Electronic Toll Collection

Report by Apex Committee for ETC Implementation

Government of India

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Executive Summary
Functioning at toll plazas becomes more efficient, transport operators will be able to track fleet movement, toll road users drive non-stop without bothering about toll rates or money change, same tag is read at toll plaza on all the Highways across the country and we save paper as well as fuel – these are only some of the benefits of the nationally interoperable Electronic Toll Collection (ETC) system. The system basically involves a self-adhesive tag affixed on the windshield of vehicle getting read by transceivers installed at toll plazas.

Given the Indian Government’s expansion plan for National Highways, there is an underlying need to delve into manual method of toll collection. Considering user convenience, rate of acceptance and ease of implementation, RFID technology was recommended by the first Committee constituted by MoRT&H in its report. Upon acceptance of the said report, an Apex Committee was constituted in March 2011 for suggesting the operational methodology for implementation and operation of the ETC system. This report details the four key areas of planning, as the committee charter had mandated, viz. implementation strategy, standards finalization, institutional framework and overseeing implementation, as deliberated upon by this Committee.

A key component for implementation of Nationwide RFID based ETC is interoperability, which requires integration and standardization. The tag on the vehicle needs to be read by all the transceivers and at the same time, all the tags should be read by a particular transceiver. Therefore, the requirement is to operate with transceivers and tags with certain common specifications. While these specifications on the transceiver and tag need to be adhered to mandatorily to be a part of the ETC system, the Committee also defined functional requirements of the Automatic Vehicle Identification system and data exchange formats.

To understand its architecture, the functions/services to be performed in the ETC system need to be identified first. The three broad components of the ETC system are Tag distribution, Toll road user account registration & recharge and Toll transaction. For managing all the functions detailed by the Committee in the report, a virtual hub, called the Central ETC System (CES), primarily a web application (portal) with access to all stakeholders, is proposed to be created. Be it Point Of Sale (POS) operator issuing a tag or Tag user putting money in the account, be it managing Toll plaza concessionaire account or serving the Government through a MIS, each stakeholder interacts with CES through web. The core functions of the CES include Management of accounts of concessionaires, users, POS, distributors, manufacturers, Tag issuance, Recharge management, Interaction with toll plaza application, Toll transaction processing & settlement and public interface functions.

In addition, certain basic applications at the Toll plaza & POS and user services support desk are operated to serve other functionalities. The toll plaza application has two components, viz. Server side, which interacts with CES, and Lane controllers, which capture tag information, perform preliminary validation & push data to the server.
Due to reasons like multiplicity of stakeholders in the ETC system, potential to expand the services to state highways, parking lots, etc. and requirement to pool knowledge from various sectors, a Special Purpose Vehicle (SPV) would be the ideal organization structure to implement and manage this project. Primarily, this SPV shall be exclusively responsible for all the services of Central ETC System and Tag distribution. The supervision, control and enforcement aspects also would need to be taken care by the SPV. Further, the SPV shall hold strategic control, including lifecycle management over ETC technology, data, information, software and all other components. At least for the initial phase of the ETC project, since it will take considerable time to develop in-house expertise, it has been assumed that certain expert services will be procured by the SPV from the market. These services could include Clearing house operations, Helpdesk operations, Web application development & maintenance and Tag distribution. Two separate RFP documents, indicative terms of reference, functional requirements, service level agreements & selection criteria for which form part of this report, will need to be finalized for each type of vendor.

ETC is a relatively new concept in the highways domain and has not been tested extensively yet in Indian conditions. Therefore, at least for the initial phase of the project, the promoting Central Government body should control the entire project. This would mean 100% stake in this SPV should be held by MoRT&H. With a passage of time, depending upon various factors like project expansion planning, expertise requirement, this shareholding could be appropriately diluted in favor of other stakeholders. Further, this SPV should be established in the form of a Company incorporated under section 25 of the Companies Act, 1956, as ETC system being a public service, for-profit motive will be unjustifiable. In the interim, a Project Implementation Unit (PIU) could be setup by MoRT&H to undertake activities like RFP finalization, bid process management and company incorporation. PIU will merge into the SPV, as and when it is formed.

As the ETC system will come into existence, there is a need to identify the possible violations and enforcement elements against the same. It has been noticed that most of the violations will get covered under various provisions of Indian Penal Code 1860 and IT Act 2000. However, for the violation of toll road user entering ETC lane without a valid tag, an official notification will be required to be issued (the Committee has provided a sample of the same).

As the way forward, the following sequence of activities should be adopted – RFP finalization, Bid process management for vendor selection, SPV formation, Solution development, deployment & testing and Pilot implementation. It is estimated that starting October 2011, this entire process shall take at least 10 months time.
ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>AVC</td>
<td>Automatic Vehicle Classification</td>
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<td>AVI</td>
<td>Automatic Vehicle Identification</td>
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<td>CES</td>
<td>Central ETC System</td>
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<td>CESP</td>
<td>Central ETC System Provider</td>
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<td>ETC</td>
<td>Electronic Toll Collection</td>
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<td>ICT</td>
<td>Information and Communications Technology</td>
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<td>IVRS</td>
<td>Integrated Voice Response System</td>
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<td>MoRT&amp;H</td>
<td>Ministry of Road Transport &amp; Highways</td>
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<td>NHAI</td>
<td>National Highways Authority of India</td>
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<td>NIC</td>
<td>National Informatics Centre</td>
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<td>POS</td>
<td>Point Of Sale</td>
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<td>RFID</td>
<td>Radio Frequency Identification</td>
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<td>RFP</td>
<td>Request For Proposal</td>
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<td>SMS</td>
<td>Short Messaging Service</td>
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<td>SPV</td>
<td>Special Purpose Vehicle</td>
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<td>VES</td>
<td>Vehicle Enforcement System</td>
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1 Introduction
Highways being the lifeline for any economy, the Ministry of Road Transport & Highways (MoRT&H), Government of India has decided to induct technology to make travel across Indian National highways seamless. Electronic Toll Collection (ETC) is the recent most initiative to enable a near non-stop travel for highway commuters across the Country. This report details the steps for implementation of ETC system in India.

1.1 Context
India is soon going to have one of the world’s most extensive National highway networks through various phases of the National Highways Development Project planned by the Government. The project, already in advanced stage of completion, is being financed largely through subscriber fees collected from subscribers at toll collection points on these improved highways. This underlines the need for large scale tolling of the highways.

As the volume of traffic increases, the current method of manual toll collection, with or without using computer generated receipts, becomes inefficient, prone to leakage and difficult to sustain. The method of payment requires vehicles to stop at toll plazas and wait a relatively long time for their turn to come. The current state of congestion and operational inefficiency at toll plazas prompted the Government to plan & implement an integrated ETC system, which can facilitate convenience for subscribers, and transparency & efficiency for operators.

