

# e-Transport MMP

## Steering a Smart Generation



### Citizens can now avail RTO services through web portals and Mobile Apps

The Transport Mission Mode Project (eTransport MMP), driven by the Ministry of Road Transport and Highways (MoRTH) and executed by NIC, has successfully automated the operations of Regional Transport Offices (RTOs) across the country. The project has set up a consolidated nationwide transport database with real-time update and availability, and has launched a host of citizen-centric and trade-centric applications, contributing greatly towards the country's e-Governance initiative under the Digital India Programme.

The genesis of the eTransport MMP goes back to the year 2000 when Vahan and Sarathi were conceived in response to the recommendations of the Smart Card Operating System for Transport Application (SCOSTA) Committee set up to study how to define standards for Registration Certificates (RCs) and Driving Licences (DLs) respectively, on a pan-India level to ensure interoperability, accuracy and timely availability of information.

As on date, the project is an extensive array of G2G, G2B and G2C services, benefiting citizens, transporters, vehicle dealers, manufacturers, police & security agencies, banks and insurance companies, along with various Government Departments at the State and Central levels. The project has reached a high maturity level, and centralised, web enabled versions, Vahan 4.0 & Sarathi 4.0 have already been implemented in close to 95% transport offices of the country. Further, the project has a repository in the form of National Register hosting 25 crore+ vehicle records and 15 crore+ licence records. A successful foray has also been made in the area of traffic enforcement solution through eChallan, a web as well as Mobile App, and mParivahan, which is a mobile extension of various transport services.



## Objectives

Primary objectives of the project are to:

- Modernise the IT infrastructure and service delivery model in the entire sector
- Bring in efficiency, transparency, accountability and reliability in services
- Minimise RTO footfall by maximising online service facilitation to citizens
- Extend range and quality of G-C, G-B and G-G services
- Promote better synergy through integration with stakeholders
- Facilitate secure data sharing with approved users as per policy
- Bring in transformative change in the entire ecosystem

## Key features & functionalities

- Vahan and Sarathi applications provide complete functionalities of RTOs, viz. Vehicle Registration, Taxation, Permit, Fitness, Enforcement, DL/LL/CL Licensing and allied services with state customisation.
- Centralised hosting is done at National Data Centre in Delhi and DR Site in

**Picturesque Shillong (East Khasi Hills District) in the north-eastern state of Meghalaya was the first District Transport Office (DTO) to operate Vahan on 15th April 2002. Sarathi was first commissioned in Kaithal district of Haryana in the same year.**

Bhubaneswar. No need to maintain servers, storage etc., at state level.

- Integration is done with state-specific payment gateway (Bank/ Cyber-treasury), smart card vendor, HSRP vendor, Postal Dispatch system and so on.
- Close to 100 online citizen-centric and trade-centric services with facilities like e-payment, online appointment, document uploads etc., are provided.
- Integrated Dealer Point Application with configurable work-flow for vehicle registration, tax/ fee collection, number generation etc., is provided.
- Vahan Homologation Application allows integration with automobile manufacturers' inventory, facilitating automatic data-capture of technical

parameters and sale price during registration process.

- Vahan CNG/ SLD/ VLT Homologation Applications also provide similar end-to-end integration, covering Type Approval, Inventory Upload, Retro-fitment and RTO approval process for relevant automobile components.
- Vahan Fancy Number Auction Application allows citizens to choose, bid and pay online for fancy/ choice registration numbers as per state policy.
- Vahan Border Check Post Application allows online tax collection from other state vehicles entering state border.
- Vahan National Permit System is integrated with RTO authorisation.
- New online application for Pollution

## Key Statistics

**Vahan**  
दिएत

(Jan-Dec 2018)

Revenue:  
**₹ 48,800 Cr.**

Vehicles Registered:  
**2 Crore**

Transactions:  
**6.8 Crore**

Permits:  
**22 lakh**

National Permits:  
**12 lakh**

**Sarathi**  
शरथी

(Jan-Dec 2018)

