



Smart City , Smart Transportation & IoT

-
- Tariq Mustafa
Head - Data Analytics (DIMTS)

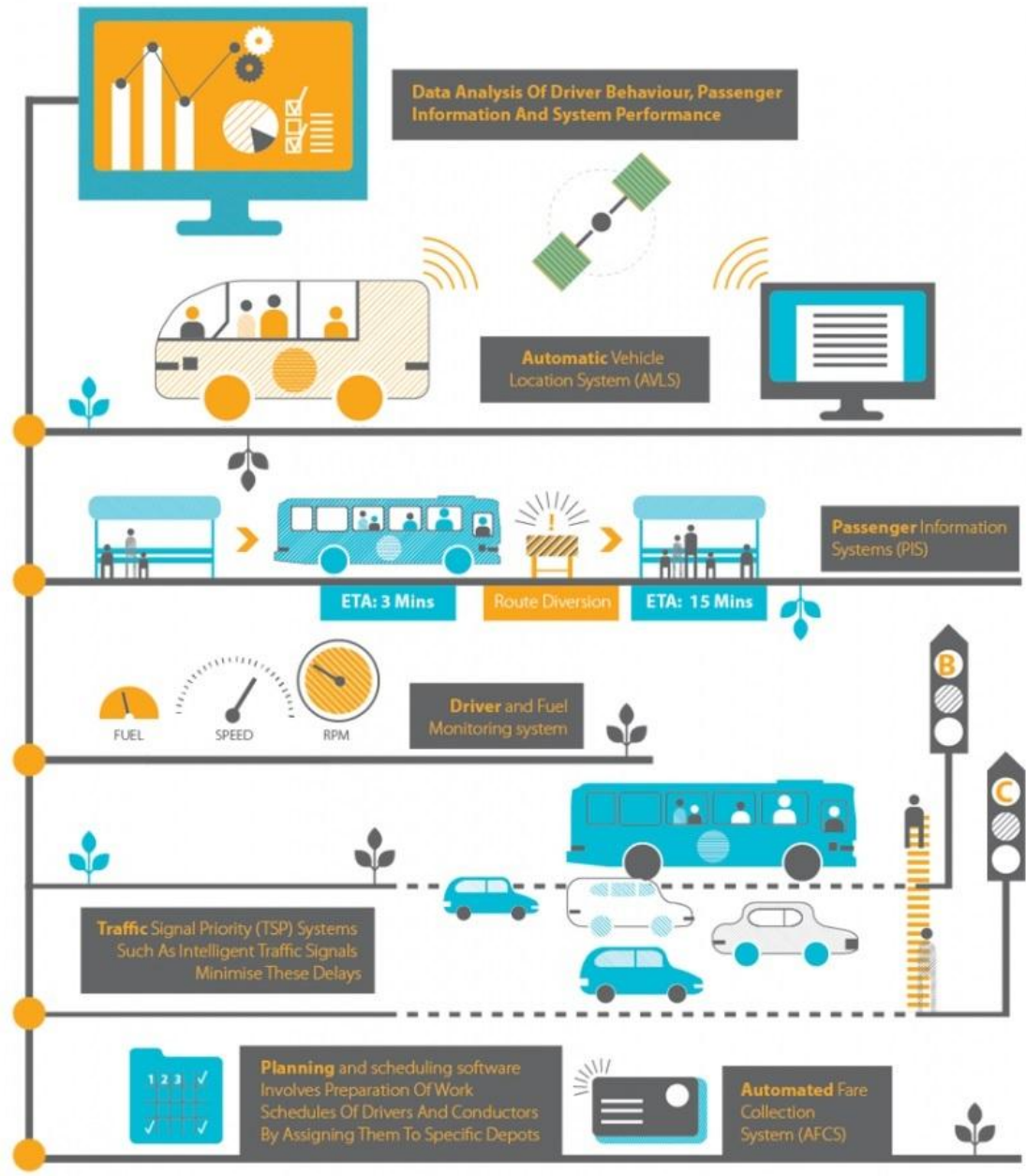


We help people move

Joint Venture of Govt. of NCT of Delhi and IDFC Foundation

An ISO 9001, 14001, OHSAS 18001, ISO 27001 & CMMI L3 Certified Company

Intelligent Traffic Systems (ITS) & Applications for City Bus Operations



IoT in Public Transit – Typical Use Cases

- **Enhanced Passenger Experiences**
 - Real Time Vehicle Tracking & ETA Information
 - Seat Availability
 - Personalized Travel Information
 - Alert for Unexpected Events: Manage Disrupted Schedules
 - Passenger Safety and Security
- **Improved Vehicle Performance/efficiency**
 - Real time detection of wear & tear and proactive maintenance

- **Ensure environmental responsibility**
 - Green initiatives and reducing carbon footprint

- **Dynamic Route Planning**

- **Route Optimization**



Challenges in Deployment of Intelligent Traffic Systems (ITS)

- limited market share of applications for public transport
- complexity involved in urban bus operations
- budgetary limitations of operating agencies in this segment
- limited functional and technical specifications to guide the development of ITS in this field; and
- the need for knowledge and experience among agencies
- Inadequate understanding about the implications of procuring a certain technology in a fast-changing ecosystem
- awarding of its contracts purely based on the lowest costing proposals rather through a quality and cost-based criteria



Automatic Vehicle Location

- Vehicle tracking & Fleet Management -> Public transport, Railway wagons, Cabs, Trucks
- Passenger Information Displays -> Kiosk, BQS
- Intelligent Routing -> Traffic information & Congestion Modelling



Mobile Applications

- NextBus Delhi App -> For expected time of arrival of the bus, seat availability
- Poochh-O -> For Travel convenience
- Telltail -> Citizens Safety