With an aim to plan for improvement the toll collection scenario across the highway network, the Government had constituted a committee under the chairmanship of Shri Nandan Nilakani in 2010. This Committee’s mandate was to examine all technologies available for ETC and recommend the most suitable technology for local conditions. The Committee concluded that the plan for implementing ETC on India’s highway network aims to ease delays and traffic congestion at toll collection points. The ETC system would enable a smoother thoroughfare of traffic at toll plazas by facilitating Automatic Vehicle Identification (AVI) and electronic collection of toll. Considering user convenience, rate of acceptance and ease of implementation, passive Radio Frequency Identification (RFID) technology was recommended by the Committee in its report dated 28 June 2010.

Upon acceptance of the report submitted by the Committee chaired by Shri Nilekani, Apex Committee was constituted vide Order No. H-25011/4/2010-P&P dated 08.03.2011 (placed at Annexure A) for suggesting the operational methodology for implementation and operation of ETC, based on consultations with stakeholders and finalization of the required standards for the different components of ETC system. This Apex Committee comprises the following members:

► Dr. Y.K. Sharma, DDG, NIC – Chairperson
The Terms of Reference for the Apex Committee were notified as follows:

1. To develop strategy for implementation of ETC in the country including planning, operational methodology, process design, system design, security function and performance requirements.
2. To evolve and finalize standards for various components of ETC system.
3. To evolve an institutional framework for implementation and operation of ETC.
4. To oversee the implementation of the project by the designated agencies.

1.2 Approach adopted by Apex Committee

The Apex Committee, mandated with design and implementation of Nationwide Electronic Tolling systems, decided to examine all aspects of ETC implementation, starting from finalization of technology followed by drafting operational methodology, process design and system design. The methodology adopted by the committee has the following dimensions to it:

- Regular committee meetings
- Stakeholder consultation
- Study of international case studies
- Engaging consultants

The Committee met twelve times over a period of 4 months, through various communication channels including video conferencing, with the agenda primarily comprising of taking decisions on various ETC system aspects and tracking project progress. A summary of the key decisions taken in these meetings is placed at Annexure B.

As recommended by the committee under Mr. Nandan Nilekani, the passive RFID technology to be adopted conferred to EPC, Gen-2, ISO 18000-6C standards. However, detailed tag and transceiver specifications were formulated by the Apex Committee.

In the process of finalization of these technical standards, the Committee decided to take the suggestions from the key stakeholders by means of a one day workshop. This consultation workshop, held on 14 June 2011, with ETC Technology Providers and Concessionaires was
organized to discuss and finalize the draft specifications for RFID tag & transceiver and Data exchange standards, as prepared by the Committee. There were more than 40 attendees representing around 22 concessionaires & technology providers for ETC systems (detailed list attached at Annexure C) and the entire participation was appreciative of this initiative of Government of India.

The Committee conducted an extensive research on international ETC best practices to understand implementations or experiments of toll charging technology in terms of urban demand management, interoperable toll schemes, account management, vehicle class identification, registration & prepaid account recharge, enforcement and violation handling, tag distribution management and installation in order to efficiently handle operational issues during roll-out.

1.3 Key planning areas
All the Committee objectives have been translated into the following key planning areas for the ETC system.
► RFID tags and transceivers
► ETC system architecture
► Institutional framework for ETC implementation
► Enforcement against violations

These four areas address the technical, commercial as well as legal requirements for implementation of an effective ETC system as per the terms of the reference of the Committee. The subsequent chapters of this Report discuss these in detail.
2  **RFID Transceiver and Tag Specifications**

The two core components of the ETC system are RFID Transceivers and Tags, which interact for the toll transaction to take place. As the vehicle reaches the toll plaza, the passive tag on the vehicle’s windshield is read by the transceiver installed at the toll plaza.

A key component for implementation of nationwide RFID based ETC is interoperability, which requires integration and standardization. The tag on the vehicle needs to be read by all the transceivers and at the same time, all the tags should be read by a particular transceiver. Therefore, the requirement is to operate with transceivers and tags with certain common specifications.

The Committee finalized these specifications under two broad parameters, viz. General and Environmental. The general specifications comprise frequency, power, protocol and other standards. Due consideration was given to local conditions while formulating environmental specifications, like relative humidity, operating temperature and storage temperature. In addition, the specifications for the transceiver include operating characteristics and for the tag include installation procedure and memory particulars.

While these specifications on the transceiver and tag need to be adhered to mandatorily to be a part of the ETC system, the Committee also defined functional requirements of the AVI system and data exchange formats. This exchange of data takes places between the tag & transceiver, transceiver & toll lane controller, toll lane controller & toll plaza server and toll plaza server & Central ETC system. The data exchange flows are shown below.

![Figure I: Schematic Data Exchange](image)

The document on the entire set of specifications, AVI functions and data exchange flows, finalized through a stakeholder workshop, forms Enclosure I.
3 ETC System Architecture

ETC is a system enabling collection of toll payments electronically, allowing for near-nonstop toll collection and traffic monitoring. ETC utilizes vehicles equipped with transponders (electronic tags), wireless communication, in-road/ roadside sensors, and a computerized system (hardware and software) for uniquely identifying each vehicle, electronically collection of toll, providing general vehicle/ traffic monitoring and data collection. It serves the dual purpose of collecting the toll electronically and strengthening control over the toll plaza operations. ETC facilitates the execution of toll transactions while vehicles travel at near-highway cruising speed. ETC can reduce congestion, increase operating efficiency, improve travel time, reduce pollution, and improve safety of the roadway facility and surrounding corridors.

To understand the fundamentals first, the basic transactions in the ETC system have been identified. The three broad categories for such identification are Tag distribution, Toll road user account registration & recharge and Toll transaction. The diagram below illustrates this entire transactional architecture of the Central ETC System (CES).

![Diagram of ETC Transactional Architecture]

**Figure II: ETC Transactional Architecture**

In simple words, CES is the central core application (web portal) responsible for the control of all the ETC services delivered to subscriber through Point of sale terminals, Toll plaza operators and User support desk. Based on the above transactional architecture, detailed functionalities of the system have been explained under the following four heads.

- Central ETC System Application
- Toll Plaza Application (Also referred to as Client Application)
3.1 Functions of Central ETC System application

The Central ETC System (CES) application is responsible for managing user accounts’ data and processing all the ETC transactions. Central ETC system is accessible to various stakeholders through interfaces (CES web interfaces or other stakeholder applications). Central ETC system processes the requests from various stakeholder application modules (like POS application, client application at Toll Plaza, etc) and performs backend processing for the toll transaction settlement and clearance.

A. CES Application Functions for Concessionaire

This group of functions defines the processes executed by CES application for managing concessionaire related functions starting from concessionaire account registration to the subsequent routine account management operations. The concessionaire functions performed by CES application includes:

1. Concessionaire registration (through web, no login required) – This is the first time registration on website, which requires information about the concessionaire, concession agreement, and toll plaza to be entered in the pre-designated fields.

2. Concessionaire status enquiry (access through web, concessionaire login)

3. Toll and Lane configuration (access through web, login required, concessionaire login) – The first point of entry for toll and lane data (depending upon the concession agreement) could be through the concessionaire access to its account and it gets configured into the system on approval by the ETC SPV.