Revenue:  
**₹ 1610 Cr.**

Learners' Licences Issued:  
**1.17 Crore**

Driving Licences Issued:  
**1.75 Crore**

Applications:  
**3.2 Crore**

Appointments:  
**1.27 Crore**

**eCHALLAN**

(Till Date)

Revenue:  
**₹ 1100 Crore**

Challans:  
**52+ Lakh**

Cases to Court:  
**3.2 Lakh**

Notices Through CCTVs:  
**3.9 Lakh**

Notices Through Citizens:  
**3.5 Lakh**

**mPARIVAHAN**

(Till Date)

**4.5 Million + Downloads**

**15 Lakh SMS alerts/ OTPs generated per day, 4.5 Crore per month on average**

Note: The figures are approximate.

Under Control Centres with real-time data integration is provided.

- Sarathi Driving School Application automates complete operation and monitoring of processes in driving schools with Aadhaar based biometric attendance option.
- Sarathi online learner licence knowledge test module allows configurable, randomised and multichoice knowledge test for applicants.
- Integration with third-party Fitness Test Centres, Driving Test Tracks etc., is done.
- Upstream integration with IRDA/IIB (for insurance data), NCRB (for stolen vehicle data) and Aadhaar (for authentication) is done.
- Downstream integration and data sharing with Govt. Agencies/ Police, NCRB/ CCTNS, Banks/ Insurers, Transporters, UMANG, DigiLocker, eDistrict, CSC, CM Dashboard etc., for data sharing are done.
- eChallan Mobile App and web portal provide a sophisticated, holistic traffic enforcement solution for Transport Enforcement Wing and Traffic Police Departments with a nationwide common database of offences and challans. These are also integrated with courts.
- mParivahan Mobile App for citizens, with 4.5 million downloads, features virtual DL/ RC with encrypted, enforceable QR Code and other services/ tools, option for road accident and traffic violation reporting by citizens.
- Comprehensive dashboard, analytics and advanced search options are provided.

## New initiatives

In the last three-four years, a series of new initiatives has been launched under this project, keeping in view its given objectives in mind. These include:

- Shifting the delivery platform to a centralised, web-enabled infrastructure. The flagship applications Vahan and Sarathi, which were already running in distributed mode across the country, have been redesigned into web-enabled versions and relaunched through a centralised portal (<https://parivahan.gov.in>) to enable a full set of G-G, G-B and G-C services.
- More than 1,100 RTOs have already shifted to the new Vahan 4.0 and Sarathi



Transport sector is the prime mover of the country's economy and it is our endeavour to transform this sector into a modern, efficient and transparent system. Comprehensive adoption of IT-based solutions and processes is required to achieve this objective. In this context, the new, centralised applications like Vahan, Sarathi, eChallan and other applications have made a tremendous contribution in completely automating the RTO processes, facilitating a wide range of citizen-centric and trade-centric services, widening ePayment facility for all taxes and fees, developing a comprehensive traffic enforcement solution, and making real-time availability of data for monitoring and decision-making.

I am glad that the complete ecosystem of the transport sector, covering Transport Departments, RTOs, Citizens, Transporters, Dealers, Automobile and Component Manufacturers, PUC Centres, Banks and Insurance Companies, Driving Schools, NCRB, and Traffic Police, is connected with the common platform facilitated through the portal [parivahan.gov.in](https://parivahan.gov.in).

I compliment NIC for this commendable work. Ministry of Road Transport & Highways is committed towards ensuring a robust and citizen-friendly system for the entire country and I am sure the joint cooperation between MoRTH and NIC will ensure this.

### NITIN GADKARI

Minister of Road Transport, Highways & Shipping, Water Resources, River Development, Ganga Rejuvenation Government of India

4.0 versions, along with complete migration of legacy data.