Automatic Fare Collection

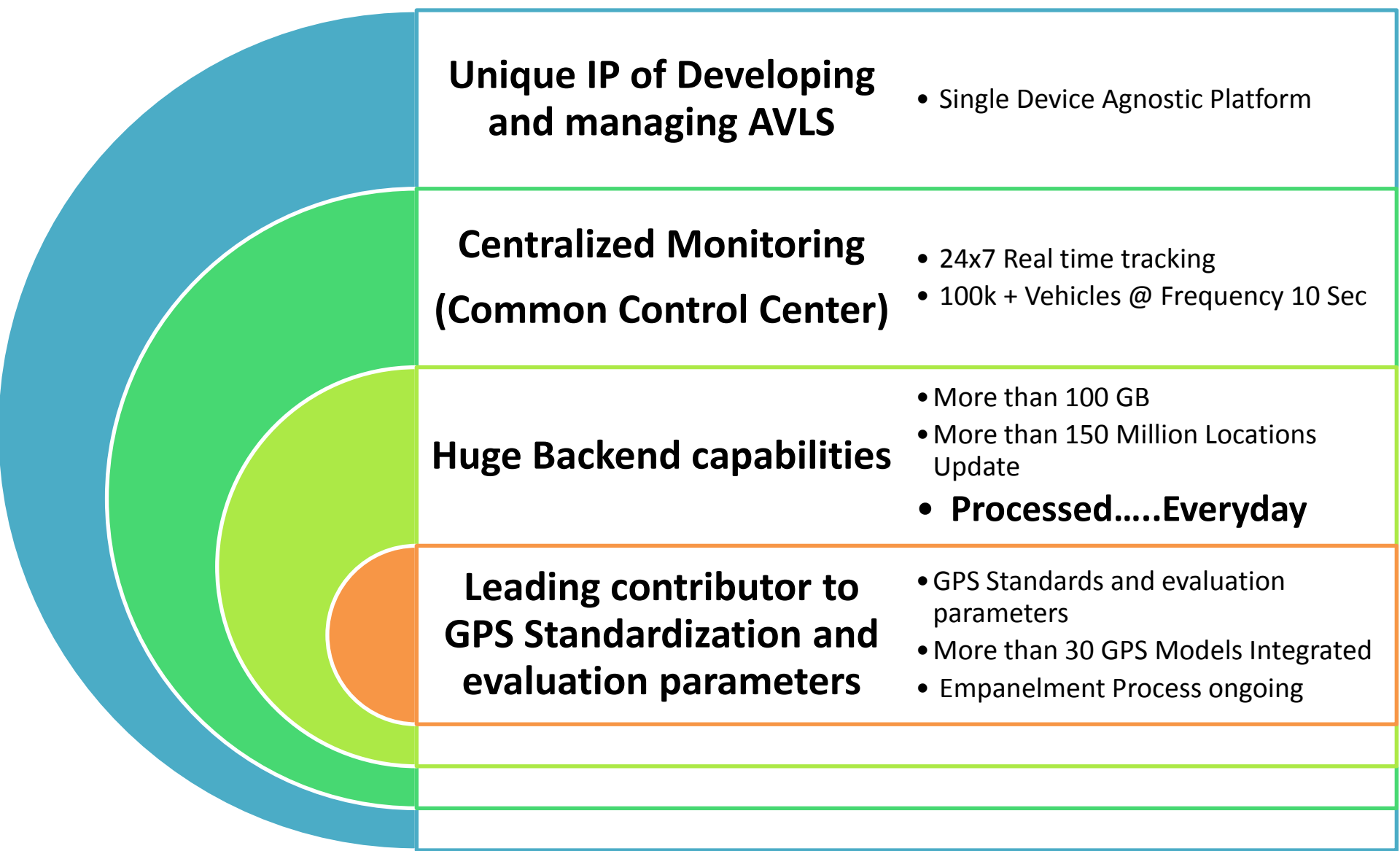
- ETMs (Electronic Ticketing Machines) -> Parking payments using Credit/Debit Cards
- Smart Card based Ticketing and Pass -> Fare Collection Modules
- Mobile based Ticketing (NFC, RFID)



Identity Management

- Smart Card Based
 - Driving License
 - Registration Certificates
 - Permits – state and national level for various entities
- PSV Badge





Operations Control Centre (OCC)

DIMTS has set-up a state-of-the-art **Operations Control Centre** for efficient management of traffic flow. It will be the kernel for real-time operation of traffic through Intelligent Signaling System, operation of stage carriage buses, the Automatic Vehicle Location System and more.



DIMTS in Nos.

- 100,000+ connected vehicles , sending data feed every 10 secs
- 3,00,000+ Kms/day, Bus routes
- 50,00,000+ Kms/day, Paratransit
- 50,00,000+ Kms/day ,PSV
- 40,000+ Kms/day, Tankers
- 800,000+ passengers /day



40,00,000 Smart Card License



12,00,000 Vehicle Registration



Snapshot: AVL Programs



AVL System for Buses

- GPS program in Public / Private Operated Bus fleet across the state of New Delhi.
- Route / Speed Tracking
- Duty Management / Driver performance monitoring.



AVL System for Public Service Vehicles

- GPS Implementation for the entire PSV segment of NCT of Delhi.
- One Platform for all non metered public service vehicles across the NCT of Delhi.
- Chartered Buses/ School Buses .
- Gramin Sewa / RTV/ Maxi Cab/ Mega Cab



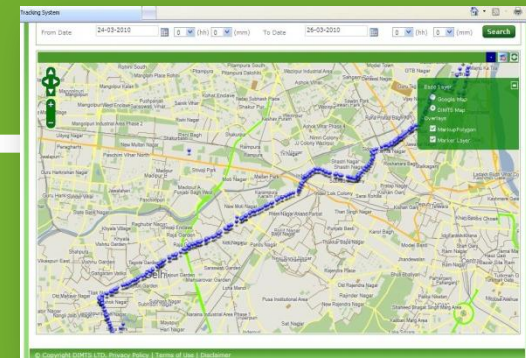
AVL System for Paratransit

- Large Paratransit GPS Implementation.
- Centralized Control Center – 75K Vehicles
- Users – Transport, Enforcement, Auto owners, Police etc.