4. Enquiry and update services (access through web, login required, concessionaire login)

5. Report generation (access through web, login required, concessionaire login) – The concessionaire as well as NHAI will have the option to generate reports with varied parameters, like toll amount, traffic, etc.

6. Concessionaire account closure (access through web, login required, concessionaire login)

B. CES Application Functions for Toll Plaza

The toll plaza system and the central system should be tightly coupled wherein the toll plaza system will be linked online with the central system which will enable the toll plaza system to receive online response on the validity of the RFID and also debit the account online whenever a vehicle passes-by. The system should also have exception handling system to handle situation when the connectivity is lost between toll plaza and central system.
1. Receive the toll transaction details from the Toll Plaza and initiate the settlement (automatic processing in presence of connectivity; push initiated by Toll Plaza) – These details would primarily include time stamp, toll lane number and tag id.

2. Send the latest tag subscriber information database to the Toll Plaza (automatic processing in presence of connectivity; sent through FTP, pull initiated by Toll Plaza) – This shall allow for transactions when there is no online connectivity between the toll plaza and CES.

3. Monitor the data transfer status (access through web, login required)

4. Toll plaza related report generation (access through web, login required) – There will be an option for the concessionaire as well as NHAI/ SPV to generate various reports about the toll transaction, traffic etc. at the toll plaza.

5. Request for placing/ removing vehicles into/ from the special list (access through web, login required) – These special lists could simply be discounts applicability.

C. CES Application Functions for Clearance and settlement

CES Application processes settlement and clearance for all transactions uploaded to the central ETC database from various toll plazas. The transactions that require financial settlement include Toll amount clearance for the toll transactions recorded at toll plazas, Subscriber account recharge requests, POS transactions (Tag commissioning, Tag replacement), etc. The clearance and settlement functions processed by CES include:

1. Validation of the toll plaza transactions (automatic processing) – The toll transaction data and information received from the toll plaza are cross-checked.

2. Validation of POS Transactions (automatic processing) – The tag purchase and recharge transaction data and information received from the POS are cross-checked.

3. Periodic Settlement (automatic processing) – Although the tag subscriber account will be debited with the applicable toll charge instantaneously, the concessionaire account will be settled as per the periodic cycle (at least once a day).

4. Claims Management (automatic processing, admin login required) – In case, the concessionaire/ tag subscriber claims a discrepancy with the reports generated by CES, the CES will have the functionality to investigate the issue and report accordingly.

5. Manual Adjustments (access through web, admin login required) – There should be functionality for manual adjustment, with appropriate approvals, in certain cases like mistake in special lists uploaded previously.

6. Fee Calculation for services (automatic Processing)

7. Audit of settlements done (access through web, audit admin login required)

8. Reports generation (access through web, finance/ audit/ system admin login required)

9. Alert to Subscriber via SMS/ E-mail (automatic processing) – As soon as the toll transaction is processed, an SMS/ email will be pushed to the subscriber account.
D. Distribution Agency Related Functions

Distribution agency requests processed at CES include issuance of EPC IDs for the manufactured tag IDs, Tag inventory management, etc. Distribution agency functions are executed through a CES web portal account provided to the authorized distribution agency.

1. Tag inventory management (access through web, CES admin/ logistics login required)
   - The application should have a functionality for manufacturer to enter the tag manufactured & transported, for distributor to enter the tags received & dispatched and for POS to enter the tags received & sold. This will automatically ensure tracking of each & every tag, starting from the point it gets manufactured.

2. Management of audit for Service Level Agreements (access through web, CES admin/ logistics login required)

3. Report generation (access through web, CES admin/ logistics login required)

4. Obtain EPC Codes for new Tags (access through Web, distribution agency login required) – The EPC codes will be generated by CES on request made by POS and burnt on the tag being issued.

E. Subscriber Related Functions

Subscriber requests which require CES processing include the functions like tag account recharge, view/ update the personal information, view the toll transaction history, raise query, log complaints, etc. There will be a functionality allowing subscriber to operate an account with CES against the ETC tag issued online. The various CES functions used for executing the subscriber requests are:

1. Online account creation (access through web, login required with ID provided during tag issue) – The intending user has the option to login the basic information like vehicle details on the website himself/ herself or directly go to POS for the same.

2. Subscriber info management (access through web, login required with subscriber password)

3. Recharge subscriber account (access through web, login required with subscriber password) – The tag subscriber will have the option of recharging sitting at home, through debit/ credit card, or going to POS and getting the recharge done.

4. Report/ bill generation (access through web, login required with subscriber password) – The subscriber will have the option of getting bills on a regular basis (email, SMS or hard copy) or request for one as and when convenient.

5. Alert to subscriber via SMS/ E-mail for account recharge (automatic processing) – As soon as the recharge is complete, an SMS/ email will be pushed to the subscriber account.
F. CES Functions for POS operator

POS application is responsible for managing the tag related functions like tag commissioning, tag re-initiation, tag recharge, tag decommissioning, etc. CES processes all these requests raised from POS terminals. CES also performs settlement and clearance to the POS operator for subscriber tag related transactions like enrollment (Commissioning) charges, re-initiation, account recharge, etc. The various functions executed at CES for POS related requests include:

1. POS registration (access through web, login not required) – An intending POS will have to access the website and enter details like address, contact details to register in CES records.

2. POS registration status enquiry (access through web, login required through registration acknowledgement ID)

3. Process the POS requests for (automatic processing):
   i. Tag Commissioning – In case of tag issuance for the first time for a vehicle.
   ii. Tag Re-Commissioning – In case of tag needs to be re-commissioned due to reasons like decommissioned or not commissioned properly in the first place
   iii. Tag Decommissioning – In case the tag subscriber decides to unsubscribe.
   iv. Tag Replacement – In case the tag is defective or gets damaged.
   v. Tag Re-initiation – In case tag cloning is suspected.

4. Report generation (access through web, POS login required) – The reports under this functionality could include parameters like number/ type/ date & time of tags commissioned, re-commissioned, decommissioned, replaced or re-initiated.

5. POS terminal closure (access through web, POS login required) – In case the POS terminal intends closure, the application shall seek some information, settle the accounts at the backend, update the database and intimate accordingly.

G. ETC System Administration

This group of functions includes administration of services like monitoring of the CES system performance, providing approvals for registration, toll tariff management, special list management as well as the generation of system level MIS. ETC system admin grants the approval in ETC system once manual approval is received from NHAI/ other approval authority for requests of ETC users. Some of the CES admin core functions include:

1. Approval of Registration of Concessionaire (web access, CES admin login required) – Requires approval from NHAI, in regard to terms & conditions as per concession agreement.

2. Approval of registration of POS Operator (web access, CES admin login required) – Requires approval from Distributor and in case of a new POS type, from SPV/ NHAI.