- A comprehensive set of configurable options have been incorporated in the centralised applications to cater to state-specific needs and variations.
- Almost 100 online citizen-centric and trade-centric services have been launched with facilities like e-payment, online appointment, document upload etc.
- A comprehensive Traffic Enforcement Solution – eChallan – has been developed with mobile and web components, which has been adopted by both Transport and Traffic Police across 14 states.
- The mParivahan Mobile App for on-the-go services and information for citizens has received wide popularity with 4 million downloads till the end of 2018. It features virtual Driving Licence and Virtual Vehicle Registration Certificates, which are now legally valid electronic documents.
- Homologation Application integrates the complete life cycle processes of an automobile – starting with Type Approval of new models, inventory upload by manufacturers, registration by dealer and integration with the Vahan database. Similar life cycle integration applications have also been developed for CNG Kit, Speed Limiting Devices and Vehicle Tracking Devices as per the mandate of MoRTH.
- Online Fancy Number Auction and Allocation System has been implemented in most of the states to bring in transparency and citizen facilitation.
- Online National Permit Application has facilitated ease-of-business to transporters and also stemmed leakage of government revenue.
- Countrywide data comprising 25 crore Vehicle Registration records, 15 crore Driving Licence records and all other relevant information have been consolidated in a central database, which is shared with thousands of authorised stakeholders such as the Police, government agencies, banks, insurers and transporters through various mechanisms such as API and portal access.
- A centralised application for use of thousands of Pollution Check Points across the country has been developed to



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The Ministry of Transport & Highways has been at the forefront of adopting digital technologies in providing better services to citizens and bringing in efficiency and transparency in the Transport Sector. With consistent support of the National Informatics Centre, we have successfully modernised the operations across the country and facilitated an array of G2G, G2B & G2C services. Almost 100 online, citizen-centric and trade-centric services are running on the Parivahan portal, with facilities like e-payment, online appointment, document upload etc. The flagship applications – VAHAN and SARATHI are integral part of the transport operations across 33 states and UTs, covering 1100 RTOs and 20,000 automobile dealers. It has an end-to-end integration with vehicle manufacturers, CNG/ SLD/ VLT manufacturers, banks and insurance companies, NCRB, police, fitness centres, motor driving schools and a host of other stakeholders.

Equally commendable are the new initiatives like mobile-based traffic enforcement solution through eChallan, adopted by both Transport and Traffic Police Departments across 14 states, citizen-centric mobile extension for services in the form of mParivahan app, with 4 million downloads, comprehensive Analytics Portal, API-based data integration facility and so on.

With the technical expertise, experience and innovative approach of NIC, I am confident that the project will be able to bring in a transformative change in the entire transport ecosystem in the country.

**Y.S. MALIK, IAS**  
Secretary, Ministry of Road  
Transport & Highways  
Government of India

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enable real-time update of vehicular pollution control status and allow its enforcement.

- A number of other applications like Border Check Post, Online Letter of Intent, Backlog Module, Driving School Module etc., have been developed as per the requirements of various states.
- API-based data integration with Insurance/ IRDA, NCRB, State Police, CSC, eDistrict, SARAL, UMANG, DigiLocker, Banks, FASTag etc., has been implemented to facilitate a connected ecosystem.
- Elaborate dashboards, analytics, MIS Reports, fast search options have been implemented.

### Major impacts

#### Eliminating/ Minimising RTO visits

Like all government endeavours, target beneficiaries are only the citizens, and the driving principle is to facilitate better, efficient and timely services to them. With the implementation of a large number of citizen-centric services, adoption of e-payment and online appointment facility, citizens have the option to carry out a major part of the transactions involved in all processes from the comfort of their homes, and need to visit RTOs only for essential functionalities such as appearing in learner or driving tests, authenticating documents, or getting physical fitness of vehicles done etc., and that too, as per pre-scheduled appointments. Some services such as tax payment, getting specific certificates etc., require no RTO visit at all. Many State Governments are further aligning their business processes with the new technological options to further reduce/ eliminate RTO footfall and relieve the citizens. Although it requires a systemic change, starting with enabling legislation down to the implementation details, the Transport Application is equipped to play a significant role in enhancing the quality of services rendered to common citizens through the intervention of appropriate technology and processes.