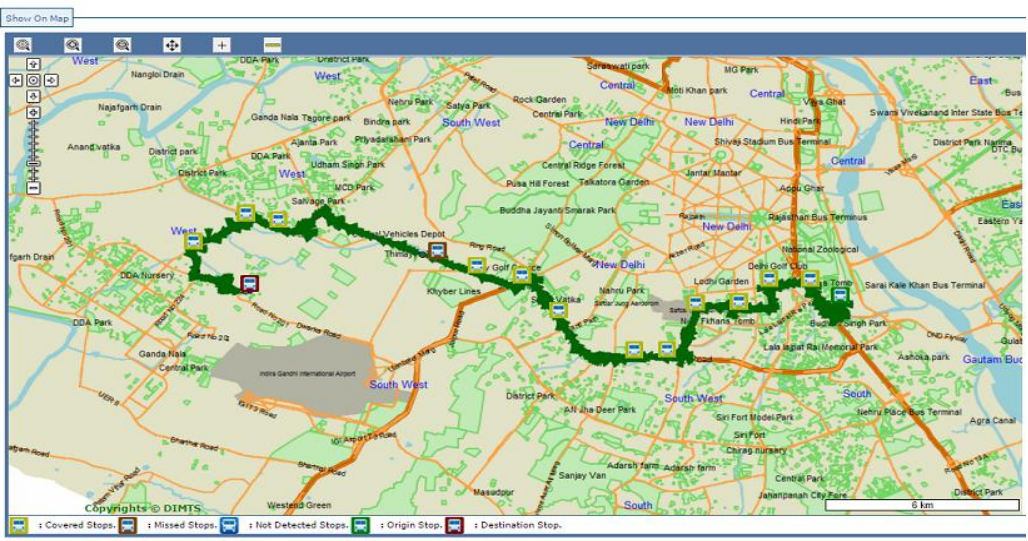


Water Tanker Distribution Management System

- Vehicle Tracking
- Water Distribution Monitoring
- Smart Card Based Hydrant Automation



Fleet Management Systems: AVLS → Cluster



GPS based Vehicle Tracking & Passenger Information System

TRANSPORT DEPARTMENT

Home Admin Operation Reports Dashboard Tracking Change Password Logout

Data Viewer Hop Viewer

Search By: [Vehicle No.] Vehicle No: [ALL] Search Criteria: Status: [ALL] Auto Refresh: [1 Minute]

Depot Name	Vehicle No	Duty	Route	Location	Status	Duration	Speed (KM/Hour)	Dir*	Ign	GPS
Dishad Garden	DL120657	423:26		Isarok Vihar Bus Stop Nelson Mandela Marg Isarok Vihar	On Duty/OFF Trip	11/03/2016 13:05:26	0			
Kar	DL120033	603:28	883200N	Plot No 55 Karnaal Road Spal Nagar	On Duty/On Trip-Race	11/03/2016 13:05:26	14			
Kanjhwala Depot	DL120166	21937L24	21937L1P	Shri Anandpur Setang Ashram Rani Jhansi Road Bara Hindu Rao	On Duty/On Trip-Race	11/03/2016 13:05:26	23			
Kushkh Nahla Depot	DL120116	405:10	405L2	ITPO Bus Stop Mathura Road Pragati Maidan	On Duty/On Trip-Race	11/03/2016 13:05:26	11			
Sunehri Pullah Depot	DL120784	805:10	805L2	Badi Crossing Bus Stop Outer Ring Road Badi	On Duty/On Trip-Race	11/03/2016 13:05:26	0			
Kushkh Nahla Depot	DL120164	507:4	507D/Dawn	JN University Bus Stop Old Palme Marg JNU Campus Area	On Duty/On Trip-Race	11/03/2016 13:05:26	0			
Kanjhwala Depot	DL120173	234:00		Kanjhwala Depot	On Duty/OFF Trip	11/03/2016 13:05:26	0			
Kushkh Nahla Depot	DL120024	405:22	405L2	Delhi Public Library Netaji Subhash Marg Red Fort	On Duty/On Trip-Race	11/03/2016 13:05:26	11			
Kushkh Nahla Depot	DL120182	405:12	405L2/Dawn	Mata Mandir Bus Stop Mathura Road Friends Colony West	On Duty/On Trip-Race	11/03/2016 13:05:26	4			
Kar	DL120033	729:36A		Mather Dairy Old Japur Road Samalka	On Duty/OFF Trip	11/03/2016 13:05:26	0			

Total Record : 1445 Page 1

Legend: Ignition ON | OFF | Not Available | GPS No breakage | Breakage less than equal to 2 hours | Breakage more than 2 hours | Direction N | NE | E | SE | S | SW | W | NW |

Copyright DIMTS LTD. Privacy Policy | Terms of Use | Disclaimer

GPS based Automatic Vehicle Location (AVL) System has been deployed on all the buses. System is being used to monitor operations of the fleet

Alerts Dashboard manages alerts and responds to deviation/violations

- Over-speeding reports
- Depot, vehicle and route wise reports
- Missed stops reports
- Route deviation reports
- Trip status reports (Cut/Short/Missed)
- Distance travelled

System Dashboard

Current stoppage

Morning	Evening	Night
Scheduled Duties	Scheduled Duties	Scheduled Duties
1681	1684	0
Allocated Duties	Allocated Duties	Allocated Duties
1202	1202	0
Unallocated Duties	Unallocated Duties	Unallocated Duties
479	482	0

Key Performance Indicators:

- Scheduled Trips: 1213
- Running Trips: 1604
- Completed Trips: 3794

Bus Stoppage:

EBM Depot: 105, Dishad Garden: 212, Kar: 105, Kanjhawala Depot: 270, Kushkh Nahla Depot: 222, Sunehri Pullah Depot: 154

Route Deviation

Route Deviation: 113

Bar chart showing Route Deviation for various depots:

Depot	Route Deviation
EBM Depot	20
Dishad Garden	90
Kar	97
Kanjhwala Depot	72
Kushkh Nahla Depot	100
Dishad Garden	4

Performance

Alerts Dashboard:

- Route Deviation: 40.03%
- Operation Rate: 26.94%
- GPS: 25.51%
- OffTime Performance: 33.77%

Bar chart showing Performance for various depots:

Depot	Performance
EBM Depot	159
Dishad Garden	212
Kar	270
Kanjhwala Depot	222
Kushkh Nahla Depot	154
Dishad Garden	4

Note: Please click on the chart icon above to show relevant graph in right section.

