Framework of e-Initiatives for Uttarakhand

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***Abstract*—It presents an improved model based on data analysis of the research for effective implementation of e-Initiatives in Uttarakhand. The study puts a road map for e-Initiatives in Uttarakhand state describing proposed e-Initiative applications such as State Citizen Data Card (SCDC), State Data Center (SDC) etc. The study highlights the required policies, infrastructure and expected benefits of proposed system for effective implementation in the state.**

***Index Terms*—e-Governance, e-initiatives, Good-Governance, State Citizen Data Card (SCDC), State Data Center (SDC).**

I. Introduction

A. e-Initiatives for Uttarakhand

This provides an in-depth explanation of significant issues surrounding e-Initiatives development and dissemination in Uttarakhand. This section presents key conclusions drawn from the previous studies to plan and implement a new strategy for better e-Initiatives. Some of the e-Initiatives undertaken by the state are discussed below.

1) UKSWAN

Uttarakhand State Wide Area Network (UKSWAN) should be operational as a Wide area network to offer the future e-Governance services as a backbone to the state. UKSWAN will cover the entire State and shall provide voice, video and data services on the network. The network could provide a reliable, resilient and secure backbone to meet the information requirements and associated services. UKSWAN is required to improve administrative effectiveness, efficiency of employees & expedite the overall development of the State and to improve the Quality of Service to the citizens of the State. The broad objectives of UKSWAN are:

- To provide a reliable and secured backbone network.
- To provide a complete array of government services and online information to the public in a secured way.
- To provide convenient, anytime, anywhere public access to government's information and services.
- To provide the State and local government entities with cost-effective long-distance converged communication services (voice, data and video) to fulfill the State's vision of widespread access to government services.
- To interconnect existing networks with the proposed network to get better utilization of the existing facilities.
- To support e-Commerce applications to meet public requirement and thereby improve the efficiency of all concerned.
- To Provide Open interfaces for connectivity to facilitate the exchange of information among State government users.
- To provide vendor-neutral in regards to user connectivity, and will expand, not limit the choice of products and services available to State agencies.
- To provide significant improvement in Government to Citizen (G2C), Citizen to Government (C2G), Government to Business (G2B), Business to Government and Government to Government (G2G) interfaces.

UKSWAN as a high capacity scalable Network based on open standards will carry Voice, Data and Video traffic among designated locations in the state. The connectivity to end-user will be the combination of standard leased circuits, dial-up circuits or wireless circuits as appropriate for the individual offices. State e-Governance Gateway (SEGG) with adequate capacity for internet and provision for connecting other existing Networks of other states and countries (Fig 5.1) are the additional requirements.

UKSWAN will work on multi-tiers of Network connectivity model, which comprise of State Head Quarter (SHQ), District Head Quarters (DHQs), Tehsil Head Quarters (THQs) etc. This shall be connected to all DHQs and offices in the State Capital with required bandwidth capacity. Each DHQ shall be connected to their respective THQs and offices in those Districts with required bandwidth capacity. Each THQ shall be connected to the offices in those Tehsils with required bandwidth capacity for delivering and dissemination of the refined data on day to day basis.

2) Proposed Applications

The study suggests the following services would be available after UKSWAN is operational:

- Online Registration and search - Citizens will be able to fill online registration forms.
- Land Record Information System - ownership, area, taxation, etc. accessible.
- Treasury Information System - status of bills submitted, revenue, expenditure etc.
- Sales Tax - Status of tax collected location-wise.
- Transport (RTO, Check Post) - Tax collected at each check post.
- High Court – status of all cases (description, pending, next hearing etc.) .
- e-Agro Services–Details of agricultural land for farmers.