#### Making payments online

Most of the states have adopted e-payment facility and some have totally abolished cash payment. About half of the total receipts made through eTrans-

port applications are through e-payment, giving a big boost to the government's stated objective to move to a digital payment platform. Another major upshot of this whole initiative is a sharp rise in the transparency and accountability in the system. Although there is a lot of ground yet to be covered, in most cases, citizens



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eTransport Mission Mode Project aims to bring convenience and transparency in the entire Transport domain fulfilling the needs of citizens, government and businesses. The technical expertise, rich domain knowledge and sustained efforts of the NIC team, our technical partner, have led to the wide-spread acceptance of various applications developed under the project.

Vahan and Sarathi, with their centralised, web-enabled versions continue to keep the flag high and have penetrated most of the states/ UTs, covering their diverse systems and processes under a unified, common system for various vehicle and license related services. New initiatives like mobile-based eChallan Traffic Enforcement Solution and citizen-centric App mParivahan have further spread a range of services.

The project is continuously evolving with the introduction of new and emerging technologies to further enhance the quality and scope of services, making a huge impact in the transport ecosystem.

I believe that with the continuous support from NIC team, we continue to succeed in our endeavour to make the life of citizens, government and allied businesses easier.

**PRIYANK BHARTI, IAS**  
Joint Secretary (MVL)  
MoRTH

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Launch of Integration of DigiLocker with Driving Licence and Vehicle Registration Certificate

are facing less hassle in getting their services. Leakages in government revenues have substantially reduced and overall environment in most of the RTOs has become more transparent and citizen-friendly.

### Enhanced monitoring through dashboards

The [parivahan.gov.in](https://parivahan.gov.in) portal incorporates dashboards, providing a variety of Key Performance Indicators (KPIs) depicted in the form of tables, graphs and charts. These live dashboards pull data from the Vahan and Sarathi databases to provide live up-to-date, easy-to-comprehend status of the projects to the entire hierarchy of decision makers, planners and administrators, enabling them to trouble shoot, course correct, plan and take decisions on the fly. This access to relevant information at a glance garners easy involvement of all stakeholders of the eTransport MMP.

### Brief overview of major new initiatives

#### Vahan 4.0 & Sarathi 4.0



The centralised Vahan 4.0 (<https://vahan.parivahan.gov.in/>) is a highly flexible and comprehensive application, which

aims to automate the RTO operations and citizen-centric services related to Vehicle Registration, Permit, Taxation, Fitness, and allied activities. Similarly, Sarathi 4.0 (<https://parivahan.gov.in/sarathiservice>) deals with citizen-centric services and back-end RTO operations related to driving licence, learner licence, motor driving schools and allied processes.

These two applications have been implemented in ~1100 RTOs across 31 States/ UTs – with state-specific rules, tax structures etc. They are endowed with sophisticated features and a huge array of functionalities. They are architected on a centralised, multi-tenanted, web-enabled platform and deployed on NIC cloud infrastructure, which provides high security, availability and data integrity. It comprises a single database and single-core application having an intelligent configuration option to address inter-state variations in the processes, tax structures, formats, payment modes and so on. The system is integrated with multiple Payment Gateways, IRDA, NCRB, CSC, Aadhaar, DigiLocker etc.

#### Analytics Portal

Considering the volume and complexity of data generated through various transport services, a progressive Analytics Portal has been implemented in the project.

NIC has adopted open source BI tools such as Javascript Libraries, Elastic Search and Text Search. An open source

database Postgres is used for all the required data repositories.

To establish the efficacy of solutions for complex Parivahan environment, NIC has experimented with multiple prototypes, viz. Alert Dashboards using Tableau and also Analytics use cases, using 'R'.