3. Approval of Toll Tariff Table (web access, CES admin login required) – Since the toll tariff table will be exactly as per the concession agreement, it will require approval from NHAI.
4. Approval of Toll Plaza proposed Special list (web access, CES admin login required) – The toll plaza special list (eg. discounting) will require concurrence from NHAI, such that it conforms to the concession agreement.

5. Manage Special List (web access, CES admin login required) – Changes might be required to be done in the special list (eg. discounting, blacklisting etc.) with approval from concerned authorities like NHAI/ SPV.

6. Approval of closure of Concessionaire, POS Operator, including unsolicited closure (web access, CES admin login required) – In the case of closure of concessionaire account, an approval from CES and NHAI will be required to ensure that accounts are settled. Similarly, in case of closure of POS, approval from CES and Distributor will be required for the same purpose.

7. Approval of Helpdesk operator registration/ de-registration – Helpdesk (customer support desk) registration would require approval from CES and SPV, as the credibility of the intending entity is verified and business terms are agreed to. De-registration will also require similar approvals as the accounts need to be settled.

H. User Account Management and Administration

CES account administration module performs the user account related functions which helps users of ETC system manage their accounts efficiently. The admin has privilege access to manage user profiles, permissions, manage user roles, access security, etc.

1. Password Reset (access through web, CES admin login required)
2. Reassignment of user privileges (access through web, CES admin login required)
3. Setting up fixed users – admin users (access through web, CES admin login required)

I. User Support Services

CES application processes all requests from user support system (call centre application and technical helpdesk services) application which involves various functions like enquiry, updates, claims, etc. CES provides controlled access of user account details to the call centre and helpdesk applications so as to be able to resolve the customer requests/ grievances. The primary functions performed by CES in response to user support services requests include:

1. Helpdesk operator registration (access through web, login not required)
2. Technical Helpdesk Services (access through web, helpdesk login required)
3. Enquiry and account update request services (access through web, helpdesk login required)
4. Ticketing and tracking services for customer grievances (access through web, helpdesk login required)
5. Receiving and acting on complaints from stakeholders (access through web, helpdesk login required)
6. Helpdesk operator de-registration (access through web, helpdesk login required)
J. CES Public Interface Functions

This group of functions is executed by CES as a part of RTI/Legal functions of ETC as well as allows management of ETC public related information.
1. RTI/Legal functionality (access through web, CES admin login required)
2. Feedback (access through web, any user, login required)
3. Public Info Management (access through web, no login required, static information)

3.2 Functions of Toll Plaza application

The Toll Plaza application is installed at toll plaza locations to record the ETC transactions. Vehicles with RFID Tags, passing through the Toll Plaza, are identified (using the subscriber information that is downloaded from the CES Central Database) at the ETC Lanes and the toll transactions are generated by the toll plaza application. These transactions are uploaded on to the CES Central Database for clearing and settlement. Thus the main functions of the Toll Plaza application include uploading of transactions to the CES Central Database and the downloading of the latest Subscriber info from CES Central Database.

A. Toll Plaza Server

Toll plaza application pulls the latest subscriber information from the CES central database on a periodic basis and records the toll transactions when vehicle passes through the ETC lane. The primary function of the toll plaza server is to validate the tag details read by the lane controller against the latest subscriber account status (pre-fetched from the CES central database). All the transactions recorded by the toll plaza application are pushed to CES central database on a predefined interval. Primary functions of the ETC toll plaza application executed at the plaza server level include:
1. Send the toll transaction details to the Central Database (automatic processing in presence of connectivity; sent through FTP etc, push initiated by Toll Plaza)
2. Receive the latest subscriber information database from the Toll Plaza (automatic processing in presence of connectivity; sent through FTP, pull initiated by Toll Plaza)
3. Propose a vehicle for entry/ removal from the special list (access through web, Toll Plaza operator login required)
4. Toll transaction processing – The first level of toll transaction processing should take place at the toll plaza server and subsequently it is sent to CES.
5. Alert generation from Toll Plaza to subscriber confirming passage through Toll Plaza (automatic processing)

B. Toll Plaza Lane Controller

The purpose of the Toll plaza lane controller/ application includes identification of vehicles at the Toll plaza ETC lanes using AVI system and sending the tag details to the
Lane controller is responsible for controlling the lane equipments based on the tag validation performed by toll plaza application (Allowing vehicle entry into ETC lane, ejecting the vehicle to premium cash lane, etc).

1. Automatic Vehicle Identification (automatic processing) – AVI happens when the tag on vehicle windshield is read by the transceiver at toll plaza and that data is pushed to the lane controller.
2. Special List handling through AVI (automatic processing)

### 3.3 Functions of POS application

The primary functions of the POS operator include commissioning of tag (at the time of tag issuance to subscriber) and perform tag account recharge. Further the POS operator, based on a request from the Subscriber, performs the act of re-initiation of the tag. POS application is supposed to be a web based application processing the various types of tag related requests like Tag replacement, Tag re-commissioning, Tag decommissioning, etc. The primary functions of POS application are:

1. Tag Commissioning/re-commissioning (access through web, POS operator login required)
2. Tag replacement (access through Web, POS login required)
3. Tag decommissioning (access through Web, POS operator login required)
4. Tag re-initiation (access through Web, POS operator login required)
5. Subscriber account recharge (access through Web, POS operator login required)

### 3.4 User Support Services

The User Support Services (USS) application is hosted at the CES for managing the call centre operations and providing technical helpdesk services to the ETC stakeholders. The users of the USS system include subscribers, POS operators, Toll Plaza operators, Concessionaire, etc. The call centre application shall access, with defined restrictions, the CES database while assisting the users resolving their queries. The functions of USS system include:

1. Enquiry/Information services
2. Grievances resolution services - Log the customer requests/claims in to CES system
3. Technical helpdesk services - Route the requests/tickets till the resolutions

Detailed process maps for each of the functions and their standard operating procedures form Enclosure II.
4 Institutional Framework for ETC implementation
The institutional framework for ETC implementation describes the entire structure with which the ETC system will function. Due to reasons like multiplicity of stakeholders in the ETC system, potential to expand the services to state highways, parking lots etc. and requirement to pool knowledge from various sectors, a Special Purpose Vehicle (SPV) would be the ideal organization structure to implement and manage this project. Although NHAI is the nodal agency for any project related to Indian National highways, its focus is more towards provision and maintenance of these highways. Therefore, this SPV should be setup under the ambit of MoRT&H. The SPV’s roles & responsibilities, framework for procuring certain expert services, SPV’s organization structure, its governance structure and legal form have now been detailed below.