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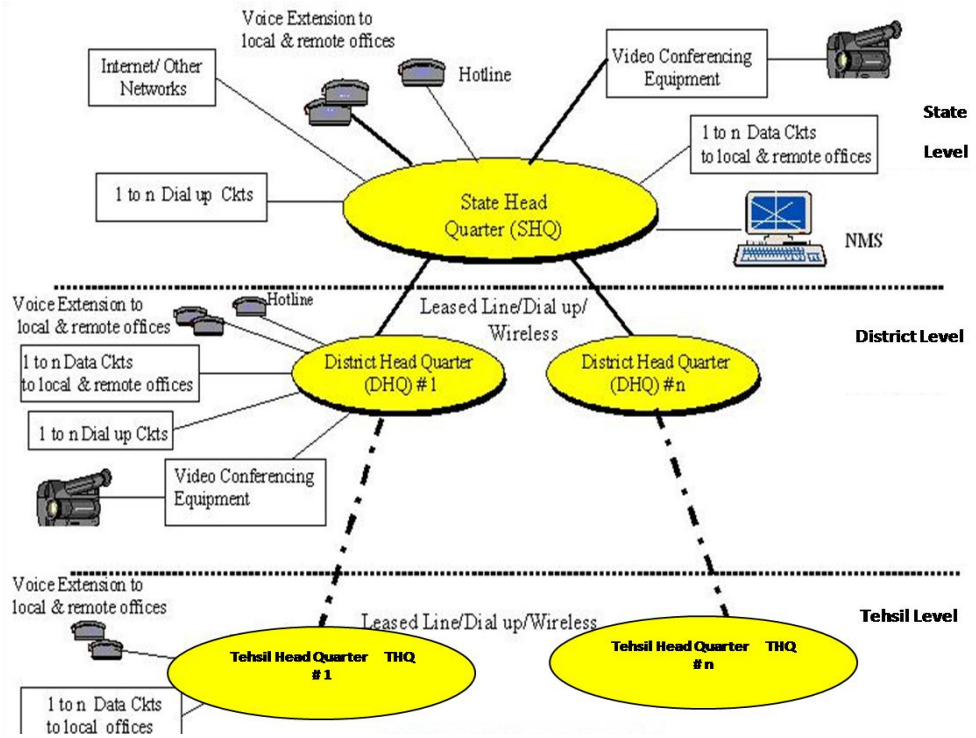

Fig. 1. UKSWAN Diagram

- e-Village – To Provide e-Governance services at last level citizens
- Public Health Information System (PHIS) – All medical colleges of state & Civil Hospitals will get connected and be able to provide telemedicine services
- Integrated Works Distribution & Management System

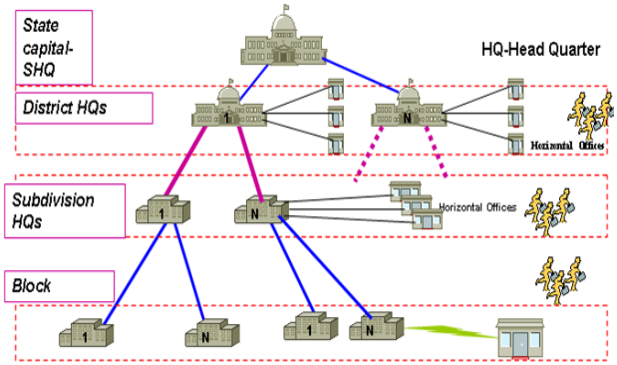

Fig. 2. State level architecture

3) e-Initiatives Roadmap

Many issues have been highlighted earlier that have an effect on e-Governance adoption as an e-Initiative in Uttarakhand. In future it will help the people of Uttarakhand to use e-Governance services, in easy to use and better environment. This study presents key factors of the proposed e-Governance model in the Uttarakhand state. A detailed framework for adoption of and illustrating the key factors and issues around proposed e-Governance model is also highlighted. In addition, this section presents valuable implications for the future e-Governance projects which have been learned from the past experiences.

4) State e- Initiative Web Portal

e- Forms based model

Benefit from the repository of valuable data that the departments collect is accessed by only a small number of people. The majority of population have no access to this. However, this issue may soon be addressed once departments start following standards for electronic forms and sharing common information on individual and business level. Experts suggest the standardization of information collection, storage and digitization of forms as the next crucial steps for making e-Initiatives services successful in the state.

