. Along with technology e-governance initiatives also have come a long way since then.

The importance of electronics was realized in by the Government of India in 1970 and established the Department of Electronics in 1970. Soon National Informatics centre (NIc) was established in 1977 which was the first major step towards e-Governance in India as for the first time 'information' and 'communication' was in focus. The launching of NIcNET in 1987 – the national satellite-based computer network, provided the main thrust for e-Governance in India. This was extended further by the launch of the District Information System of the National Informatics centre (DISNIc) program, targeted to computerize all district offices. By 1990 NIcNET has covered all district headquarters via the State capitals.

The first implementation of E-Governance project in India was AHSHAYA in Kerala involving setting up around 5000 multipurpose community technology centers called Akshaya e-Kendra's across Kerala. Run by private entrepreneurs, each e-Kendra set up within 2-3 kilometers of every household, will cater to the requirements of around 1000-3000 families to make available the power of networking and connectivity to common man. Akshaya is a social and economic catalyst focusing on the various facets of e-learning, e-transaction, e-governance, information and communication.

National e-Governance Plan

The National e-Governance Plan 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. The ultimate objective is to bring public services closer home to citizens, as articulated in the Vision Statement of NeGP.

"*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 realise the basic needs of the common man*"[2]

It comprises of 31 Mission Mode Projects (MMPs) and 10 components. Various MMPs are owned and spearheaded by the concerned ministries.

1. Physical Architecture
   a. Data Centers
   b. NoFN – 2Mbps network connectivity to each Panchayat.
   c. Kiosks at the front end. 1 for each 6 village cluster following honey comb structure. Kiosks to have a PC along with basic support equipment like printer, scanner and UPS.
2. G2C Services to be Offered
   a. Land records
   b. Registration of vehicles
   c. Issue of certificates
   d. Employment exchange

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[2] http://meity.gov.in/divisions/national-e-governance-plan

e. Ration cards
f. Electoral services
g. Pension schemes
h. Issue of licenses
i. Public grievance
j. Payment of bills

Mission Mode Projects

1. MCA 21: The MMP is in its post-implementation stage and is providing electronic services to the Companies for their related activities such as allocation and change of name, incorporation, online payment of registration charges, change in address of registered office, viewing of public records and other related services. It also makes public the company related data.

2. Pension: A website provides updated information on government pension rules and regulations; helps facilitating registration of grievances; enables monitoring timely sanction of pension; maintains a database of pensioners.

3. Income Tax: It offers services including facility for downloading of various forms, online submission of applications for PAN, tracking the applications, e-filing of Income Tax Returns, e-filing of TDS returns, online payment of taxes, issue of refunds.

4. Passport, Visa and Immigration: The e-services being offered under the MMP include re-issue of Passport, issue of duplicate Passport, issue of Tatkal Passport, change in name, address, ECNR/ ECR suspensions, passport status enquiry etc.

5. Central Excise: The important e-services being offered include e-filing of Import and Export documentation, electronic processing of declarations, facilities for e-filing of Central Excise and Service Tax returns, e-registration services, digital signatures, e-payment of Customs Duties.

6. Banking: It includes Electronic Central Registry and One India One Account for Public Sector Banks.

7. UID.

8. e-Office: The functioning of government offices would be computerized.

9. Insurance: The MMP is an industry initiative (by public sector insurance companies). The MMP aims at facilitating customer services, automating grievance redressal mechanism and, creating a database.

Integrated MMPs

1. e-Courts:The first phase includes building computer infrastructure in the lower courts and upgrading it at High Courts and the Supreme Court. The second phase of the MMP includes providing services like availability of copies of judgments, e-filing of cases, video conferencing of outstation witnesses, issue of notices to clients through e-mail.

2. Electronic Data Interchange/e-Trade (EDI): It aims at facilitating electronic data interchange amongst various agencies involved in the process of imports and exports. It offers services like electronic filing and clearance of EXIM documents and e-Payments of duties.

3. India Portal: It provides a single window access to information about governments at all levels, in a multilingual form.

4. e-Procurement: This MMP of the Ministry of Commerce aims at rolling-out IT-enabled procurement by government departments.