4.1 SPV’s Roles & Responsibilities
The SPV will have the exclusive role of managing the entire ETC project strategically, administratively, legally, technically & commercially and specific responsibilities shall include, but not be limited to:

1. Services of Central ETC System, which includes toll transaction clearing house operations, helpdesk support and managing stakeholder accounts (detailed scope of work forms part of Enclosure III);

2. Services of Tag distribution (detailed scope of work forms part of Enclosure III);

3. Release advisories, guidelines, standards and specifications on various ETC components like ETC technology, Transceiver or Tag specifications, Toll lane or plaza layout, Toll lane or plaza software & hardware, POS layout, POS software & hardware;

4. Supervision and Control of ETC system components, including
   i. Establishing and managing the mechanism to ensure adherence to guidelines, standards & specifications, by means of testing, auditing etc.
   ii. Complaint/ feedback handling - Any person, irrespective of enrolled in the system or not, can register complaint or feedback through various modes of communication, which the SPV shall be responsible to take to a logical conclusion and report in the system.
   iii. Conflict resolution – In case of any conflict arising between two stakeholders in the system, the SPV shall be responsible to resolve the same.
   iv. Enforcement against violations in the ETC system – In case the SPV holds any enrolled stakeholder guilty of violating the prescribed rules & regulations, it shall undertake defined enforcement procedures. The SPV shall also duly enforce against the violations covered under law.
The SPV may also undertake investigations or detailed study for any of the above purposes. If necessary, the SPV may appoint an independent agency for the same.

5. **Concept marketing** – The SPV may market the ETC concept through various modes of communication in the interest of public.

6. **Record management & Reporting** – The SPV shall be required to maintain complete records of the entire ETC system, including the records relating to the above roles & responsibilities. All public documents should be made available on the ETC web-portal. The SPV will be covered under the RTI Act and at the same time it will have to produce an annual report to the MoRT&H on its state of affairs.

7. **Maintain a Management Information System** to monitor & evaluate ETC project performance and propose suitable policy amendments to the MoRT&H.

8. **Hold strategic control**, including lifecycle management (development, testing, integration, implementation, maintenance, operation) over ETC technology, software and all other components. Entire data collected or any information processed from any data in the ETC system will also be under the complete control cum ownership of this SPV.

9. Any other activity, required to make ETC system achieve the primary objectives of convenience, transparency and cost saving, or as assigned to this SPV.

The SPV may decide to outsource/ procure any of the above services, which will require the SPV to select the vendors and manage the contracts. Contract management shall primarily include monitoring service level agreements.

### 4.2 Service procurement

At least for the initial phase of the ETC project, since it will take considerable time to develop in-house expertise, it has been assumed that certain expert services will be procured by the SPV from the market. These services could include Clearing house operations, Helpdesk operations, Tag distribution and the System development or integration. While the SPV will procure these services, it will create enough in-house capability and capacity to hold strategic control of the technical solutions deployed within the SPV. The procurement could be undertaken in the following three different ways:

- **Managed Service Provider (MSP)** – A single service provider would be providing all the services to the central ETC agency.
Separate expert agencies – Under this option, separate agencies are appointed in accordance with the skill sets required for each ETC component, like Clearing House, Distribution Agency and System Integrator.

Hybrid services – The central ETC agency can adopt the hybrid service model, wherein certain skill sets are combined to enable hiring of not many vendors and at the same time avoiding monopolistic situation, as under MSP option.

The following factors may be considered for deciding on the procurement arrangement for services:

1. Multiple Service Providers vs. Single Service Provider with contractual Monopoly – Multiple Service Providers will encourage healthy competition while selection of single service provider might lead to monopoly power to extract unfair benefits.

2. In house capability development vs. procurement – It may not possible/difficult/too expensive to develop all the in technical solutions in-house. On the other hand dependence on external service providers for critical functions may lead to vendor lock-in.

3. Project expansion – In case the plan is to extend the services of ETC project in other areas like parking charges collection, the diversity of skills needed could be high which supports buying of services.

Considering the above with respect to ETC operations, Hybrid services model seems to be the most suitable for ETC implementation. Following two categories of service providers may be hired.

Central ETC System Provider (CESP) – Scope of work for this vendor will include,

a. Design, development, deployment and maintenance of Central ETC System application which has web access rights to Users, Manufacturers, Distributors, POS, Concessionaires, SPV and general public
b. Processing and settling financial transactions (toll, tag purchase, recharge)
c. Account support services, which basically comprises operating a call centre for any update or queries

As there would be only one central system holding together the total ETC operation here will be only one such service provider at one point in time. However, there may be no contractual exclusivity. For this purpose, the contract should provide for termination clause and exit management clause in a fashion that will allow the SPV to seamlessly move to a new service provider without disrupting the operation.

Distribution Agency/ Coordinator – This agency is responsible to coordinate between self-appointed/nominated Manufacturers and Point Of Sale outlets to ensure that RFID tags are available at user’s convenience.

There will be multiple such vendors at one point in time.
These service providers shall be selected through an open tender. Two separate Request For Proposal (RFP) documents, for which indicative scope & key terms and conditions form Enclosure III, will need to finalized for each type of vendor.

- Terms of Reference
- Functional Requirement Specification (for CESP only)
- Service Level Agreement
- Pre-qualification Criteria
- Technical Evaluation Criteria

The guiding principle behind drafting these RFPs has been to make the tender terms and conditions outcome based, instead of focusing on qualifications or certifications of the employees or micro-managing how the service provider should conduct his business. With this in view strict service level commitments with stringent penalties for non-compliance have been specified. For example, even in case of technology recommendation only broad server (hardware) and network guidance have been given. Further the criteria for selection may also be stringent to ensure that only entities who have the ware withal to set-up and run such a key operation and who will commit to stand behind the SLA are selected.

4.3 Organization structure

The detailed planning and incorporation procedure for SPV will take at least 3 months. To save on time, MoRT&H could establish a Project Implementation Unit (PIU), which when SPV is formed will get subsumed into it. Consequently, the process for procurement of services and SPV formation can be undertaken simultaneously and the SPV only signs vendor agreements. As a contingency plan, even in case there is a delay in formation of SPV, this PIU shall continue to manage the ETC operations under the aegis of MoRT&H.

The table below proposes the team composition at three different levels, the number of team members at each of these levels, their hiring procedure, minimum experience requirement and tenure in the SPV. To ensure continuity in the operations, until the level 1 team is formed, this Apex Committee for ETC implementation only could manage level 1 responsibilities. Therefore, the immediate step for MoRT&H to take is to appoint experts in respective fields as division heads and bestow staffing power to them.
<table>
<thead>
<tr>
<th>Level</th>
<th>Prime Business Responsibility</th>
<th>Number</th>
<th>Sourcing/ Expertise</th>
<th>Experience</th>
<th>Tenure</th>
</tr>
</thead>
</table>
| 1     | Board of Directors  
► Final decisions on strategic aspects, like technology, specifications, enforcement  
► Quarterly (or earlier) review of state of affairs  
► Coordinate with Government for any policy matters  
► Review and approval of annual report  
► Full-time MD & CEO to run the business (and monitor divisional performance monthly) | 1      | At least 3 nominees from Government (including experts from the fields of Road Transport & Highways, ICT and Financial services) and at least one from industry/academia | >15 years  | 3 years (rotational) |
|       |                                                                                                |        |                                                                                    |            |              |
| 2     | Divisional heads  
► Central ETC System - Operations  
► Distribution  
► Enforcement  
► Technology  
► Technical (Road Transport & Highways)  
► Finance and Accounts  
► Office admin and HR | 7      | Selection through open advertisement | >10 years  | Regular employment |
|       |                                                                                                |        |                                                                                    |            |              |
| 3     | ► Execution of day-to-day tasks  
► Reporting to divisional heads on fortnightly basis | Depending upon No. of Vendors and Scale of operations | -         | -                         | -             |