As a foundation step, Uttarakhand has already deployed UKSWAN, and is in the process of establishing Common Service Centers (CSC) and deploying and putting in place the State Data Centers (SDCs). e-Forms will ride on these three pillars – UKSWAN, SDC and CSC. In our proposed model for Uttarakhand, the State Portal of Uttarakhand should host all the forms as e-forms, for the various Government Services accessible to citizens in the state. A citizen will be able to download the e-Forms through the various CSC outlets and submit his/her application electronically. This submitted form will be routed intelligently by the State Portal to SDC. A citizen will be able to query the status of his/her application at a later point in time.

Standardization of information collection, and storage and digitization of forms are the key factors for making e-Initiatives services in Uttarakhand effective [27].

These Initiatives, under the different projects may automate the processes, related to the proactive enforcement and compliance of the legal requirements under the Companies Act, 1956. For these projects fortunately, standardization of its various forms is not a big hindrance as the proposed service. Being a state-wide rollout, there is enough political and bureaucratic support to ensure to smooth running of the administration activities as well .The highlights of the proposed model are:

- The UKSWAN infrastructure helps in connecting all State government offices, horizontally and vertically.
- SDC is used for hosting the State Service delivery gateway (SSDG) and state portal.
- CSC is the main access point for citizens and will be

used for filling up e-Forms from a remote location.

- Once the infrastructure is in place, state government would be loading applications on the UKSWAN, which can be accessed through the SSDG. These gateways will provide a single window access to the information and services of the state government at all levels. By filling in specific forms with the required information at nearby CSCs, all citizens, including those in remote areas, will be able to access data and apply for certificates etc with the click of a mouse.

II. Uttarakhand on the Path of e-Initiatives

Lots of e-Initiatives have been successfully implemented in Uttarakhand

The Chief Minister's Information System facilitates monitoring of CM's announcements, budget announcements, projects and various financial aided schemes. These include Chief Minister's Schedule, issue of various sanctions from CM Relief Fund/ BPL Schemes etc. The disaster Management System is a web based enabled integrated system designed and developed to monitor and control various activities being carried out under relief works. These applications being transparent reduce response time in administration procedures in Government departments.

A. State Citizen Data Card (SCDC)

- In the present scenario all the citizens do not have identity proof or cards .They are using either PAN card or Electoral Identification Card to prove their identity.
- It is proposed that the State prepare an STDC - State Citizen Data Card, with biometric authentication which is considered as the most reliable way of guaranteeing peoples identity, since each person has his or her own individual characteristics that cannot be forged, changed, lost or stolen.
- Fake identities can have very serious consequences, as shown by Cyber crimes, terrorism and illegal immigration. Biometrics is highly recommended as the best solution to counter these threats. It is considered to be the most reliable way of guaranteeing peoples identity, or the identification of individuals and is used in this way by certain program of States. Figure 5.3 shows the prototype of SCDC card.

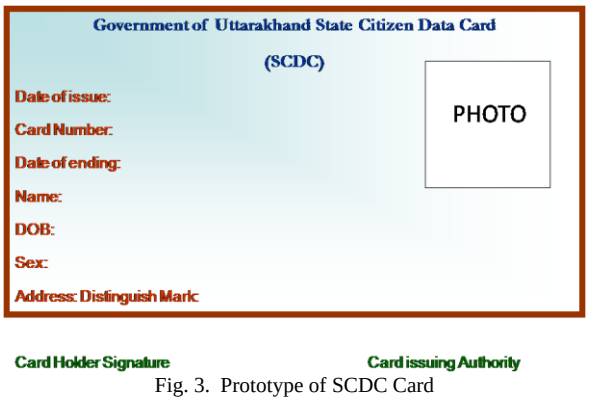

Fig. 3. Prototype of SCDC Card

This prototype intends to provide an interface between citizens and state officers to process the application online for better delivery of services. The system provides a form for the state citizens to apply online using the web portal. They need to fill up all the relevant information as required in the form to submit it to the system. The system will cross check the data with the master database. If a person has earlier applied for say a birth certificate, which actually generates an identification number, this number will be referenced. If not, the system will create a new identification card number and a reference number. This reference number is to facilitate the user to check the application status.

If the status is approved, then the user must go to any of the state kiosk or CIC to provide the thumb print and scanned photo. Once all the information is uploaded to State Data Center - database and once SDC passes the information to CSC, it will produce the SRIC and SRIC for the uses of the system.

