Integration of Public Transportation through National e-Governance Service Delivery Framework

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Abstract

Government of India has taken major initiatives and policy plans to accelerate the development and implementation of e-Governance to provide an appropriate environment by introducing G2G, G2B, G2C and G2E services within the country. Impact of e-Governance is gradually changing our life, from day to day access of information to access various services at our door steps. Public Transportation is also improving their mechanism for service delivery using ICT in their service delivery process. This paper discusses the current scenario of public transportation in India and various issues involved therein. It gives a brief idea of government initiative regarding structure and service delivery framework for e-Governance and their basic components in India. Further it discusses the integration and nationalization of public transportation through effective implementation of e-Governance in the sector. Finally we focused on integration of various State Road Transport Corporation's through a common service delivery gateway using existing National e-Governance Service Delivery Framework.

Keywords: *Integration, e-Governance, public transportation, service delivery gateway, domain gateway.*

1. Introduction

e-Governance can be defined [1] as "E-governance is the application of information & communication technologies to transform the efficiency, effectiveness, transparency and accountability of informational & transactional exchanges with in government, between govt. & govt. Agencies of National, State, Municipal & Local levels, citizen & businesses, and to empower citizens through access & use of information". Government of India trying to utilize ICT to improve its efficiency in service delivery, through implementation of e-Governance. The transport sector is one of them but it is limited to the Vahan and Sarathi e-Governance projects [2] for vehicle registration, driving license and for various certifications for drivers and conductors. The central government also promotes the use of ICT in public transportation too, by providing financial assistance to the sector for infrastructure developments to provide nationalized transportation up to year 2032 [3]. This aims to achieve improvement in service delivery mechanism to empower citizens or commuters through greater access to information and services through transparent and accountable governance in public transportation. The objective of the paper is to discuss various components of National e-Governance service delivery framework, issues and integration of public transportation with it. Further it discussed some core benefits of the integration of public transportation and finally concluded.

2. Public Transportation

The public transport sector (Bus based) provides an alternate mode of transportation. It makes the most optimum use of the available road space and fossil fuel by transporting the maximum number of people per unit of road space. Public transportation sector in the developing countries like India carries more than 90 percent of passengers by buses and about 65 percent of freight [4], even though the sector faces severe problems such as lack of infrastructure, comfortable buses and financial resources which restrict investment and up gradation of the existing transportation system. Moreover the lack of proper and effective planning in public transportation sector India has led to rapid growth in cars and two wheeled motor vehicle which causes congestion on roads that slows down the bus services or public transportation, ultimately increases the operating cost and discourage the use of public transportations [5]. Economical pressure and deficit

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budgets pressurizes the public transport sector to improve operational effectiveness and efficient services. The public transport sector should use information and communication technology as a powerful tool to achieve operational effectiveness. Web technologies enabled the government and administration to reduce efforts and costs for their services. Effective implementation of e-Governance in the public transport sector will be able to minimize the economic pressure.

3. Issues in Public Transportation

Issues of public transportation have been raised in the extensive survey performed over commuters as well as on officials of public transportation on state of Uttar Pradesh in India to identify the needs of customers as well as officials to provide effective services to their commuters [6].

• Interconnectivity: Officials as well as commuter is enthusiastically requiring the need of interconnectivity between states to access interstate services. This will be helpful to improve business prospects for citizens as well as State Road Transport Corporation (SRTC) of the operating state.

• ICT enabled depots: Capacity building for development of ICT enabled depots for easy and rapid and service delivery to the commuters.

• Online services: Effective and efficient online applications will help to access G2B and G2C services to their commuters. This will help to provide services at the citizen's doorstep.

• Time bound grievance system: Time bound grievance system will force the SRTC to deliver quality services.

• GIS based system: Required a GIS based tracking services to foresight the approximate arrival of services at any source station.

The above issues can be resolved by using an integrated approach of public transportation because it can improve the interconnectivity between states that helps to improve business prospects for citizens as well as SRTC's of the states. Integration in public transportation will also help to improve the service delivery mechanism by using ICT enabled application. Using NeGP's National e-Governance service delivery framework an effective and efficient integrated model has been proposed in Fig. 3.

4. National e-Governance Service Delivery Framework

The National e-Governance Plan (NeGP) of the Government of India aims to make a framework for all government services accessible to the common man in his locality, through common service delivery outlets which ensure efficiency, transparency & reliability of such services at affordable cost.