The portal, provisioned with an aim to enable efficient decision-making and forecasting, serves the following key purposes:

- Business Intelligence (BI) Portal to fulfill the analytics and reporting needs related to Vahan, Sarathi and other transport related data. Comprehensive dashboards for Vahan and Sarathi to analyse and monitor the important analytics KPIs.
- Advanced, fast and comprehensive search utility to quickly access details of Vahan RC and Sarathi DL
- Leveraging Advanced Analytics to forecast the occurrence of events in future, based upon the historical data

#### eChallan

This integrated Traffic Enforcement Solution has been designed primarily for the Transport Enforcement Wing & Traffic Police.

- Android-based Mobile App and back-end web application
- Online payment of challans by citizens, "anytime and anywhere"



First Zonal Level Workshop held on 12th September 2018

- Management of traffic violations through multiple devices such as Smart PoS, CCTV, GPS and Speed Guns
- Seamless integration with National Databases like Vahan 4.0 and Sarathi 4.0 to book online and offline challans
- Central monitoring of Road Safety Policy implementation
- No duplicate or fake challans (comprehensive monitoring, audit option for each individual challan or concerned official by department remotely)
- Completely customisable as per state/department requirements
- Blockage of transactions on concerned vehicle/ licence, in case of pending challan

### mParivahan

- A mobile-based application meant primarily for citizens and transport operators for accessing various transport-related services such as payment of road tax, application related/informational services, and other citizen-centric functionalities
- Android-based App: Easy to download from Google Play Store

- Access to all-India RTO vehicle RC number search, and vehicle information like Owner Name, Registration Date, Make, Model, Fuel Type etc.
- Most downloaded App of NIC: 4.5 million+ downloads
- Virtual Driving Licence and Virtual Vehicle Registration Certificate through back-end connectivity to the Transport National Register, encrypted in QR code to replace existing physical documents/cards with the secured, enforceable, digital identities
- Virtual DL, RC now notified as valid documents by MoRTH, GoI

### Homologation of vehicles

This application (<https://parivahan.gov.in/makermodel/>) allows vehicle manufacturers to get their models registered and type approved online through authorised Type Approval Agencies (ARAI, ICAT etc.), upload inventory (with chassis number, engine number, colour, date of manufacture, ex-showroom price etc.), which is later linked to the Vahan and Online Dealer Point Applications during the registration process.

### Fancy Number Auction

- e-Bidding facility for online booking of premium registration numbers by new vehicle owners
- Allows citizens to choose, bid and pay online for fancy/ choice registration numbers as per the state policy
- Introduced under the NIC flagship application, VAHAN, with a view to bringing transparency into the system of allocation of registration numbers
- Aims to avoid unwarranted pressure on officers for these numbers and contributes to revenue for the exchequer
- Minimal auction registration fee, as decided by the state transport policy

### CheckPost

It is an online solution for tax collection of vehicles coming from other states, facilitating cashless and seamless collection of taxes.

- A portal has been developed to serve as a common platform for various states/UTs through which one can deposit state entry taxes through e-payment facility rather than physically visiting the RTO.
- SMS based receipt is generated as a proof of payment.
- Authenticity of payment is ensured by providing login facility to transport officials to use the portal.

### Applications for CNG Kit, SLD and VLT Devices

The users are CNG Kit Component Manufacturers, Dealers, Retro-fitment Agencies, Vehicle Owners and RTOs. This application allows CNG KIT component manufacturers to register, upload their models, get type approval

<https://parivahan.gov.in/cngmaker>

<https://vahan.parivahan.gov.in/vahanservice>





“The successful implementation of Vahan 4.0 and Sarathi 4.0 in all our Transport Offices of the Union Territory of Puducherry have empowered the citizens to avail the online services on any time anywhere basis and the workflow based application has improved and enhanced the way in which the services are delivered in an accountable and transparent manner. The ongoing support that is being provided by the State and Central team of NIC in pre-implementation and post-implementation is laudable.

**DR. A.S. SIVAKUMAR**  
Transport Commissioner  
Puducherry

and upload inventory. This is further utilised by other stakeholders for different stages/ points.