The current system requires citizens to provide thumb prints and their photograph in order to process SRIC application. Besides giving thumb prints manually using thumb pads, thumb prints can also be given using biometric thumb scanner and related software to store it. There are many kinds of biometric scanners in the market which can support these options. Fingerprint and thumbprint scanners are popular for their ease of use. Several of these devices are integrated into web based or stand-alone scanners. BioLinks released U-Match 3.5 fingerprint scanner. The U-Match Matchbook 5.0 has taken the concept one step further. These scanners contain a built-in thumb-print scanner and provide log-on security with no extra hardware on the desk. The U-Match Matchbook provides added security by combining a fingerprint scanner and smart card reader. Both devices can be used by USB port. Biolinks biometric scanners are widely used in Government departments such as Passport departments in Senegal, Maldives, sales tax department in India, department of human services in San Francisco, and a few Banks in Kazakhstan. It is not practical for citizens to acquire it in order to perform the online registration considering the high price of acquiring it. Therefore, one of the ways to capture the fingerprint is by way of placing this type of biometric scanner at CSC kiosks at public places, so that citizens can drop by at kiosks and provide thumb prints and photo while they do their shopping. The same is applicable for loading citizens' photo into the SDC database.

B. State Data Centre (SDC)

State Data Centre (SDC) has been identified as one of the important element of the core infrastructure for supporting e-Governance initiatives. This study suggests creating State Data Canters 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 platforms seamlessly supported by core connectivity infrastructure such as Uttarakhand State Wide Area Network (UKSWAN) and Common Service Centre (CSC) that feature connectivity extended up to village level. State Data Centre would provide many functionalities and some of the key functionalities are on 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.

The State Data Centre can work as a key-supporting

element of e-Governance Initiatives & businesses for delivering services to the citizens with greater reliability, availability and serviceability. SDC can provide better operations & management control and minimize overall cost of Data Management, IT Management, Deployment and other costs.

State Data Centre may act as an interface and convergence point between open unsecured public domain and sensitive government environment. It could enable various State departments to host their services/applications on a common infrastructure, leading to ease of integration and efficient management, and ensuring that computing resources and the support connectivity infrastructure (UKSWAN) are adequately and optimally used.

The SDC will be equipped to host / co-locate systems (e.g. Web Servers, Application Servers, Database Servers, SAN, and NAS etc.) to host applications at the SDC to use the centralized computing power. The centralized computers/Servers can be used to host multiple applications. SDC would have high availability, centralized authenticating system to authenticate the users to access their respective systems depending on the authentication matrix. State would need to establish the SDC using any one of the two options indicated below.

In option (i) the State/UT and the NIC together can form a composite team for the State Data Centre. The sovereign control of the data/ applications shall lie with the State and NIC through its dedicated core team (6-7domain experts /professionals) which may be specially created for each State. It shall provide complete handholding for infrastructure up-keep, operations & management including issues related to business continuity. NIC Data Centre team would further be supported by domain specialists and support staff that would be recruited by the Centre/State for the State Data Centre. The Facility Management services for physical infrastructure may be outsourced, if required.

In option (ii), the State leverages the capabilities of existing commercial Internet Data Centers (IDCs) for which different deployment models are available (Co-located services, Dedicated Services and Managed Services). Under this option, the State may identify a suitable model (confined to either co-located services or dedicated services, only keeping in view the security implications) to select an appropriate agency through a suitable competitive process for outsourcing. The entire process of outsourcing, including advising on the most appropriate model, would be managed by the consulting agency to be made available by DIT to the State. Further, the State may also exercise the option to engage and utilize the manpower resources of NIC.