It is important to note here that this organization is an executive, more than administrative, body. The key competencies required to run such organization, therefore, should be in the field of ICT, Electronics and RFID. This would entail involvement of experts in these fields from academia as well as industry.
4.4 Governance structure

It is now important to elaborate on what degree of control on the functioning of the ETC system will be exercised by the two groups of stakeholders, Government and Private. For division of responsibilities, control has been classified into Strategic, Administrative and Operational control. The Government entities in this case would primarily be MoRT&H, NIC & NHAI and Private entities could be the clearing house operator, distribution agency, manufacturers, banks, toll concessionaires, system integrators etc. Following are the control options possible between the Government and private entities.

- Strategic + administrative + operational control – In this case 100% ownership of this SPV remains with the Government and would hence provide the Government with complete control.
- Strategic + administrative control – This would constitute a 51-74% stake for the Government and a 26-49% stake for the private agencies. Any important decision requiring majority shareholders’ consent will necessitate Government involvement.
- Strategic control only – 26-49% stake for the Government with no single private player having a stake greater than 25%, would mean only strategic control with the Government. The Government, in this case therefore, will be involved only in key strategic decisions, requiring 3/4\(^{th}\) shareholders’ consent (called as special resolution under the Companies Act, 1956).

The decision on the above Governance structure should be taken based on the following three criteria.

1. Government Control vs. Flexibility in operations – While 100% ownership ensures complete Government control, the same also brings least flexibility & more procedural compliance in taking day to day decisions.

2. Private vendor vs. Owner (share responsibility and return) – The decision on whether to procure the services of an expert agency as a vendor or owner (shareholder), which will share the responsibility as well as the return, will also contribute to determining the governance structure.

ETC is a relatively new concept in the highways domain and has not been tested extensively yet in Indian conditions. Therefore, at least for the initial phase of the project, the Central Government should control the entire project. This would mean 100% stake in this SPV should be held by the Central Government. With a passage of time, depending upon various factors like project expansion planning, expertise requirement, this shareholding could be diluted in favor of other stakeholders. These stakeholders could include State Governments, transport, banking and ICT industry players. However, it is recommended that the Government always retains strategic control in the SPV, probably through holding at least 26% stake, with voting rights, in the company.
For Central Government, MoRT&H should be the agency through which the Government would own this entire stake, at least for the inception. Thereby, multiple Government departments, including PSUs, could be involved in not only owning but also functioning of the ETC system. Further, it could help garner State Government participation as decided by MoRT&H.

4.5 Legal Form

Once a decision on the governance framework is taken, the legal form of this SPV would need to be decided upon. The Committee evaluated three legal forms for the SPV, viz. For Profit Company under the Companies Act, 1956, Company under Section 25 of the Companies Act, 1956 and Society under Societies Registration Act, as detailed in the table below.

<table>
<thead>
<tr>
<th></th>
<th>For Profit Company</th>
<th>Section 25 Company</th>
<th>Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
<td>Shareholders</td>
<td>Shareholders</td>
<td>Society</td>
</tr>
<tr>
<td>Capital</td>
<td>Share capital</td>
<td>Share capital</td>
<td>Corpus fund</td>
</tr>
<tr>
<td>Profit use</td>
<td>Dividend to shareholders</td>
<td>Reused in company</td>
<td>Reused in society</td>
</tr>
<tr>
<td>Example</td>
<td>Delhi International Airport Ltd., NSDL</td>
<td>NICSI, National Payment Corporation of India</td>
<td>ERNET India, CRIS</td>
</tr>
</tbody>
</table>
| Relevance to ETC    | Can Government participate (possibly through institutions/PSUs and restricting dividend)? | ▶ Recommended when promoter demands proportionate ownership (rights)  
▶ Stricter regulations but higher transparency | Simplest form (under Societies Registration Act, 1860) |

Corporate entities in India (whether for-profit or not for profit) are governed by the Companies Act, 1956, which clearly distinguishes the segregation between Management and Governing Body representing the stakeholders providing for management independence. The Companies Act lays down transparent and standard governance guidelines including that of roles and responsibilities of MD and Directors, Board Structure etc unlike societies which are governed by bylaws which are specifically defined for each society as the Societies Registration Act 1860 provides for full flexibility to the members of the society to define bylaws based on which the society is governed and managed.

Therefore, a company structure is recommended for the SPV. Since, this SPV is providing a public service, it is felt that there is no profit motive and hence, the SPV should be structured
as a Section 25 Company (not for profit). This will prevent distribution of surplus to shareholder and require to use this surplus for internal requirement. As provided in the section on governance to begin with the 100% stake in this company may be held by Government which in future may be diluted to provide limited ownership to other stakeholders in the operation. However, it is always recommended that to retain strategic control by Government in the SPV it should at all time hold at least 26% stake, with voting rights, in the company.

The private agencies may not be enthused to invest in “not for profit” company. In such case, out of the three forms of private participation in the SPV, viz. providing services (clearing house, distribution etc.) to the SPV, investing in the SPV & influencing decisions in the SPV, the private agencies may prefer the first and third form. Therefore, even if the private agencies do not invest in the SPV, they can still participate to provide their expertise. On the other hand some of the stakeholders may still invest to be a part of the board which decides on the policies.

‘Trust’ is another legal form possible for an entity to adopt. However, this form is not widely accepted as law governing Trusts does not elaborate on many issues, like dissolution of trust.

In conclusion, the Committee recommends formation of a Special Purpose Vehicle for the purpose of detailed planning, establishing, operating and managing the entire ETC system, with MoRT&H being the promoters for this Section 25 Company.
5 Enforcement against violations

As the ETC system will come into existence, there is a need to identify the possible violations and enforcement elements against the same. The violations could result from breach of operational rules of ETC by any of the ETC users (subscribers, manufacturer, distributor, concessionaire) or by the general public. Following is a list of possible violations related to the ETC system:

1. Damage to or Tampering (Physical or Data) with Tag, Transceiver, any property at POS or Toll plaza
2. Duplication/ cloning of Tag or Transceiver
3. Manufacturing Tag or Transceiver outside specs
4. Incorrect reporting in ETC system (including but not limited to, to Clearing house, to ETC application, to POS, to Concessionaire)
5. Malpractices in Tag or Transceiver installation
6. Fraudulent activities in Recharge
7. Mismatch between Tag and Vehicle
8. Unauthorized access or misuse of any information in ETC system
9. Entering ETC lane without valid Tag (no tag or no minimum balance or tampered Tag or blacklisted)

Each of the above violations were reviewed and examined for possible coverage under existing laws. Most of the violations listed above (1 to 8) will get covered under various provisions of Indian Penal Code 1860, like section 90, 420, 425, 463, 468 & 471, and IT Act 2000, like section 65 & 66. However, it will be too strenuous for the ETC system to enforce each such violation through an external law enforcement agency like police or courts. Therefore, the possibility of enforcing liquidated damages on the violator by the SPV itself should be explored. Law enforcement agencies could be involved only in case of repeated or serious violations.