Copyright DIMTS LTD. Privacy Policy | Terms of Use | Disclaimer

Automatic Fare Collection Systems: ETM

We have deployed New Generation Electronic Ticketing Machines (ETMs)

- Real Time data transfer through GPRS
- Smart Card Enabled
- Over the air configuration & update of master data, configuration data and application
- Total Transactions generated in a day:
 - 9,00,000 tickets
 - 13000 trips
 - 2500 shifts



Electronic Ticketing Machines

Home Depot Operations Reports ETM Tracking

You are here: ETM Tracking: ETM Alert Dashboard

Total No of Records:- Status as of Date at : 16-04-2012 12:39:32 PM Depot Name: MILLENIUM DEPOT
 Total ETM : Total ETM Deployed but Not Cleared: 0
 Total Red ETM : 1 Total Amber ETM : Total Green ETM :

ETM ID	WZL/ETM STATUS	CONDUCTOR ID	CONDUCTOR NAME	CONDUCTOR MID NO	SHIFT ID	SHIFT NAME	TRIP NO	TRIP NAME	LAST TICKETING TIME	TICKETING STATUS	PRINTED STATUS	DATE/TIME STATUS	DEPOT NAME
330-171-452		01255	Amit Kumar	958282152	53412M	534DOIN	DL1PC3954	16/04/2012 9:56:08 AM	NO	NO ERROR	72%	MILLENIUM DEPOT	
330-171-307		01201	Viresh Derman	9072440789	49922M	499UP	DL1PC3974	16/04/2012 12:04:17 PM	YES	NO ERROR	30%	MILLENIUM DEPOT	
330-171-315		01316	Idrish Mohammed	9719328747	53414M	534UP	DL1PC3956	16/04/2012 12:27:14 PM	YES	NO ERROR	49%	MILLENIUM DEPOT	
330-171-449		01224	Mangy Kumar	9809836951	53424M	534DOIN	DL139941	16/04/2012 12:09:11 PM	YES	NO ERROR	30%	MILLENIUM DEPOT	
330-171-187		01837	HANVJET SINGH	9013328565	41931M	419UP	DL1PC3562	16/04/2012 11:09:57 AM	NO	NO ERROR	49%	MILLENIUM DEPOT	
330-171-314		01048	AMIT KUMAR	9952072425	41909M	419UP	DL1PC2030	16/04/2012 12:03:03 PM	YES	NO ERROR	30%	MILLENIUM DEPOT	
330-171-349		01495	ARUN KUMAR	7838869490	41904M	419UP	DL1PC3954	16/04/2012 12:02:08 PM	YES	NO ERROR	39%	MILLENIUM DEPOT	
330-171-367		01844	VIKRAMBET	9009638808	41916M	419DOIN	DL1PC3882	16/04/2012 12:06:10 PM	YES	NO ERROR	34%	MILLENIUM DEPOT	
330-171-375		01311	Anand Kumar	9212604429	46534M	465DOIN	DL1PC3880	16/04/2012 12:04:01 PM	YES	NO ERROR	47%	MILLENIUM DEPOT	
330-171-378		01021	ANISH ALI	9910093030	53404M	534UP	DL1PC3950	16/04/2012 12:06:21 PM	YES	NO ERROR	21%	MILLENIUM DEPOT	
330-171-380		01395	Sonu Sharma	9250882834	53403M	534DOIN	DL1PC3867	16/04/2012 12:05:09 PM	YES	NO ERROR	46%	MILLENIUM DEPOT	
330-171-451		01903	Sunil Kumar	9813938803	53403M	534DOIN	DL1PC3886	16/04/2012 12:02:06 PM	YES	NO ERROR	47%	MILLENIUM DEPOT	
330-171-479		01877	DHARAM DASS	9728349254	41912M	419UP	DL1PC3599	16/04/2012 12:02:21 PM	YES	NO ERROR	41%	MILLENIUM DEPOT	
330-171-357		01241	Vikash Kumar	9071237301	52209M	522DOIN	DL1PC3985	16/04/2012 11:05:00 AM	NO	NO ERROR	39%	MILLENIUM DEPOT	
330-171-409		01838	VUNES	8743807897	53409M	534UP	DL1PC3952	16/04/2012 12:07:54 PM	YES	NO ERROR	41%	MILLENIUM DEPOT	
330-171-388		01441	Narendra Pal	9891635119	41930M	419DOIN	DL1PC3870	16/04/2012 11:54:08 AM	YES	NO ERROR	72%	MILLENIUM DEPOT	
330-171-444		01655	Serjeer Kumar	9658721210	41104M	411UP	DL1PC3590	16/04/2012 12:27:41 PM	YES	NO ERROR	39%	MILLENIUM DEPOT	
330-171-345		01281	Prakash	9998236388	46912M	469UP	DL1PC3870	16/04/2012 12:06:01 PM	YES	NO ERROR	37%	MILLENIUM DEPOT	
330-171-391		01140	VINOD KUMAR	9688779425	53410M	534UP	DL1PC3953	16/04/2012 12:05:58 PM	YES	NO ERROR	44%	MILLENIUM DEPOT	
330-171-377		01032	SHIV VERMA	9911498059	52209M	522DOIN	DL139583	16/04/2012 12:04:04 PM	YES	NO ERROR	45%	MILLENIUM DEPOT	
330-171-455		01084	KAMALAKANT KAUSHIK	7838188274	41933M	419UP	DL1PC3587	16/04/2012 12:09:02 PM	YES	NO ERROR	40%	MILLENIUM DEPOT	