C. Common Service Centers (CSC)

As a part of the National e-Governance Plan there will be:

- 100,000 Common Services Centers in Rural India - 10,000 in Urban India
- One CSC to service a cluster of 6 villages – 6,00,000 villages networked
- CSCs enabled with appropriate IT Infrastructure and Connectivity
- Focus on Rural Entrepreneurship & Market Mechanisms
- Focus on Private Sector services for quick sustainability
- CSCs to be positioned as the retail extension outlets in rural India
- No Capital Subsidy but Guaranteed Revenue Support from State/Centre

The CSCs would offer a multitude of services in the areas of e-Government, education, health, agriculture, commerce, retail, etc. It is to be noted that delivery of Government services would be mandatory for the CSCs. The services that can be provided to people through this interface using G2C.G2C services include:

- Land Records
- Birth/Death Certificates
- Grievances
- Form downloads and submissions
- Bill payments –water, electricity, telecom, etc.
- Licenses, permits, subsidies
- Property Tax and Registration
- Bus pass, Railway tickets, Passport, etc.

1) Business to Business – B2B/G2B -

- B2B model including the transitions between markets, BPO etc.
- Market Research, Surveys, Data Collection
- Rural BPO Services (Data Collection, Digitalization, etc.)
- Advertising, Branding and Promotions

2) Business to Consumer Services - B2C

B2C focus on

- IT services (Printing, Scanning, DTP, web surfing, etc.)
- Agri-business services (consulting, procurement, etc.)
- Banking and Financial Services (Loans, Deposits, etc.)
- Telecom Services (PCO, phone sales, etc.)
- Commercial Services (Matrimonial, Astrology, Bio-data, etc.)
- Retail Sales & Referrals (Farm Inputs, Vehicles, etc.)
- Education Services (IT Training, English Speaking, etc.)
- Health (Tele-medicine, OTC medicines, etc.)
- e-Commerce (Online shopping, trading, etc.)

3) Common Services through CSC

The common services through CSC can cover Electricity, Water, Telephone, Ration Card, Sanitation, Public Transport, Land Records, Telephone, House tax billing, FIR Registration, Lost and Found , Pension, Registration of Licenses and Certificates Ration Cards, Birth Certificates, Death Certificate, Domicile Certificate, Caste/Tribe Certificate, Arms Renewal, Registration of Documents, School Registration, University Registration, Motor Vehicle Registration, Driving License (issue and renewal), Employment Exchange Registration, Employment Opportunities, Examination Results, Hospitals / Beds Availability / Services, Railway Time Tables, Airline Time Tables, Road Transport Time Tables, Government Forms, Government Schemes, Seeds Information, Pesticides, Fertilizers, Crop disease, weather Forecast - short range / District wise, Market Price for agriculture areas, Taxation & Return Filing, Income Tax, Corporate Tax ,Sales Tax, House Tax, Property Tax, Road Tax, Company Returns and many more.

4) Status of CSC at Uttarakhand

Uttarakhand government will run CSC scheme in PPP mode with Reliance Communication. The main areas of this project will be:

- Pithoragarh
- Udham Singh Nagar
- Chamoli
- Almora
- Bageshwar
- Haridwar
- Pauri Garhwal
- Champawat
- Nainital

D. State Data Warehouse

Data warehouse is a subject-oriented, integrated, time-variant, non-volatile collection of data, cutting across the enterprise. Unless there is a repository of accurate data across the enterprise value chain, application of mining tools to analyze and aid in strategic government decisions is not possible. Currently in most of the enterprises, the difficult and resource consuming stage is development and deployment of data warehouse and mining applications.

Government departments might come across shortage of resources in one department. This could be due to non-availability of proper data and facilities to disseminate information. If government departments are computerized and networked data access and response serving can be made available directly. This is because the information is stored in different formats, in different platforms and in heterogeneous database systems. A look at the information requirements at each level and the information flow across levels shows a pattern. While information that flows from top (fund sanction, allocation and disbursement details) is split to lower levels, information that flows from grass root level (such as expenditure details, benefits details, beneficiary details etc.) is consolidated to generate information for higher levels. This pattern makes the entire vertical domain of e-Governance framework, an ideal domain for development of data warehousing and use of data mining applications.

1) Benefits of State Data Warehouse

- Do not have to deal with heterogeneous and silo systems.
- Dependence on IT staff minimized.
- Can obtain easily decipherable and comprehensive information without the need to use sophisticated tools.
- Can perform extensive analysis of stored data to provide answers to exhaustive queries.
- Helps in formulating more effective strategies and policies for citizen facilitation.

