



AUTOMATED TRAFFIC MONITORING AND CHALLANING SYSTEM – BENGALURU

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Introduction:

Enormous growth of vehicles, indiscipline on the part of road users and poor traffic enforcement has led to traffic congestion, increased pollution levels and road accidents in most of the Indian cities today. The problems are largely due to manual Traffic Challaning System which is ineffective and has low deterrence level.

In order to bring transparency in challaning traffic offenders, Bangalore City Traffic Police started the Enforcement Automation Centre in the year 2002. In Mysore City Automated Traffic Challaning System was introduced in September 2013. In this system, violation of traffic rules by road users is captured on cameras and computerized Challans are sent to the owners of vehicles to pay traffic fines.

This system has proved effective in enforcing traffic rules. Use of technology with least human intervention has also helped in gaining public acceptance and support.

This system has several advantages like:

- It brings transparency in enforcement of traffic rules
- Avoids conflicts between police and public
- Increase in awareness of traffic rules and regulation
- Reduction in the processing time of violation and disposal of the same
- It helps in identification of repeat violation and imposing enhanced fine
- It can be used as an effective tool of e-governance to manage, monitor and administer

How does this system works?

Main Automation Centre:

The Automation Center works on the computerized process of capturing the violations through various inputs such as - reports from the police personnel, complaints by the public (SMS, E-mail, Facebook, IVRS), analysing the live images/videos captured by the Enforcement/Red light Camera, Field Traffic Violations noted by the Traffic Police Personnel on the field etc. All these inputs are fed into a Centralized Database Server accessed through the workstation by the personnel at the Automation Center.

The data so collected is properly organized and is made available to all Police Stations over the internet. It can also be accessed by Blackberry Enforcement Devices provided to the field personnel. This facilitates the public to go to the nearest police station or to the traffic personnel with Blackberry Enforcement Device to pay fine and compound the offences leading to “Anywhere Anytime” fine collection and disposal mechanism.

This systems works on the inputs given by:



- 1) Enforcement/ Red light Camera
- 2) Surveillance camera
- 3) Field Traffic Violation Reports through digital cameras
- 4) Public complaints through IVRS, G-Mail, Face book and Public-Eye

1. **Red light camera** captures the image of a vehicle crossing an intersection violating red signal. It continuously monitors the traffic signal and is triggered by any vehicle entering the intersection above the preset minimum speed and specified time after the signal has turned red. The image of captured vehicle's registration number is perused and fed manually to the computer. The address of the vehicle registered with RTO is obtained through an interface with the RTO's Vehicle Registration Database details like name of owner and make, model and class of vehicle. Then a notice under section 133 of IMV Act is generated in an automated process with details like owner of the vehicle, date and time of violation, make and model, fine amount and the location of violation and sent to the owner.
2. **Surveillance cameras** installed at junctions provide live video streams/still images to the Traffic Management Center via a leased line network which are seen and analysed by the personnel at the Automation Centre for identifying violations. PTZ (Pan, Tilt and Zoom) cameras are being used for greater flexibility in viewing the video/images in various angles with clarity. Some of the violations noted are - not wearing helmet, crossing stop line, parking on zebra crossing etc. After carefully observing the violation, it is entered in the violation database for further processing.
3. **Field Traffic Violation Report:** This involves the constabulary noting down details like the registration number, type of vehicle, colour and make in a pre-printed proforma called FTVR (Field Traffic Violation Report). This data is fed in a computer at the police station and sent to the Automation Enforcement Center equipped with computers, software and vehicle database provided by the M.V Department where they are processed and notices are generated.
4. **Public complaints** which come to the traffic police through various means are processed as mentioned earlier and notices under section 133 of IMV Act are generated.

Serving Notices:

Notices are served through post and sometimes through police personnel. If the owner of the vehicle pays the fine it gets deleted in the server. If not, it comes up in the Blackberry handset of traffic police officer. The owner can clear the pending fine by:

1. Payment at any traffic police station
2. Payment through any traffic ASI, PSI, PI in the field
3. Payment at Automation Enforcement Center / TMC

Implementation Strategy:

In order to implement Automated Traffic Challaning System in a city with a population of one million, the following deliverables are required:-



- i) Database server and its connectivity with Transport Department Server
- ii) 100 Nos. hand-held enforcement devices along with Bluetooth enabled printers
- iii) Back-end connectivity between handheld devices and database server through a service provider.
- iv) 50 Nos. surveillance cameras with connectivity to Traffic Management Center
- v) 4 Nos. enforcement cameras with connectivity to Traffic Management Center
- vi) 200 Nos. digital cameras with online connectivity with data base server through a service provider
- vii) Printed blank challans for generating notices under Section 133 of IMV Act.
- viii) 75 Nos. Traffic Police Officers of and above the rank of Assistant Sub-Inspectors of Police.
- ix) 250 Nos. Head Constables / Police Constables
- x) Police constables trained in computers for manning Traffic Management Center and Automation Center