Pre-printed ticket



Ticket through ETM

DELHI TRANSIT

TOTAL: Rs.15

DL1PB9761 02/07/2011 12:22
 No. T94388110111213011-0004
 Route Number :**411UP**
Mori Gate Trml. - > DDA Flat
Kalkaji
 Adult : 1 x 15=Rs 15

Worlds Largest GPS Implementation in Passenger Vehicles

• Paratransit Vehicles:

- Centralized Control Center equipped for 1 Lac TSR and Taxis
- Electronic Fare meter device integrated with GPS/GPRS and Printer with panic button and tempering alerts. Option for printed fare receipts.
- Total EFM devices empaneled : 16
- Backend integration already done for 75000+ TSRs and 20000+ Taxis and ongoing
- Users – Transport, Enforcement, Auto drivers, & Police

• Public Service Vehicles:

- One Platform for all non-metered public service vehicles across the NCT of Delhi Rural Vehicles (Gramin Sewa and RTV), Chartered Buses, School Buses, Other Cabs viz. Maxi Cabs, Mega Cabs, Phat Phat Sewa etc.
- Stand Alone GPS Device.
- Total GPS device empaneled: 24
- Backend integration already done for 20000+ and ongoing



GPS Satellite



Bus with GPS



Auto with GPS



Other PSV



City Command and Control

Driving Licence Online Appointment System

DELHI GOVERNMENT
Team Delhi Making things happen
Transport Department

Driving Licence Online Appointment System

DIMTS
We help people move

HOME SERVICES APPLICATIONS FAQ CONTACT US

Driving Licence Online Appointment System – The no queue system!

Use this quicker and smoother way to get your driving licence and save time!
With this online facility you can now pay your fees online and book your appointment with the zonal office in advance and **avoid the long queues.**
Choose from any of the options below.

Online Service: Appointment with e-Payment

Track DL Delivery Status

Call Center Service: Appointment without e-payment

→ Locate Zonal Office → Track Reference Number → Track e-Payment Status → LL Question Bank

All Rights reserved @ 2010 DIMTS Ltd Site best viewed in IE 8.0 and above. (click here for download)

Smart Card Driving Licenses = 40,00,000 + issued till date

Registration Certificates = 12,00,000 + issued till date

IT enabled Parking – Central Delhi

- ❖ 90+ sites, 220+ ETMs, 35 BB, Average 14K tickets/day
- ❖ Electronic Ticketing
 - ETM based e-Ticketing
 - Boom Barrier based e-Ticketing
 - Barcode Based e-Ticketing
- ❖ Field devices send the tickets' information and alerts OTA to a back-end processing system in real-time
- ❖ Field Devices can be used in offline as well as online mode.



- ❖ Backend server provides the following services:
 - Validation, Segregation and Archival of the incoming transactional messages
 - ETM Device Inventory Management
 - Handling the Pass / Exempt Vehicles
 - Provides following Online, real-time Reports
 - Device health Dashboard
 - Daily Parking Revenue Summary Report
 - Detailed Transaction Report
 - Site-wise, Shift-wise Summary Reports
 - Capacity Summary Report
 - Provides following scheduled auto-emailer reports
 - Hourly, Daily, Monthly Parking Revenue
 - Hourly device health

Dashboard Status as on: 11/03/2016 05:24 PM

Single Conductor with Multiple Duty: 11 ETM Deployed But Not Cleared: 72

11 25 120 28 All 184

Search all columns

ETM Sr. No.	Conductor ID-Name	Conductor Mobile No.	Battery Status	Duty ID	Route Name	Bus No.	Last Ticketing Time	Ticketing Status	Sltn No.	Last Server Message
58170290234	29785-BHANKAR KUMAR	9811635077	85%	4950		548	11/03/2016 16:45	No	862414025558487	11/03/2016 17:22
581702900154	48787-DEEPAK KUMAR	8711373454	85%	0163		624	11/03/2016 17:26	Yes	862414027420008	11/03/2016 17:23
50037526	10155-		85%	1645		509	11/03/2016 17:20	Yes	862414025205170	11/03/2016 17:23
581702902954	20013-BHOD	9015633171	85%	8859		629	11/03/2016 16:24	No	862414026335190	11/03/2016 17:15
5580170119	25001701HMOOLCHAND-		100%	7777		526	11/03/2016 17:17	Yes		11/03/2016 17:17

Daily Parking ETM Revenue Report

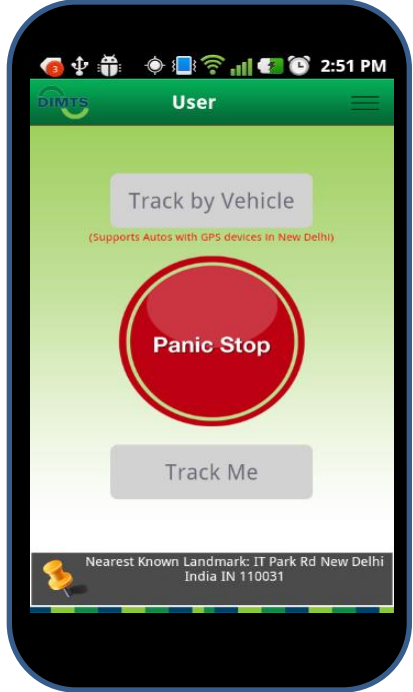
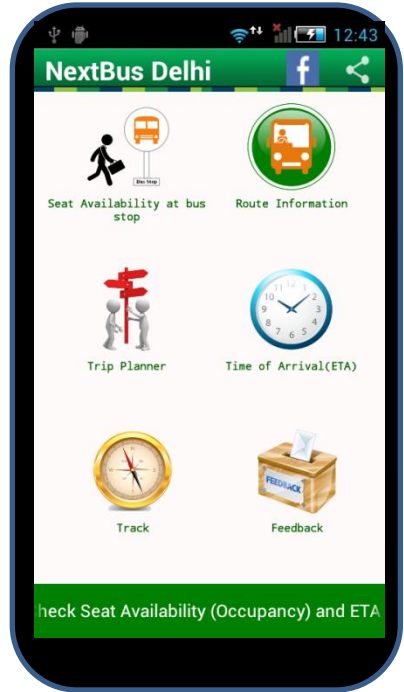
Search: 10 records per page