Similar applications are also available for Speed Limiting Devices (SLDs) and Vehicle Location Tracking Devices (VLTDs) (<https://parivahan.gov.in/cngmaker/>, <https://parivahan.gov.in/sldmaker/>)

### Vahan 4.0 (RTO Application) Online Services

(<https://vahan.parivahan.gov.in/vahanservice>)

Online citizen-centric and trade-centric services related to Vehicle Registration, Permit, Fitness, Tax Payment etc., are accessible through this website. Option for e-payment of fees/ taxes and Appointment/ slot booking is available.

Sample list of available online services:

- Pay online Road Tax
- Hypothecation Endorsement, Termination
- NoC to Other State

- Transfer of Ownership
- Change of Address
- Renewal of Registration Certificate
- Duplicate Registration Certificate
- Particulars of Registration Certificate
- Application for Fitness Certificate
- Request for Mobile No. Update
- Temporary Permit
- Pay Online Border Entry Tax
- Conversion of Vehicles
- Alteration of Vehicles
- Re-assignment of RC Number
- RC Cancellation, Surrender, release
- Duplicate Fitness Certificate
- Online Trade Certificate
- Renewal of NP, AITP Authorization
- Fresh Permit, Special Permit

### Sarathi 4.0 (RTO Application) Online Services

(<https://parivahan.gov.in/sarathiservice>)

- New Learner Licence (LL)
- New Driving Licence (DL)
- New Conductor Licence (CL)
- Learner’s Licence for Expired CoV
- Services on LL/ DL/ CL
- Search/ Cancel/ Modify/ Track Application
- Camp Registration
- Upload Documents/ Photographs
- Slot Booking for LL Test/ DL Skill Test
- Add Class of Vehicle to Existing DL
- Print Learner Licence, DL Extract Online

### Technology Landscape

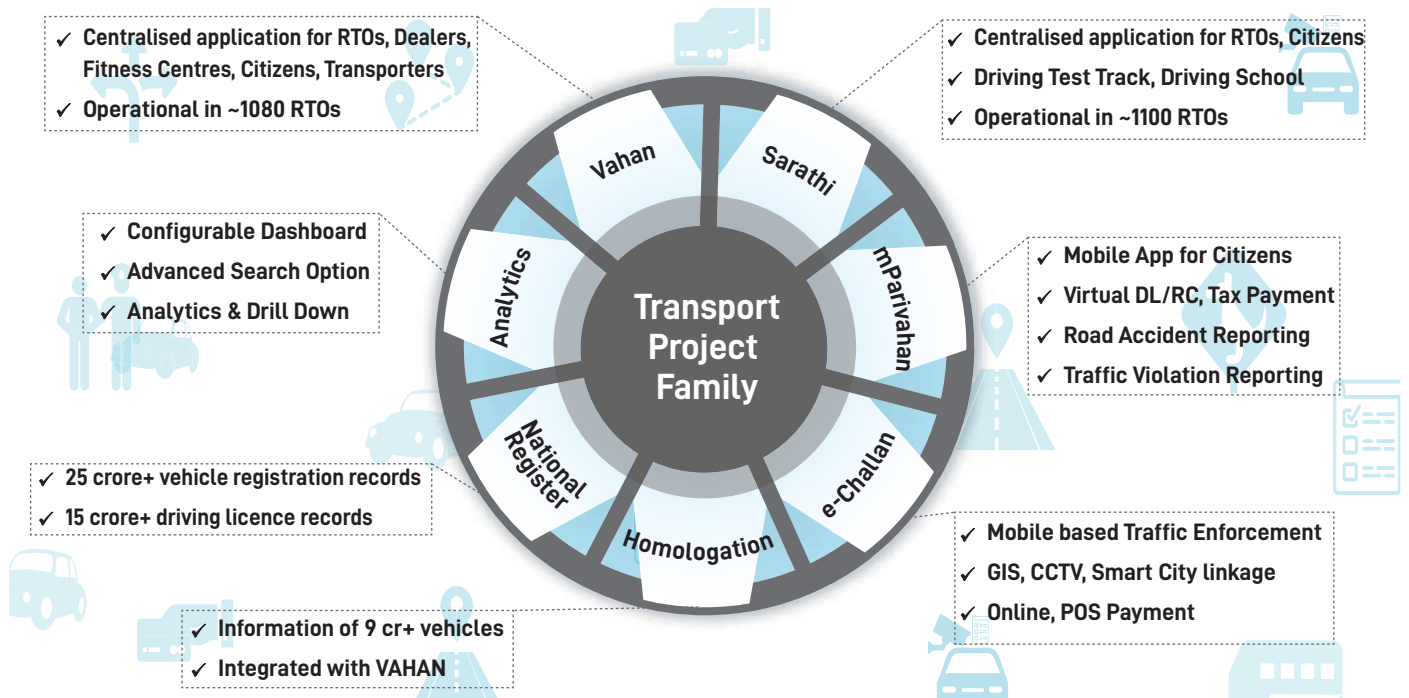
Application	Java 8, struts 2.x, JavaScript, JQuery 1.11, HTML 5, CSS 3, BOOTSTRAP 3.3.0, Hibernate 3.x, Ajax,JSF, PHP Zend, Angular JS
Web Servers	SOAP, RESTFUL
Web Servers	Web Servers: Tomcat 7.x
Database	PostgreSQL 9.6/ 10
Database Tools	Pgbouncer 1.7, Pgbadger 7.x, EFM
Monitoring Tools	Zavix, Nagios, PEM
Operating System	Windows, Linux, Android