5. Road Transport: This MMP proposes to offer many e-Services like vehicle registration, driving licenses and Smart Card based registration certificates to citizens.

6. Agriculture: The MMP aims at providing information regarding farm practices, market trends, agricultural and technical know-how. It has two components i.e. AGRISNET and AGMARKNET. AGMARKNET aims at creating an information network which will capture/update information at various mandis. AGRISNET aims at back-end computerization of State Agriculture departments

7. e-District: This MMP aims at delivery of high volume, citizen-centric services through kiosks. These would primarily be services not covered by other specific MMPs. A minimum of 7 services will be delivered in every State.

Analysis of NeGP

1. The Institutional Structure
   a. It has become essential to ensure that the numerous projects being implemented by the different governments and departments are consistent with a broad policy and adhere to common standards.
   b. This requires empowered institutional arrangements to oversee the projects.

2. Role of local governments
   a. There is no role for the local governments in the implementation of the plan and not even at kiosk level.
   b. Monitoring bodies of elected local body representatives should be set up to monitor the implementation of the plan.
   c. PRIs should also spread awareness among the people about the services being offered and encourage them to utilize them.

3. Business process restructuring and capacity building issues
   a. The MMPs have the potential of creating a direct impact on citizens since they provide high volume G2C services. Unfortunately, these are the very sectors where progress in implementation is lagging.
   b. The most critical bottleneck is delay in business process restructuring and insufficient capacity building.
   c. The large scale of the transactions involved, prevalence of outdated and cumbersome procedures, inertia and resistance to change, the overhang of old and outdated records are other issues.

4. Project management issues

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a. There is lack of clear demarcation of responsibility among the project authorities

b. Most of the State level e-Governance projects are still at the conceptual stage.

c. Many of the projects have pre-maturely gone ahead with the ICT component without first prioritizing the governance reforms that are a pre-requisite. This would result in automation of the existing inefficiencies in the system.
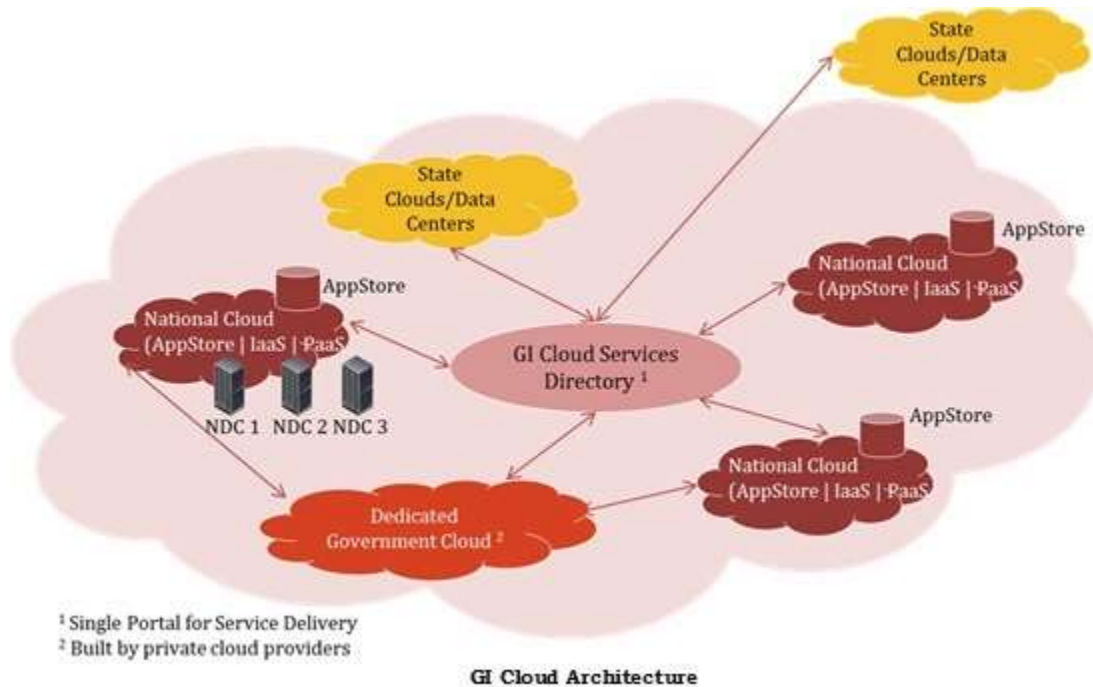
e-Governance Infrastructure