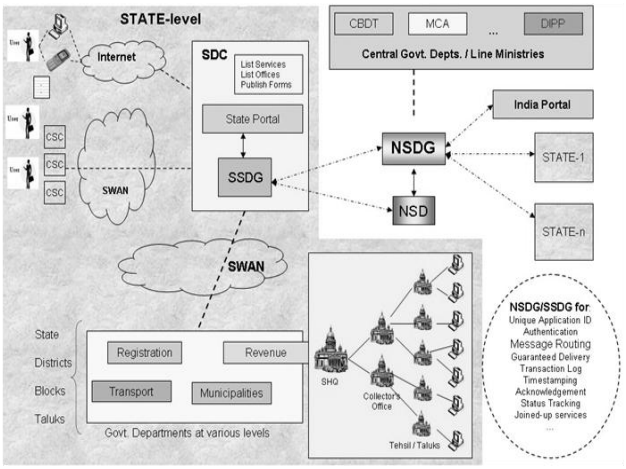

Fig. 1 NeGP's National e-Governance service delivery framework [7]

To meet this vision government's needed to cooperate, collaborate and integrate information across different departments in the Centre, States and Local levels. The given framework in figure1 is the NeGP's framework to deliver e-Governance services to the citizens as well as numerous department of the India, transport sector is also among them.

National e-Governance Service Delivery Gateway (NSDG): It is one of the Mission mode project (MMP) under the NeGP, NSDG can act as a standard based messaging switch to provide flawless interoperability and exchange of data across the departments. It acts as a nerve centre or middleware, would handle large number of transactions and helps in tracking, time stamping transaction log, joined up of services for all transactions of the governments.

State e-Governance Service Delivery Gateway (SSDG): SSDG 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 interoperable. The State e-Governance Service Delivery Gateway (SSDG) aims to achieve a high order of interoperability among autonomous and heterogeneous entities of the states based on a framework of e-Governance Standards as in figure 2.

National Service Directory (NSD): The NSD has utilized by all gateways across the country for address resolution of services. The primary function of the National Services Directory (NSD) is to provide a registry, which acts as a

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service resolution point for all the services in the Gateway constellation. NSD is a collection of service hosting information outside the Gateway. All the Gateways that need to resolve services, which are not in their domain, need to resolve it at the NSD. The Gateways need to register with the NSD before they can attempt to resolve a service from the directory.

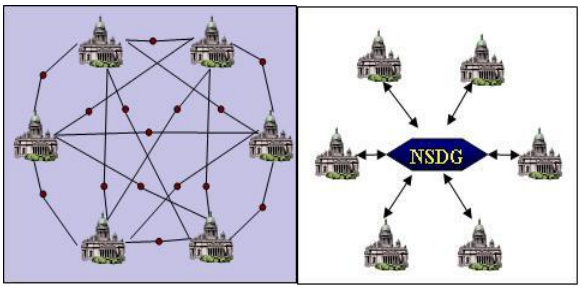

Fig. 2 SSDG interoperability mechanism by reducing point of connections

Domain Gateway: Domain gateways are purpose specific or department specific gateways to provide G2G, G2C and G2B service to the citizens. These are implemented for specific business needs requirements for the perspective projects to route request between front end and backend applications are known as domain gateways. Many government departments of centre and state have required domain gateways to satisfy their specific needs.

5. Integration of Public Transportation

SRTC's are geographically dispersed in all states of India. Technically it is not feasible to transform the all SRTC's together to integrate the services of public transportation. Therefore it needs a middleware like NSDG, so that all communications or information's are routed through the NSDG which controls communication, authentication, authorizations and security of application.

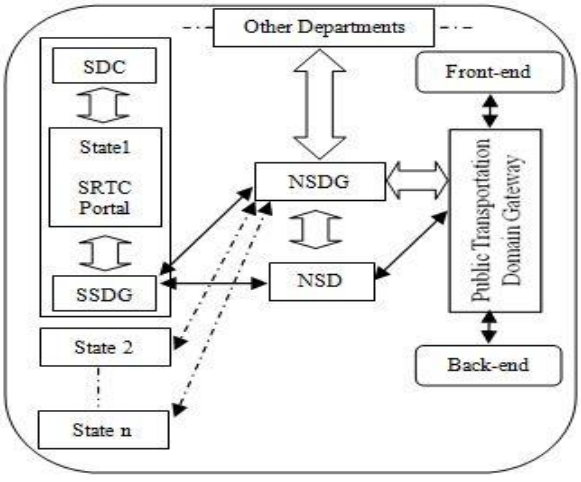

Fig. 3 Design for Integration of public transportation

Integration of public transportation is a step towards nationalization of public transportation using National e-Governance Service Delivery Framework as in figure 1. We propose to establish and setup a domain gateway to provide integrated services for specific needs of public transportation as in figure 3. Public Domain gateway will provides integration and interoperability between SRTC's of the states in India. The model represents centralized access of information with distributed environment.