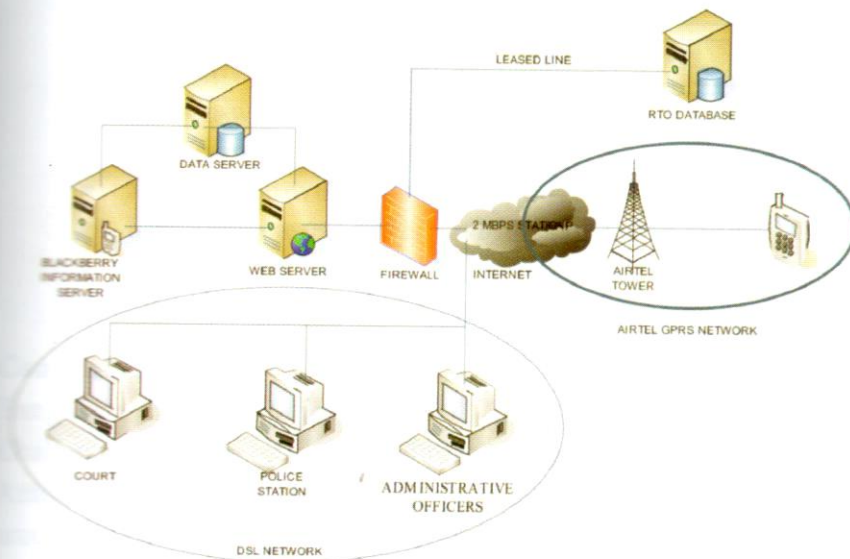
System Architecture

Traffic Enforcement System Architecture

- The solution enables traffic field personnel to access the backend infrastructure through a mobile handheld device in a highly secured manner with ease
- The handheld application print data on a Bluetooth/Wi-Fi enabled printer
- Push technology for data transfer - 'Always ON' feature

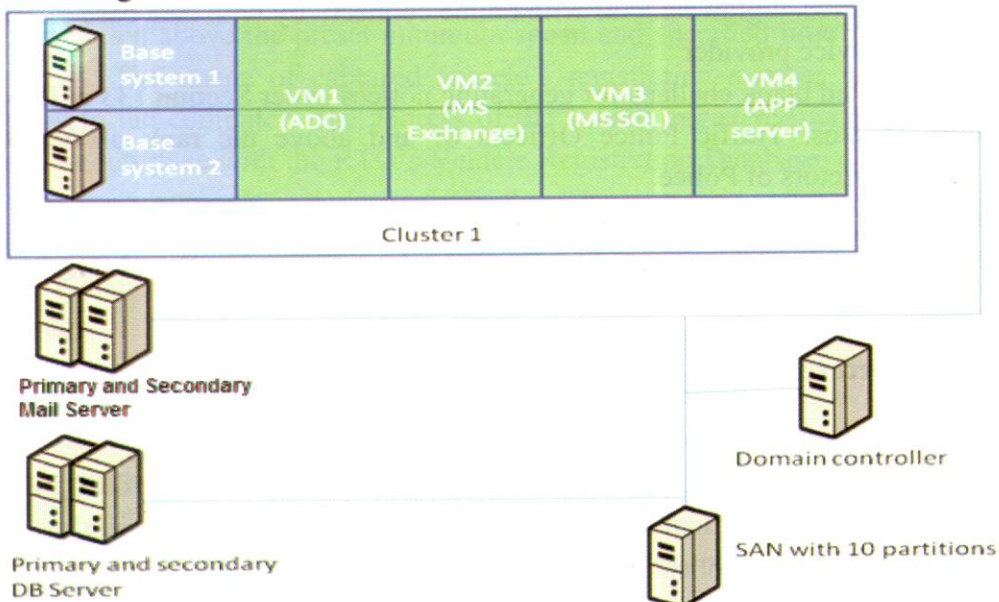
Network Architecture

- The handheld devices are connected with State Data Centre through mobile packet data network (GPRS/EDGE/3G/4G)
- The application in the handheld devices enables collection of fines online
- In case of any network issue or server related issues, data gets stored on the handheld device and gets uploaded on the server automatically once the network connectivity is restored

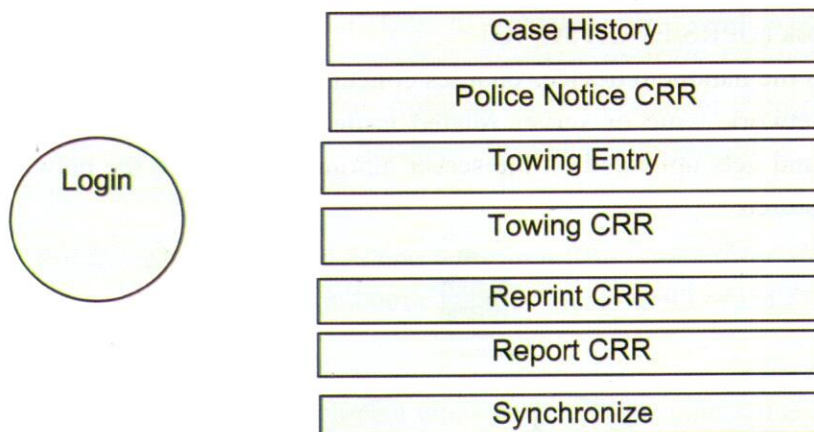


Server architecture:

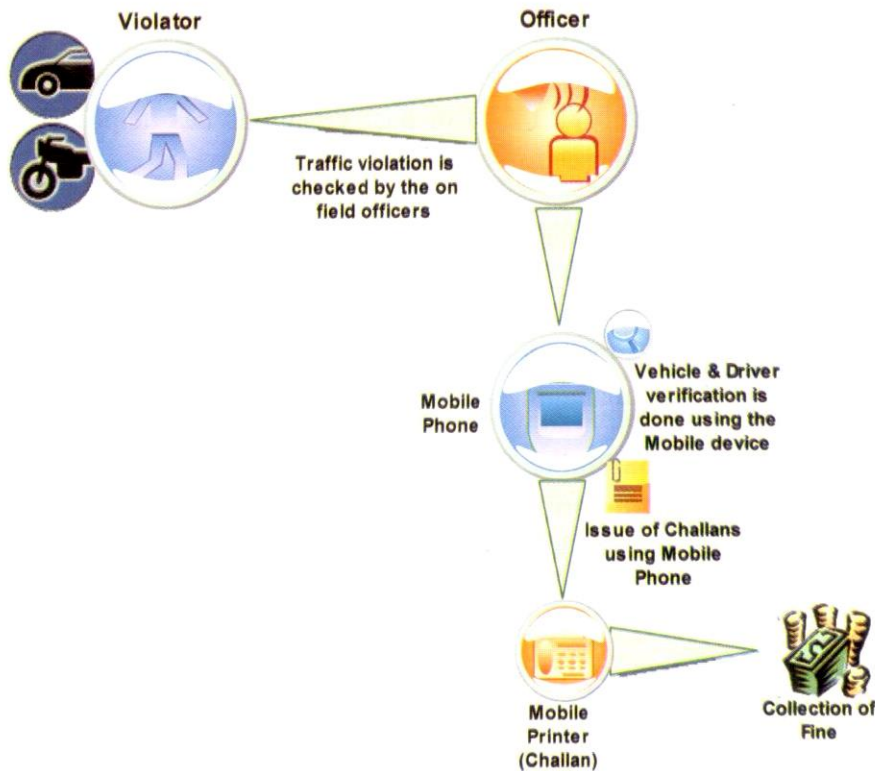
- Redundant infrastructure with high availability
- Application Servers
- Data Base Servers
- Mail Servers
- Storage



Features of the Enforcement Application Software:



Process Flow Diagram



Typical Management Information System Reports:

Reports are provided to senior officers to monitor the activities. Web reports can be accessed with login and password to avoid unauthorized access. Hierarchy based MIS report sub-modules can be designed as per requirements.

Following reports are generated:

- Vehicle-wise offences daily/monthly or weekly reports
- Police station-wise offences
- Station-wise case booked report
- Station-wise amount collection report
- Station-wise issue of police notice and on the spot fine
- Station-wise charge sheet generation report
- Officer-wise case booked and fine amount collection report
- Subdivision-wise reports
- Report on cases booked and fine collection report
- Report of cancellation of licenses
- Suspension & revocation of permits

Conclusion:

Bangalore Traffic Police under B-Trac project implemented the Automated Traffic Challaning System way back in the year 2003. Some other cities had also initiated Automated Enforcement in a limited way. On an average Bangalore Traffic Police books around 8000 traffic violation cases through cameras and another 8000 through handheld Blackberry devices. Bangalore Traffic Police has booked over 7.4 million traffic violation



cases in the year 2014 and has collected Rs. 65 crores as fine during the same period. Presently Bangalore Traffic Police is using 5 enforcement cameras, 175 surveillance cameras and around 500 digital cameras. This system has brought dividends for Bangalore Traffic Police in the form of greater transparency and effective enforcement of traffic laws. Apart from this, ready availability of data of past violations has helped Bangalore Traffic Police to send 4,587 driving licenses for suspension.

Similar system has been implemented in Mysore City since September 2013, and Mysore Police has generated 4,50,000 notices for violations of traffic rules through it. Bengaluru Traffic Police generates more than 20 lakh notices every year. Automated Traffic Challaning System can be adopted in other Indian cities & towns and can be used as an effective e-governance tool in managing and monitoring traffic related issues.

The Automated Traffic Challaning System is a revenue generating model. Similar system for a city of one million population would require an approximate initial investment of Rs. 10.32 Crores which can be recouped within one year. Thus, the entire system is self-sustaining and does not require any funds for expansion.