As far e-Governance infrastructure is concerned, following are its components:

1. Aadhar Digital Biometric Infrastructure
   Aadhaar is a unique digital ID provides platform for authenticating a resident anytime and anywhere with a purpose to enable residents to prove their identity and for service providers to verify the citizens in order to supply services and give access to benefits. It has two modules:
   a. Enrolment & Update Ecosystem
   b. Authentication Ecosystem

2. Digital Locker
   DigiLocker is a key initiative under Digital India intended to transform India into a digitally empowered society and knowledge economy. DigiLocker provides citizens a shareable private space on a public cloud and making all

documents and certificates available on this cloud.

3. Open Data
   Government has formulated the National Data Sharing and Accessibility Policy (NDSAP) notified in 2012, pursuing which Ministry of Electronics & Information Technology (MeitY) has set up the Open Government Data (OGD) Platform India to provide open access by proactive release of the data available with various ministries/ departments/ organizations of Government of India.

4. Government Procurement – Government e-Marketplace (GeM)
   Government created one stop Government e-Marketplace (GeM) to enable on line procurement of common use Goods & Services required by various Government entities. This will ensure transparency, enhance efficiency and increase speed in public procurement in addition of providing the tools of e-bidding and reverse e-auction along with demand aggregation to facilitate the government users to achieve the best value for the money.

5. GI Cloud (Meghraj)
   In order to utilize and harness the benefits of Cloud Computing, Government of India embarked upon an ambitious initiative – "GI Cloud" which has been coined as 'Meghraj'. The focus of this initiative is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government.[3]

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[3] http://meity.gov.in/content/gi-cloud-meghraj

GI Cloud Architecture

¹ Single Portal for Service Delivery
² Built by private cloud providers

6. Common Service Centres (CSCs)

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, the CSC Guidelines envisage a wide variety of content and services that could be offered as listed below:

a. Agriculture Services (Agriculture, Horticulture, Animal Husbandry, Fisheries etc.)

b. Education & Training Services (School, College, Vocational Education, Employment, etc.)

c. Health Services (Telemedicine, Health Check-ups, Medicines)

d. Rural Banking & Insurance Services (Micro-credit, Loans, Insurance)

e. Entertainment Services (Movies, Television)

f. Utility Services (Bill Payments, Online bookings)

g. Commercial Services (DTP, Printing, Internet Browsing, Village level BPO)[4]

7. Service Delivery Gateway
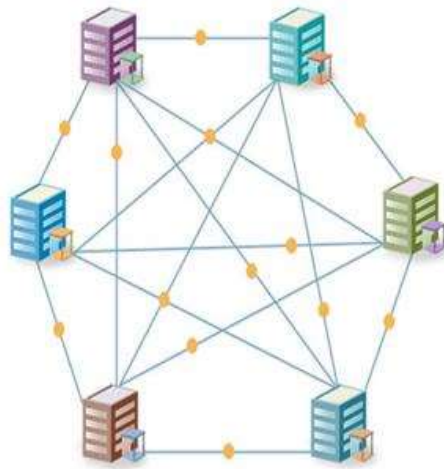
a. National e-Governance Service Delivery Gateway (NSDG)

Some of the objectives of NSDG are:

i. To act as a core infrastructure for achieving standards-based interoperability between various e-Government applications

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[4] http://meity.gov.in/content/csc-scheme

implemented at various levels and geographically dispersed locations.

ii. To evolve Gateway messaging standards and build a government owned Central Gateway based on these standards.

iii. Act as a catalyst in enabling the building of Standards based e-Governance applications with Gateway as the middleware to ensure interoperability.

iv. Enable integration across Centre, State or Local Governments there by enabling Integrated Service Delivery and a Service Oriented Architecture (SOA) leading to joined up government.