Figure 4 and 5 represents the communication between commuter and domain gateway. Figure 4 represents the information flow within state or State Road Transport Corporation (SRTC) for communication where as figure 5 represent the inter-state information flow between SRTC's of the states. Domain gateway (D.G.) for public transportation will enables the public transportation to integrate all the SRTC's of states of India which are geographically connected. It acts as central web application server to integrate all SRTC's of the states in India. Domain gateway of public transportation has its own Front end application and backend to manage user or commuter's request. In figure 4, the commuter's request is analyses at domain gateway by web application server and forwards the request to the NSDG middleware after keeping necessary records in their database. NSDG is used to connect the intended State Road Transport Corporation (SRTC) portal through SSDG using middleware standard based interoperability to full fill commuter's request.

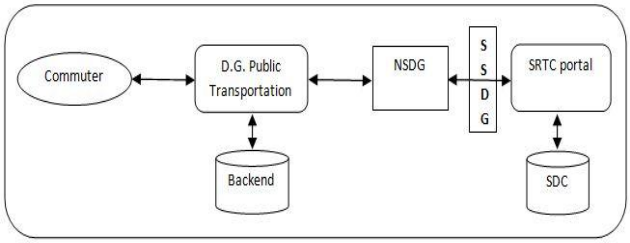

Fig 4. Information flow for within state Public Transportation

In case of inter-state communication, domain gateway web application will analyses the users or commuters request. Forward the request to the source state through NSDG after keeping necessary information in their database. The desired request has to be served at source state's portal through SSDG and update their SDC (State Data Centre). Further state portal retrieves the in between states from source state to destination station from user request except source state. The list of in between states would be passed from the commuter's request to the NSDG middleware server for interoperable services. NSDG will forward message along with user request to all the SSDG's of the

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intended states in the incoming list from source state and portals have to update respective information's.

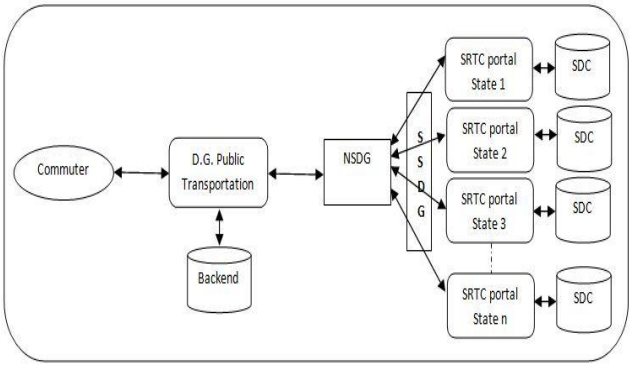

Fig. 5 Information flow for inter-state Public Transportation

6. Core Advantages

The Integration of the public transportation as suggested in this paper may enhance the functionality of the sector and would provide the following benefits:-

1. The implementation of the model through the NeGP's architecture for e-governance may provide flawless inter-connectivity between states which may enhance the business prospects of SRTU's.
2. Commuters are benefited by the one-stop, integrated services of public transportation to access, interact and performed online transaction with any source to the desired destination of India.
3. SWAN acts as the backbone for the National Service Delivery Gateway (NSDG) to support a national network infrastructure for e-Governance service delivery. Use of integrated public transportation saves cost incurred by third parties for application and network management.
4. SRTU's effectiveness can be improved by providing integrated services to the commuters of public transportation because of the competitive environment.
5. Effectiveness and efficiency can be achieved by one-stop integrated could improve government response time to citizens and reduce paperwork burden of public transportation.

4. Conclusions

The implementation of e-Governance in any sector can enhance the quality of service delivery. It could be beneficial for public transportation. NeGP's National e-Governance service delivery framework will acts as the backbone for integrating the SRTC of the state in India. The integration of public transportation permits the commuters and officials to access services of any states from one stop. This will boost up the business prospects for citizens by better connectivity between SRTU's of all the states inoder to fulfill the dream of nationalized public transportation.

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