III. Policies

The aim of e-Initiatives is to transform the Government into a knowledge society and make the benefits of information technology available to all citizens. The main objectives of the e-Initiatives polices are improving economy, employment creation, citizen-centered governance, and globally competent government. These e-Initiatives considers for achieving better e-Initiatives project of the following components

- Human Resource Development and Management.
- Data and Content Management
- Security
- Front End
- Middleware
- Back end and Department Automation
- Integrated Services
- Process Re-engineering
- Back End and stakeholders
- Users through sensitization
- Orientation
- Motivation

Figure 4 presents a policy framework for the effective implementation of e-Initiatives for the state of Uttarakhand.

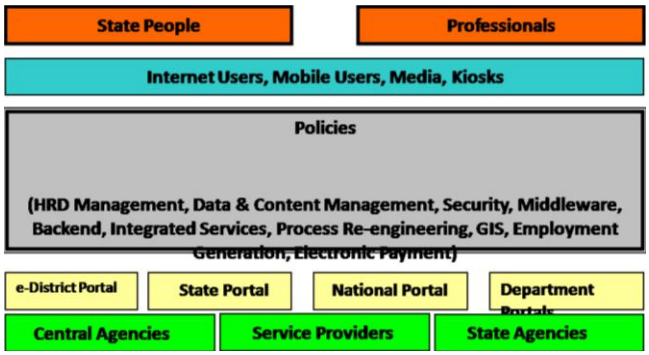

Fig. 4. Initiatives policies framework

IV. e-Architecture

A. e-State

The proposed e-Governance model for Uttarakhand state can aim to make all Government services accessible to the common man in his own vicinity, through common service delivery outlets (CSC). It can ensure efficiency, transparency & reliability of such services at affordable costs to realize the basic needs of the common man by which Uttarakhand can be viewed as an e-State. One of the goals of the state Government, to meet this vision i.e., to become an e-State, is the need to cooperate, collaborate and integrate information across different departments in the Centre, States and Local Government. Government departments of Uttarakhand state can be characterized by islands of legacy systems using heterogeneous platforms and technologies spread across diverse geographical locations including hilly and remote areas, in varying state of automation, to make this task very challenging. The figure 5 shows an abstract model of proposed e-State framework.

B. Some proposed e-Initiatives applications

1) Online Job counseling

It is a central gateway to provide information pertaining to various courses, their admission criteria, fee structure, employment opportunities, seat availability etc. that are available in the State.

2) e-Initiative applications for future

Government / Ministries Websites:

This is further incorporated with inter-department or inter-agency data transfer. For example, a birth registration will be recorded also by the statistics department for

statistical purposes, education department for forecasting school enrollment and probably notification to the parents about their placement at nearby schools, health department for notification of immunization and latest updates regarding medication.

3) Online Search Option

The proposed system only provides submission of registration. The future system may provide more options to citizens as well as to government officials to query and search on data stored in databases, with implementation of strict and powerful security features.

It can provide options to Lodge complaints regarding Loss of Certificates or SRIC and apply for its copy: Currently, every loss of certificates is registered manually and the proposed system does not provide any option to lodge the loss or application for a copy of the certificates. The future system should include these options in order to provide a complete service.

4) e-Payment and m-Payment

Steps to create electronic payment system and incorporate it with the portal can be initiated. Services such as, marriage and adoption, registrations incur charges. This charges must be made payable through State government portal. The system with e-Payment facilities and m-payment using m-banking facility will definitely provide ease of use.

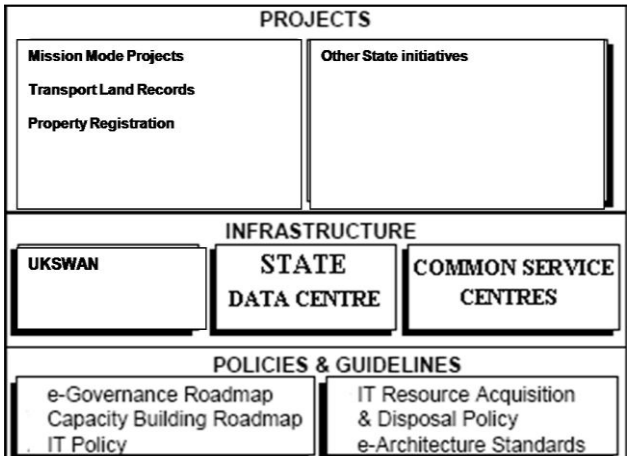

Fig. 5. e-Governance framework for Uttarakhand

SEGG	State e-Governance Gateway
SDWC	State Data warehouse Center
UKSWAN	Uttarakhand State Wide Area Network
SHQ	State Head Quarer
CSC	Common Services Center
NSDG	National and other State Data Gateway
NSDWC	National and other State Data warehouse