The last violation mentioned above, i.e. toll road user enters the ETC lane without a valid tag, does not seem to be covered as an unlawful activity in existing laws like IPC or various National Highway laws & regulations. Therefore, an official notification classifying the same as a violation/ offence and related penal provisions will be required to be issued. This notification could be drawn on the lines of a similar notification issued by the Government of National Capital Territory of Delhi (No.F19(69)/Tpt./Sectt./08/4984, 8 December 2010) for restricting entry all motor vehicles except state carriage buses on the Bus Rapid Transport corridor last year. A draft of the proposed notification under ETC system is placed at Annexure D.
6 Way forward

The implementation of the ETC system could be taken-up based on the decisions taken by the respective authority on each of the critical decision areas like Governance structure for Central ETC system and RFP terms & conditions. Following key steps, mentioned along with tentative timelines, will be involved in this implementation.

► Finalization of institutional framework – The decision on the Government structure needs to be taken immediately such that the actual set-up is undertaken parallel to the process of selection of the two types of vendors. The vendor agreements will be signed by this agency. The finalization of institutional framework will also involve estimating the project cost, such that decision on financial powers of the Governing body could be taken. The capital cost for the project could be classified under the following heads:
  o ICT hardware cost, including servers, routers, switches, computers, printers, scanners
  o Software licensing cost
  o Infrastructure cost, including data centre space, customer support desk
  o Office set-up cost
  o Manpower cost to develop the application

The operating cost would mainly be the cost of manpower operating the support desk, office running costs and expenditure on maintaining the application & infrastructure.

Assuming 150 toll plazas, 1crore ETC transactions and immovable assets on lease in the first couple of years of operation, the total capital and operating costs in the initial period have been estimated to be around Rs.20crores and Rs.5crores, respectively. These estimates include the costing for ETC components at toll plazas also.

► Approval of RFP – The RFPs will be released in the market as and when approved by the competent authority. Although the RFP may follow the standard terms & conditions as per MoRT&H/ NHAI norms, the same would require thorough examination from various perspectives, like Technical, Commercial and Legal.

► RFP release and Bid process management – The bid process under the prescribed guidelines normally consumes around 3 months, which involves pre-bid meeting, issue of addendum, receipt of proposals, technical presentation by bidders, evaluation of proposals and signing of vendor agreements. To ensure timely completion of this process, MoRT&H needs to appoint a dedicated task force, which may then merge/ incorporate into the governing agency.

► Solution development, deployment & testing – The above activities estimated to take a total of 5 months will enable start of solution development in April 2012. With the current assessment of work involved, solution development, deployment & testing for both the vendors should take around 4 months time.
Pilot implementation – The pilot implementation should be planned in a manner that it covers multiple concessionaires. Only this level of pilot will actually test the interoperability and clearing house aspects. The RFID technology, toll plaza layout and other basic components would have been tested already to some extent by the individual concessionaires, as the Government released RFID Tag & Transceiver specifications in June 2011. Depending upon the initial usage volumes and changes required to be made to the system based on the learning from this first phase, the system could be gradually extended to the entire National highways stretch.

Hence, from the day the vendor RFPs are released, it should take around one year’s time for the system to become stable. The sequence of activities is depicted in the table below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Months</th>
<th>Dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9</td>
<td></td>
</tr>
<tr>
<td>Finalization of institutional framework and enforcement</td>
<td></td>
<td>Approvals on report</td>
</tr>
<tr>
<td>Preparation and discussion on draft RFP</td>
<td></td>
<td>PIU setup</td>
</tr>
<tr>
<td>RFP release &amp; Bid process management and POC</td>
<td></td>
<td>Approvals on RFP, CIRT + STQC</td>
</tr>
<tr>
<td>Technical and commercial bid evaluation</td>
<td>4 5</td>
<td>Evaluation committee</td>
</tr>
<tr>
<td>Vendor selection &amp; contract signing</td>
<td></td>
<td>L1 approval &amp; SPV Formation</td>
</tr>
<tr>
<td>Solution development, deployment &amp; testing</td>
<td>6 7 8</td>
<td>Toll operator participate</td>
</tr>
<tr>
<td>Start of Pilot implementation</td>
<td></td>
<td>Incentives to users</td>
</tr>
</tbody>
</table>
Annexure A – Apex Committee Constitution order

OFFICE MEMORANDUM

Subject: Apex Committee for implementation of Electronic Toll Collection (ETC).

A Committee headed by Shri Nandan Nilekani, Chairman, UIDAI submitted a Report on Implementation of Electronic Toll Collection (ETC), which has been accepted by the Government. It has, therefore, been decided to constitute an Apex Committee to hold consultations with stakeholders, practically view the systems already under implementation and then finalize the required standards for the different components of ETC System and then suggest the operational methodology for implementation and operation of ETC. The Committee will consist of the following:

1. Dr. Y.K. Sharma, DDG, NIC ...........Chairman
2. Shri Sanjay Bandopadhyaya, JSL(A&C), Ministry of Road Transport & Highways
3. Dr. Mahesh Chandra, DDG, NIC ...........Member
4. Shri K.C. Dwivedi, Senior Technical Director, NIC ...........Member
5. Shri V.L. Patankar, Member(T), NHAI ...........Member
6. Shri Manoj Dave, Head of O&M(Road), L&T Infrastructure Projects Ltd.
7. Shri R.C. Palekar, GM (Electronics), NHAI ...........Member Secretary

Two members from the field of Academics are proposed to be nominated later.

The terms of Reference of the aforesaid Apex Committee would be as under:

1. To develop strategy for implementation of ETC in the country including planning, operational methodology, process design, system design, security function and performance requirements.

2. To evolve and finalize Standards for various components of ETC System.
3. To evolve an institutional framework for implementation and operation of ETC.
4. To oversee the implementation of the project by the designated agencies.

The Apex Committee may finalize its recommendations within a period of four months.

To
All Members of the Committee as above.