v. De-link the back-end departments/Service Providers (SP) from the front-end Service Access Providers.

vi. Ensuring separation of concerns of service access from the service implementation i.e. separates the Portal, CSC, Kiosks etc from the government services which reside in the backend departments

b. State e-Governance Service Delivery Gateway (SSDG)

SSDG is a core component in e-Governance infrastructure under the NeGP. It is an attempt to reduce 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. It acts as a standards-based messaging switch and providing seamless interoperability and exchange of data across.[5]

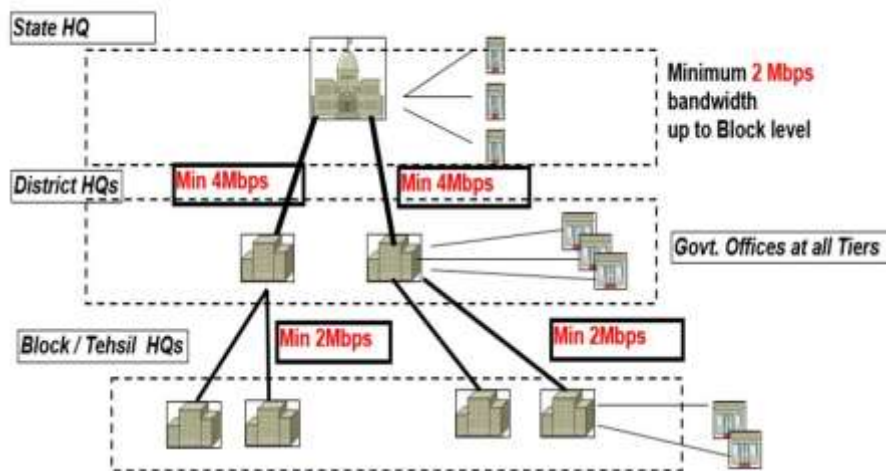c. Mobile e-governance Service Delivery Gateway (MSDG)

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. As MSDG is developed based on IIP/IIS (Interoperability Interface Protocol / Interoperability Interface Specifications) standards of government of India, it provides seamless integration with backend department through existing NSDG/SSDG eGov exchange infrastructure.

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[5] http://meity.gov.in/content/ssdg

Backend departments will be connected to MSDG for mobile based services.[6]

8. State Wise Area Network (SWAN)
    SWAN is envisaged as the converged backbone network for data, voice and video communications throughout a State/UT with the following salient features:

a. One PoP at each State / District / Block Headquarter
b. Each PoP has Configurable Aggregation Equipment to enable vertical & horizontal connectivity Gateway to NICNET (National Backbone) for Inter-State connectivity.
c. State/ NIC would receive discounted price for BSNL BW cost (MoU signed)