“I have been associated with eTransport MMP almost from its inception, and I take great pride in the progress and impact this project has shown over the years. The implementation of this project has been both intellectually and emotionally stimulating, which has ensured my growth as well, all along.

It is one of the leading e-Governance projects implemented by NIC, recognised at various forums and levels, and continues to scale even greater heights. Notable is the expansion in the scope from creation of National & State Register to centralised, web-enabled RC & DL services through Vahan 4.0 and Sarathi 4.0 applications, implemented across the country. The team at NIC has been innovative and sincere enough to introduce new solutions, viz. eChallan for an effective traffic enforcement, mParivahan Mobile App for on-the-go service availability. The initiatives have been hugely popular and made great inroads in the transport ecosystem in a very short span of time.

**GAUTAM GHOSH**  
DDG & HoG  
eTransport Project, NIC



Transport Project: Key Applications/ Systems

- Download/ Print Application Form
- Mock LL Test

Key Aspects

- The Transport Project Applications (Vahan, Sarathi, eChallan etc.) are hosted on a centralised platform in multi-tenanted deployment architecture with all RTOs, citizens and other stakeholders connecting over the Internet.
- Data Centre is at NDC, Delhi and DR site and NDC, Bhubaneswar.
- The state-wise variations are addressed through an elaborate set of configuration options.
- Legacy data is migrated with an appropriate mapping and transformation.

- The Applications are primarily based on open source technologies/ platforms, making it replicable and interoperable.
- Vahan 4.0 is currently running on 24 application servers and Sarathi 4.0 on 32 application servers. As the load increases, more application servers are added to facilitate horizontal scalability.
- High-end physical servers (4 CPU, 72 core, 512 GB RAM) have been utilised with additional features like separation of the read and write requests. Functionalities like MIS Reports, Analytics, API, Data Sharing etc., are addressed through separate DB servers, which are kept in sync through streaming replications.

Way forward

The vision of the eTransport Project is to:

- Bring in transformational changes in the processes, technology and mindset behind the system
- Focus on the citizen-first approach, simplified and easily accessible services, and interoperable systems
- Make the best use of emerging technologies and redefine the focus of government services

*The changes brought about in the system are already touching the lives of citizens, Trade, Departmental officials and other stakeholders in the Transport ecosystem in a very positive way and going forward, these changes have the potential to make it a true success story of Digital India. ■*



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