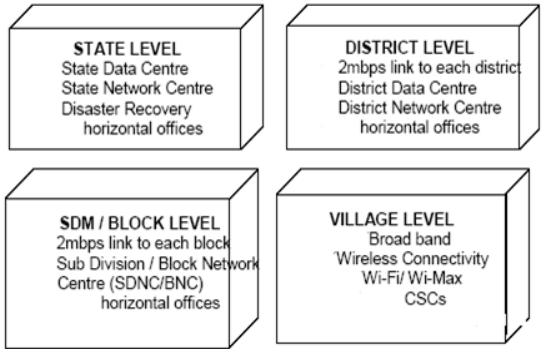

Fig. 6. e-Architecture

In future, people will log on to a website, establish their identity with a password and digital signature, and carry out their transaction with government without leaving their home. In time, the Internet will affect the public sector much more profoundly than it has done in the private sector, for the simple reason that people like to go out shopping whereas they dread the thought of making a trip to a government office and do so only out of necessity. Using the Internet would not only make people's lives easier, it will change the way they think about government.

5) m-Services (Mobile phone based services)

We have more mobile users, as compared to the Internet users, in the state. This fact provides a strong opportunity for the state government to provide anytime anywhere services to citizens without a stationary wired setup. Mobile governance is comparatively, a broader phenomenon which is inevitable and will have a substantial influence on the generation of standard strategies, rules and functions of e-Governance in future.

The volume of penetration of mobile devices will put severe pressure on m-Governance implementations. The users will want to have government services (those which are appropriate for mobile technologies) to be delivered and made accessible anywhere and at anytime.

6) SMS Alerts (In Local Language)

University results, Boards results, the various entrance examinations results can be sent through SMSs on mobile phone along with information, regarding farming and disaster information. Health related information can also be sent on mobile phone.

The following are some of the attractive benefits of using m-services:

Low Cost: Mobile phones are a relatively low cost technology as compared to Internet technology.

Ease of Learning: Usage of mobile devices is fairly simple thus making it easy for any common person to use it and to access information.

Enhanced Network: A wide range of government services can be delivered via mobile network. According to an estimate by R.Chandrashekhar, Additional Secretary (e-Gov), Government of India, approximately 50% to 60% of government services in India can be delivered through mobile channels.

Wide availability of mobile phones: The use of Internet requires a fairly complex set of skills and technology know how's. There are certain requirements such as electricity, communication lines, computer workstation and in most cases a reasonable fluency in English. These requirements are difficult to meet in many e-Governance applications. These cannot be implemented and even if implemented somehow fail to succeed and meet their objective.

Easy Infrastructure Setup: Due to the simple architecture of mobile telephony, new mobile phone networks can be easily installed in countries where infrastructure is an issue and that too without too much economic constraint.

3G Services: A shift towards higher data transfer rates and third generation (3G) services can be made as it promises to make more information available at faster speeds.

V. Data Security

The proposed model will work as an online system hosted by a public (Internet) of private network (UKSWAN), and user trust is a must for that to use those applications. The following are some recommendations:

Authentication: This is the ability to say that an electronic communication (whether via an email or web) genuinely comes from who it purports to. The challenge here is to have simple, cost-effective but a strong enough authentication method. At least two levels of authentication are recommended. However, implementations of hardware tokens like Citizen Smart card are expensive and not easily manageable.

Privacy: Privacy is the ability to ensure that information is accessed and changed only by authorized parties. Typically this is achieved by enforcing strong security controls in the server systems and via encryption.