Site Id	Location	Parking Lot	Agency	Terminal Sr. No.	Terminal Type	Closed Shift	Open Shift	In Out	Only In	Only Out	Revenue (₹)
1001	CP	A-BLKINNER COL.	SS	30007811	PAX	3	0	201	3	0	2520.00
1001	CP	A-BLKFRM-MIDDLE COL.	SS	30007838	PAX	1	0	41	0	0	1020.00
1001	CP	A-BLKFRM-MIDDLE COL.	SS	6670292004	XED	1	0	15	4	4	465.00
1001	CP	A-BLKFRM-MIDDLE COL.	SS	6670292006	XED	1	0	31	2	2	820.00
1001	CP	G-BLKMAHARAJ-HOTEL	SS	2500102111	BOOM BARRIER	1	0	207	0	0	5440.00
1001	CP	G-BLKMAHARAJ-HOTEL	SS	30007840	PAX	1	0	11	0	0	380.00
1001	CP	G-BLKMAHARAJ-HOTEL	SS	2500102110	BOOM BARRIER	1	0	0	6	0	0.00
1001	CP	G-BLKMAHARAJ-HOTEL	SS	30007810	PAX	2	0	116	5	0	4100.00
1002	CP	G-BLKMAHARAJ-HOTEL	SS			0	0	0	0	0	0.00
1001	CP	G-BLOCK-RR-2	SS	6670292019	XED	2	0	77	6	0	2180.00

Mobile Applications- NextBus, Poocho & TellTail



NextBus Delhi App



- **NextBus Features:**

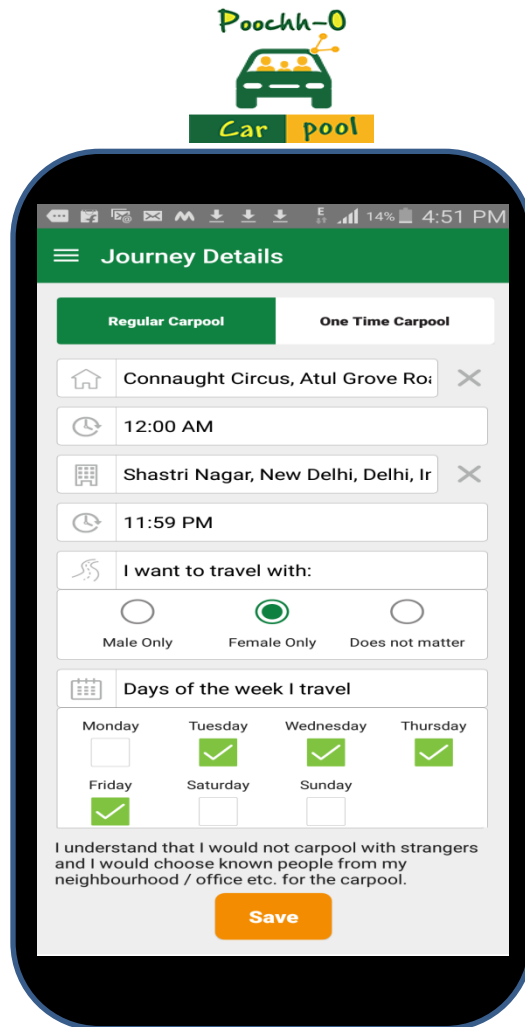
- **Seat Availability**
- **Estimated Time of Arrival**
- **Real Time Bus Location**
- **Trip Planner**

- **One Transit App for Delhi**

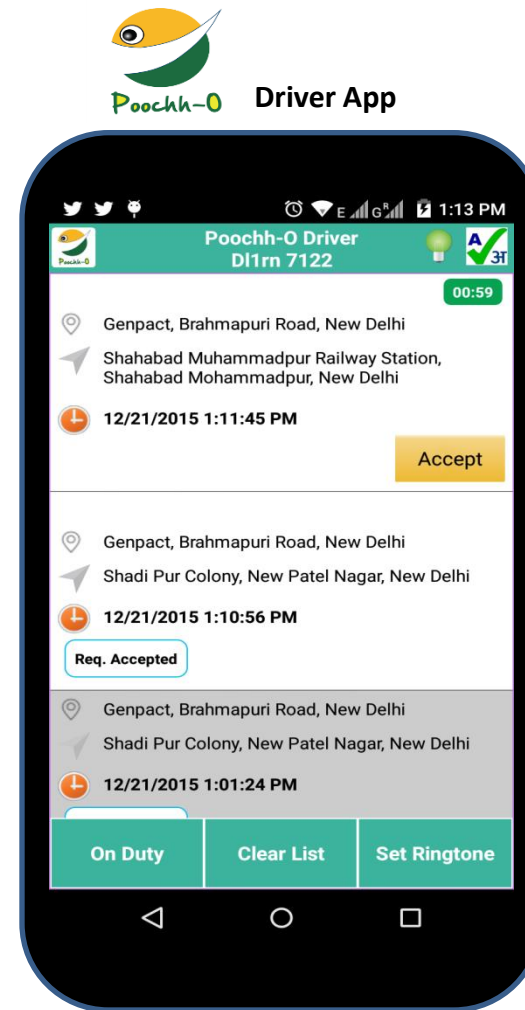
- **Auto/Taxi**
- **NextBus**
- **Car Pool**
- **Parking**
- **Traffic**