Copy to:
1. PS to Hon’ble Minister (Road Transport & Highways)
2. PS to Hon’ble Minister of State (RT&H – Shri Jitin Prasada)
3. PS to Hon’ble Minister (Road Transport & Highways – Dr. Tushar A Chaudhary)
4. PS to Secretary, Ministry of Road Transport & Highways
Annexure B – Summary of Key Decisions

<table>
<thead>
<tr>
<th>ETC System Component</th>
<th>Key Decisions</th>
</tr>
</thead>
</table>
| **Tag & Transceiver Technology** | ► In view of the fact that HSRP implementation has to be expedited and no further changes in plan is possible, JS (RT) advised for keeping HSRP project separate from the currently proposed ETC project for the time being.  
► Although it was realized that for RFID (recommended by the Hon’ble Minister and the Committee headed by Mr. Nandan Nilekani) risks of cloning and issues of lack of good connectivity at all toll plazas exist, which the Committee had referred to earlier, it was decided that these should be handled to the extent possible & feasible. |
| **Toll Plaza Operation** | ► For AVC/ VES, the cameras should be installed at the toll plaza in a manner that pictures of front number plate of vehicle along with the view of driver can be captured.  
► The client application should be integrated with the AVC application where the client application will trigger AVC detection of vehicles.  
► Since client application will be adopted in its totality at NHAI run toll plazas, the cash lane operations should also be integrated in this application. The administrative decision on whether even BOT toll plazas should have this application running on cash lanes could be taken later.  
► The client application will calculate the toll amount based on business rules. These would be uploaded by concessionaires on the system, go through a process of review by the concerned authority at Clearing House, SPV or NHAI and finally published on the web-portal. |
| **Tag Distribution** | ► It is required to burn/ write user Information on Tags at the Point of Sale and therefore tag distribution needs to be a controlled mechanism  
► The tags can therefore reach the users through authorized outlets (RTO, toll plaza, Petrol stations to start with)  
► To prevent duplication & unauthorized distribution, the outlet will have to specify a unique initiation code issued to it on the Tag |
| **Tag Manufacture** | ► Manufacturing of the RFID tags and readers should be through open market operations to ensure competition. However, the intending manufacturers will have to adhere to specifications & guidelines and also go through testing & licensing from a laboratory under the SPV.  
► STQC will be the appointed agency for tag testing  
► The distribution of RFID tags to final users will be through a controlled process. The intending distributors will approach the Clearing House for providing it the license to distribute RFID tags. The distributor will be responsible for verifying the users’ records, linking the tag ID with user account information and affixing the tag on the vehicle. |
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is required to centrally identify agencies to personalize and deliver vehicle tags. Some of these agencies could be Toll Plazas, authorized Dealers or Manufacturers. Though the Government (or SPV formed) will however have the overall responsibility of secured manufacture and distribution, a private agency should be hired to manage the entire distribution channel. Further discussions need to be held in regard to conflict of interest, in case the toll operators get into manufacturing or distribution of tags or readers.</td>
<td></td>
</tr>
<tr>
<td>Account Recharge Mechanism</td>
<td>The account recharge mechanism will again be opened to the market, wherein there are options of recharge through debit card, credit card, mobile operator billing and cash. These could be done online, at any store or using mobile phones (SMS or Integrated Voice Response System-IVRS).</td>
</tr>
<tr>
<td>Central ETC System for back office operations</td>
<td>A Central ETC system will provide back office services and user service support which will include the following:</td>
</tr>
<tr>
<td></td>
<td>o User account management (registration, recharge, special instructions, Updation)</td>
</tr>
<tr>
<td></td>
<td>o User services support (Web-portal, call centre, SMS, fax, manual desk)</td>
</tr>
<tr>
<td></td>
<td>o Toll Transaction &amp; Settlement (reporting &amp; record)</td>
</tr>
<tr>
<td></td>
<td>o Toll operator account management (registration, toll rates)</td>
</tr>
<tr>
<td></td>
<td>o Toll operator services support (Web-portal, call centre, SMS, fax, manual desk)</td>
</tr>
<tr>
<td></td>
<td>o Reconciliation, Credit transaction and Periodic auditing</td>
</tr>
<tr>
<td></td>
<td>Central ETC System Services Provider/ Vendor will be allowed as a consortium of companies to provide the capabilities of distribution tracking, technology platform (including for support services) as well as financial settlement between various participants.</td>
</tr>
<tr>
<td>Reconciliation of Toll Transactions</td>
<td>Plaza operators should update the total transactions at as higher frequency as possible. Credit of the all the funds to the escrow account of toll operator (required in most concession agreements) will be done by clearing house as per RBI norms.</td>
</tr>
<tr>
<td>Institutional framework to manage implementation</td>
<td>Decision with respect to possible options from the perspectives of ownership (between Government &amp; Private) and ETC services (Clearing house, Distribution, Enforcement &amp; Overall supervision) procurement needs to be taken.</td>
</tr>
<tr>
<td></td>
<td>For entire implementation and monitoring of the ETC project, a Special Purpose Vehicle should be setup under MoRT&amp;H, incorporated under section 25 of Companies Act, 1956.</td>
</tr>
<tr>
<td>Specification finalization for Tags, Transceivers and POS Handheld Units</td>
<td>The specifications and standards were finalized and released to the stakeholders. Tag &amp; Transceiver specifications were discussed with Tag Manufacturers and Concessionaires in workshop that was conducted by NHAI. Some suggestions made by the stakeholder group were incorporated.</td>
</tr>
<tr>
<td>Proposed enforcement rules to control the violation</td>
<td>It was decided to divide these possible violations in a manner that some could be covered under the agreement the stakeholder signs with SPV, some under current Indian laws (IPC, IT) and some unavoidably requiring modification in NH Act/Rules.</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Proof of concept</td>
<td>The concept will be tested with agencies like CIRT (Central Institute of Road Transport) and C-DAC (Centre for Development of Advanced Computing). The proof of concept can be rolled out in parallel to the ongoing system development and will facilitate to highlight the probable areas for improvement.</td>
</tr>
</tbody>
</table>
| Pilot implementation                               | ► Toll plazas in and around Delhi (within a vicinity of approx. 100 Kms.) will be covered for pilot implementation.  
► Tentative date for start of pilot implementation would be March 2012, only with the dependencies completed in time. |
Annexure C – Workshop Attendee Entities

1. IRDSA
2. Egis Infra
3. L&T Infra
4. GMR
5. HCC Infrastructure
6. JICA
7. Metro Infrasys
8. DSC
9. EFKON India
10. Kapsh-Metro
11. Siemens
12. IAITO Infotech Pvt. Ltd.
13. ESSEN, Mumbai
14. ATT Systems, Bangalore
15. Mitsubishi
16. IBI Group
17. Neology
18. Steria
19. Tag Factory
20. NEXCO
21. Beans Electronics
22. Mark-O-Line Hopetech
Annexure D – Draft Notification for enforcement

In exercise of the powers conferred by section 115 and section 2 of the Motor Vehicles Act, 1988, read with this Government notification, the Ministry of Road Transport & Highways, Government of India on being satisfied that it is necessary in the interest of public safety and convenience of the general public to regulate the movement of traffics, prohibits the entry of all motor vehicles except the ones with valid Tag on the ETC lane. Whoever contravenes the above prohibitional restrictions shall be punished in accordance with the provisions of section 194 of the Act.

The above mentioned prohibition/ restrictions shall not be applicable during emergent situations to the motor vehicles of Police, Ambulance, Fire Brigade and other Emergency Service Vehicles, when proceeding on emergency duties.

By order