Authorization: Authorization allows a person or computer system to determine if someone has the authority to request or approve an action or information. Authorization is tied with Authentication. If a system can securely verify that a request for information (such as a web page) or a service (purchase requisition) has come from a known individual, the system can then check against its internal rules to see if that person has sufficient authority for the request to proceed. However, in case of e-Governance, the huge and varied types of clientele pose a challenge for the authorization process.

Integrity: The Integrity of information means ensuring that a communication received has not been altered or tampered with. Traditionally, this problem has been dealt with by having tight control over access to paper documents and requiring authorized officers to initial all changes made – a system with obvious drawbacks and limitations. Integrity of messages can be achieved in G2B and G2G applications by using digital certificates. However, for general population this will remain a challenge.

VI. Benefits of Proposed System

The proposed framework will be built on **public-private partnership model**. Citizens shall be provided with a clean, transparent, efficient and effective administrative system through the state-of-art Electronic and communication technology. This model will be a direct interface between the citizens and the government **(C2G),** which saves considerable time, energy and money to every one and gives the citizens the advantage of hassle free dealings with the administration. All administrative departments of Uttarakhand will come under one roof, offering a wide Range Of citizen- friendly services. All service centers would be facilitated with an electronic system. It will be a one-stop-shop for many of G2C and B2C services of Uttarkhand.

The following will be the key benefits after the adoption of this proposed model:

- All services can be availed at any Common Service Center (CSC) or with the help of information kiosks.
- All services can be availed at any counter within the center, i.e. a consumer need not visit one counter for one service and another for another service.
- Services can be availed on holidays as well (365*24 work culture).
- Bill payments can be made over the internet using EFT schemes of Banks.
- Development of Integrated Citizen Service House (ICSH) to offer services of multiple Government departments under one roof.
- Payment of utility bills like water, electricity, telephone, property tax etc using Internet / Mobile phone, Issue of birth, death and property certificates on line.
- Booking bus tickets and train tickets through Internet, ATM machine, information kiosks.
- Issue of license on line.
- Filing of passport application in Uttarakhand state on line.
- Sale of legal documents for land registration.
- Sale of state tourism department's travel and entertainment packages.
- Integrated caste, nativity and birth certificate based on CID number.
- Filing of income tax and sale tax returns.
- e-Education for rural areas in distance learning mode.
- e- Healthcare System to provide mobile medical facilities in remote areas of Hills.
- Citizens are not charged for any utility payments.
- At all State e-Governance counters payment can be made through cash, cheque, demand draft & credit card.
- Each Data center communicates with the servers of the departments concerned. Therefore, payment particulars get updated on the departmental servers in real time.
- About 10000 citizens can transact at the e-Governance centers everyday in future.
- Citizens can use the facilities through the net by online payments.
- Electronic receipt is treated as a conclusive proof of payment.
- Business to Consumer (B2C) services at all centers. They include financial services like ATM's, mutual funds etc. Other services include air ticketing, Train booking, cellular phone bill payments etc.
- Online exchange of inter-departmental user specific data to effectively reduce cycle time for service fulfilment.
- Initiation of transactions by citizens shall lead to revenue enhancement for urban local body.
- Optimized IT infrastructure.
- Employment opportunities through mechanism like agent login.
- Reduced paper work.
- Information on volume of service request with break-up by type and nature
- Cycle time and all levels resolution of services requests.
- Monitoring of incidents (Complaints) and their resolution cycle time.
- Information on frequency and details of changes to city infrastructure
- Useful information for capacity planning for infrastructure provision based on land transactions

/service requests received

- Control of building activity in areas where infrastructure capacity is inadequate

VII. Future Scope

Practical implementing of suggested applications or services is beyond the scope of this study. Future workers may design some working modules based upon our theoretical model that can be utilized by the state government. A new trend of using mobile based services and applications within developing nations is observed. In future, the m-service may be popular among people in Uttarakhand. Future research can study or implement the new forms of m-services integrated with basic internet and e-Governance services [28]. In Uttarakhand, more focus is required on mobile based applications such as m-commerce and m-governance. The SMS based alert systems could be viewed as an early initiative in this direction. Future work could test the validity of the findings of this study's on m-Governance and m-Commerce initiatives.

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