- **A security application that allows the user to track herself and alert family in case of emergency**

Mobile Applications- Carpool, Driver app



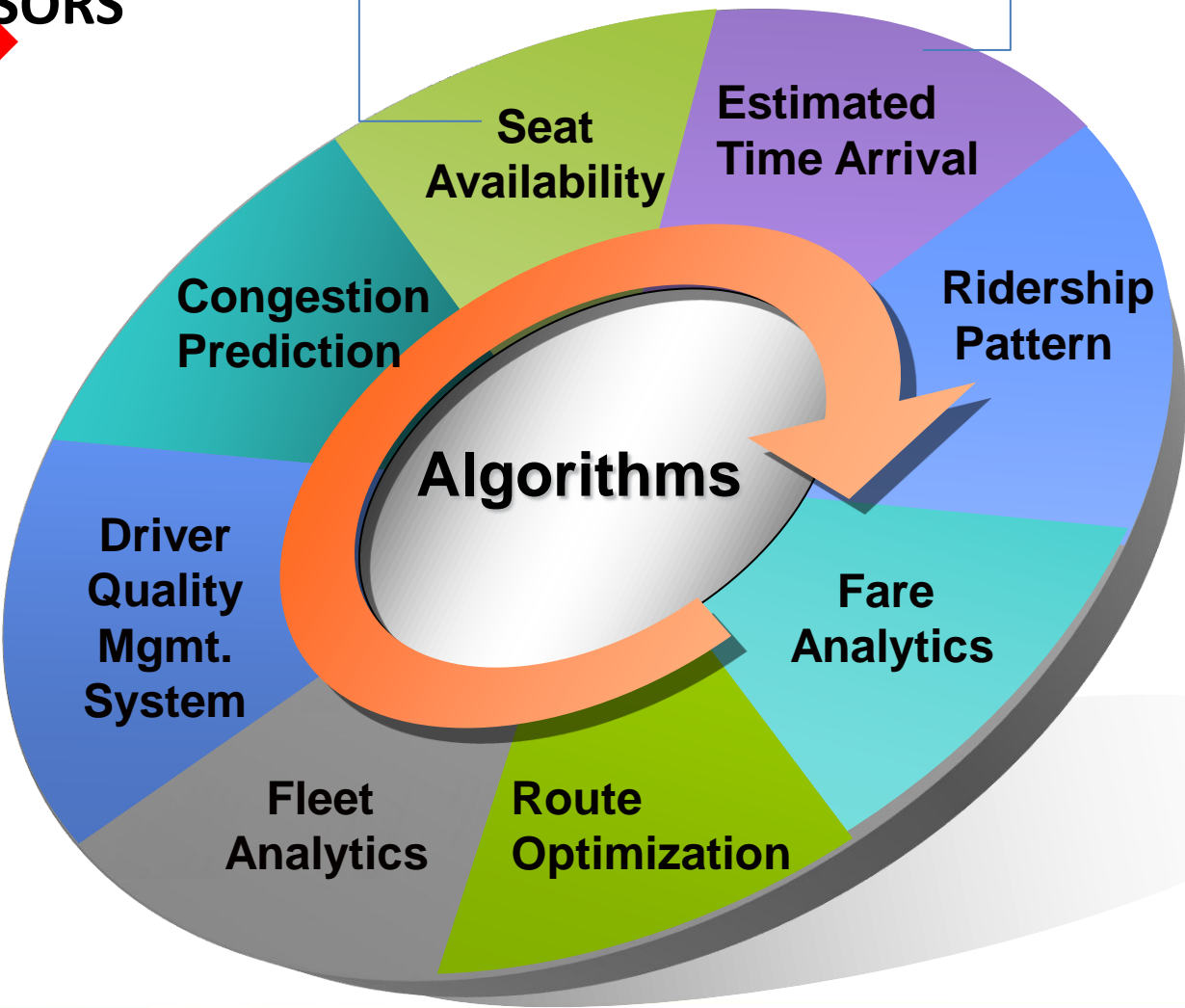
- For car owners and riders to share their commuting schedules and find carpool members



- App for Auto/Taxi drivers in Delhi to get messages for trip request from commuters using Poochho.
- On accepting the request, the commuters can call the drivers back.