State HQ

Minimum 2 Mbps bandwidth up to Block level

District HQs
Min 4Mbps   Min 4Mbps

Govt. Offices at all Tiers

Block / Tehsil HQs
Min 2Mbps   Min 2Mbps

Funding support:
- Upto 34 Mbps from SHQ to DHQ
- 8 Mbps from DHQ to BHQ

Capacity :
- Upto 660 Mbps from SHQ to DHQ
- Upto 100 Mbps from DHQ to BHQ

9. eTaal
    Electronic Transaction Aggregation & Analysis Layer (eTaal) is a portal developed by Ministry of Electronics and Information Technology (MeitY) along with National Informatics Centre (NIC) which provides quick view, statistics and analysis of Transactions performed electronically through e-Governance applications. It provides real time view of the e-Governance projects helping in remedial actions or interventions wherever needed.
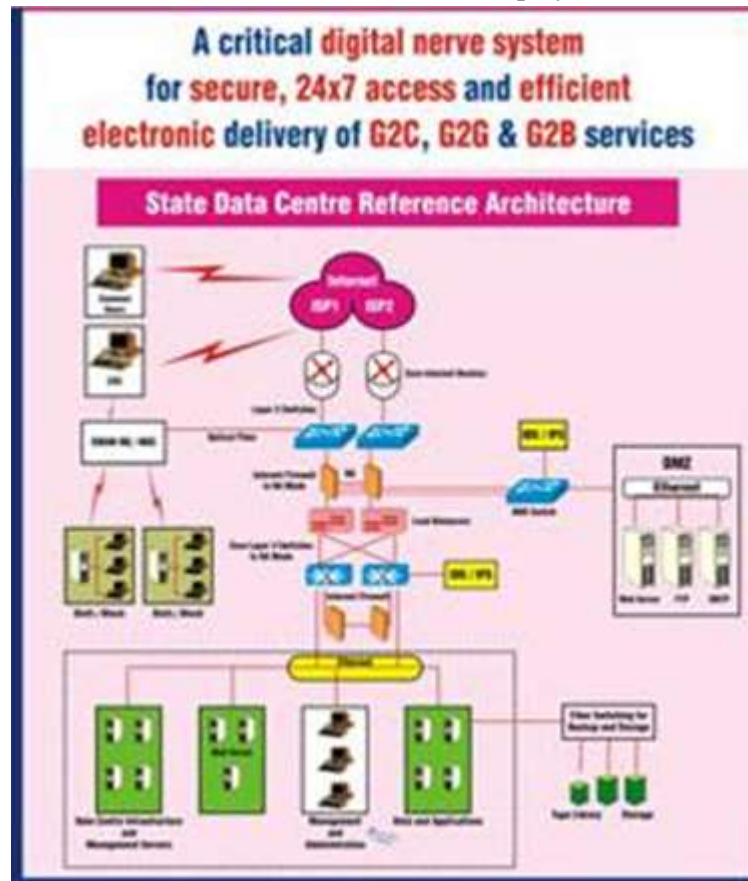
10. State Data Centre
    Under NeGP, it is proposed to create State Data Centres for the States to consolidate services, applications and infrastructure to provide efficient electronic delivery of G2G, G2C and G2B services. These services can be rendered by the States through common delivery platform seamlessly supported by core Connectivity Infrastructure such

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[6] http://meity.gov.in/content/msdg

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as State Wide Area Network (SWAN) and Common Service Centre (CSC) connectivity extended up to village level. State Data Centre would provide many functionalities and some of the key functionalities are Central Repository of the State, Secure Data Storage, Online Delivery of Services, Citizen Information/Services Portal, State Intranet Portal, Disaster Recovery, Remote Management and Service Integration etc. SDCs would also provide better operation & management control and minimize overall cost of Data Management, IT Resource Management, Deployment and other costs.

State Data Centre Reference Architecture[7]

Status of Implementation

1. Status of MMPs: Out of the 31 MMPs, 14 MMPs are delivering the full range of services while 9 have started delivering some services to the citizens.

2. e-TAAL: It is a web portal which aggregates and analyses the statistics

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[7] Available at http://meity.gov.in/content/state-data-centre

of e-governance projects including MMPs on a real time basis. It is expected to enhance the outcome focus of e-Governance programs.

3. Mobile Seva: It is a unique countrywide initiative on mobile governance to provide public services to the citizens through mobile phones. As on date, 444 departments are on it offering over 200 services. A mobile AppStore has also been launched with 153 applications.

4. NoFN: Pilot has been conducted and rollout is in progress.

5. e-Gov AppStore: It will host successful e-governance applications which can be replicated by all government departments intending to implement e-Gov initiatives, thereby saving immense time and costs.

6. e-Procurement: All departments have been directed to switch over to it.

7. Meghraj: This is the new Government of India cloud (GI Cloud) computing environment to be created at the national level. It will bring the benefits of cloud computing.

8. National e-Governance Academy: To promote research, documentation, training, this academy will be opened.

Conclusion

In this paper, we have given a framework and application of E-Governance along with a list

E-Governance projects run by state and central governments. It includes plans, projects, infrastructure framework, implementation status and analysis. E-Governance in India is much more evolved and moving towards Open Source Platforms and Cloud Computing as far as technology is concerned. There is still lot of work to be done to ensure last mile connectivity and make sure that even person on the lowest strata of the society is benefitted by the e-Governance initiatives taken by the government.