~~SENSORS~~

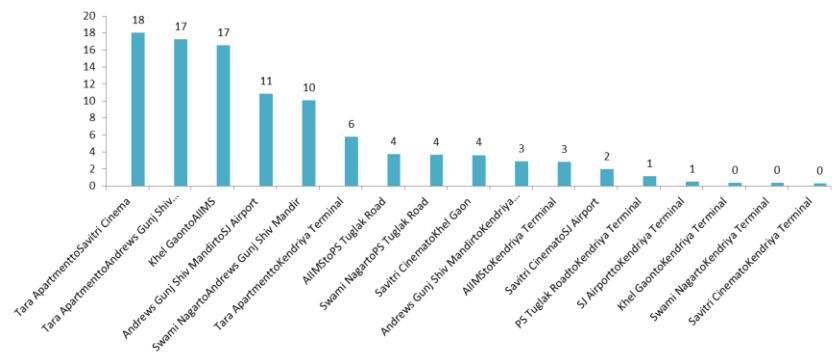
Precision of 1 minute



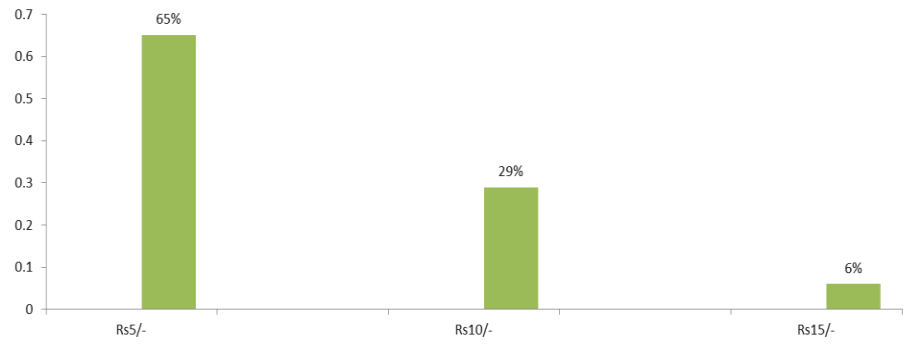
Route Optimization Analytics

Detailed Analysis of Low Ridership Sectors

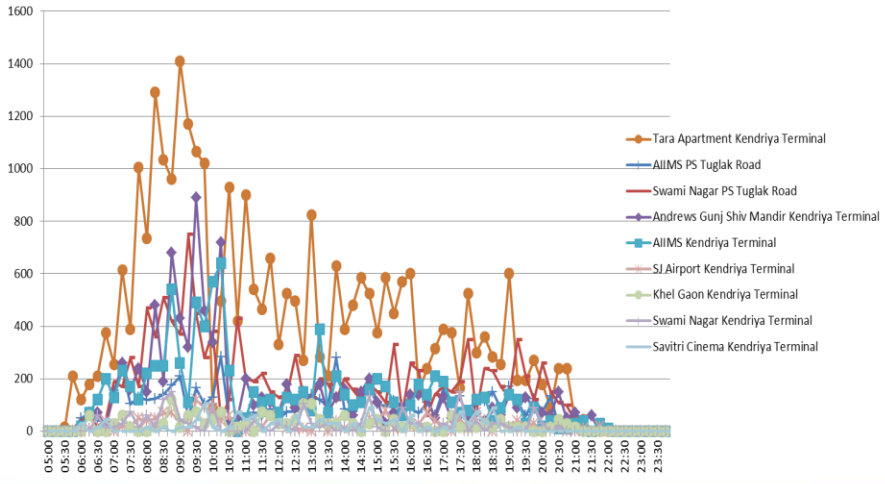
% Pax O_D Profiling
540 DN(Tara Apartment to Central Secretariat)



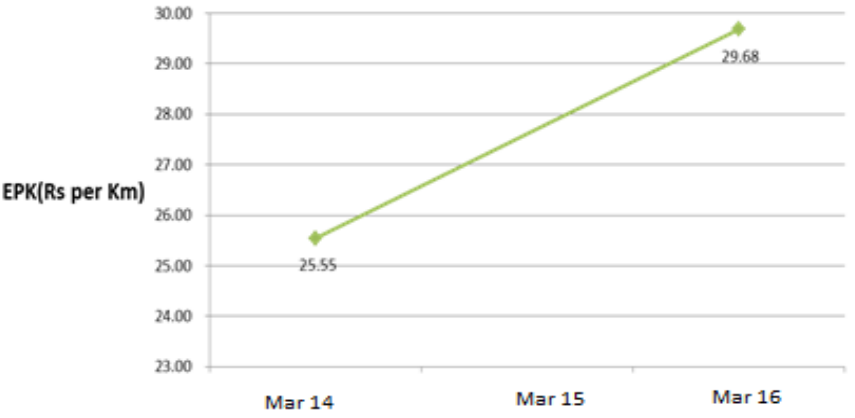
Denomination Profiling
540 DN



Revenue Generation Rate 540DN for O-D Pair Beyond SJ Airport to Central Secretariat segment



540 Earning Improvement After Modifications



Route Deviation & Bunching Alerts

The screenshot shows the DIMTS web application interface. At the top, there's a navigation bar with options like Home, Admin, Operation, Reports, Dashboard, Tracking, Change Password, and Logout. Below this is a search area with dropdowns for 'Search By' (set to Vehicle No), 'Vehicle No.' (set to ALL), and 'Status' (set to ALL). The main content is a table with the following columns: Depot Name, Vehicle No, Duty, Route, Location, Status, DateTime, Speed(KM/Hour), Dir#, Ign, and GPS. The table lists various vehicles and their current status and location. At the bottom of the screenshot, a taskbar shows the system time as 17:03 on 25-04-2016.

Route Deviation
&
Bunching Alerts

Alert	Vehicle No	Route Name	Datetime
Deviated	DL1PD0216	807ExtDown*	25/04/16 17:03
Deviated	DL1PC4220	990CLDOWN*	25/04/16 17:03
Deviated	DL1PD0649	816Down*	25/04/16 17:02
Deviated	DL1PC6729	236DOWN*	25/04/16 16:57
Deviated	DL1PC4829	78DOWN*	25/04/16 16:55
Deviated	DL1PD0691	85UP*	25/04/16 16:53
Deviated	DL1PC5017	405UP*	25/04/16 16:52
Deviated	DL1PC6702	429CLDown*	25/04/16 16:52
Deviated	DL1PD1694	RL-77DOWN*	25/04/16 16:51
Deviated	DL1PC6846	611BDOWN*	25/04/16 16:51
Bunching	DL1PC5413	507CLUp	25/04/16 16:49
Bunching	DL1PC6329	717AUP	25/04/16 16:48
Bunching	DL1PD1443	990E_CL_DN	25/04/16 16:46
Bunching	DL1PD1156	753UP	25/04/16 16:43
Bunching	DL1PC4857	108UP	25/04/16 16:43
Bunching	DL1PC6308	717AUP	25/04/16 16:42
Bunching	DL1PC4165	TMS+Punjabi Bagh	25/04/16 16:42
Bunching	DL1PD0270	165UP	25/04/16 16:41
Bunching	DL1PC4712	108UP	25/04/16 16:41



Route Deviation & Bunching Alerts

Vehicle: DL1PC5017

Depot Name: Kushak Nallah
Depot

Duty Name: 405/19A

Driver: PRAMOD GIRI

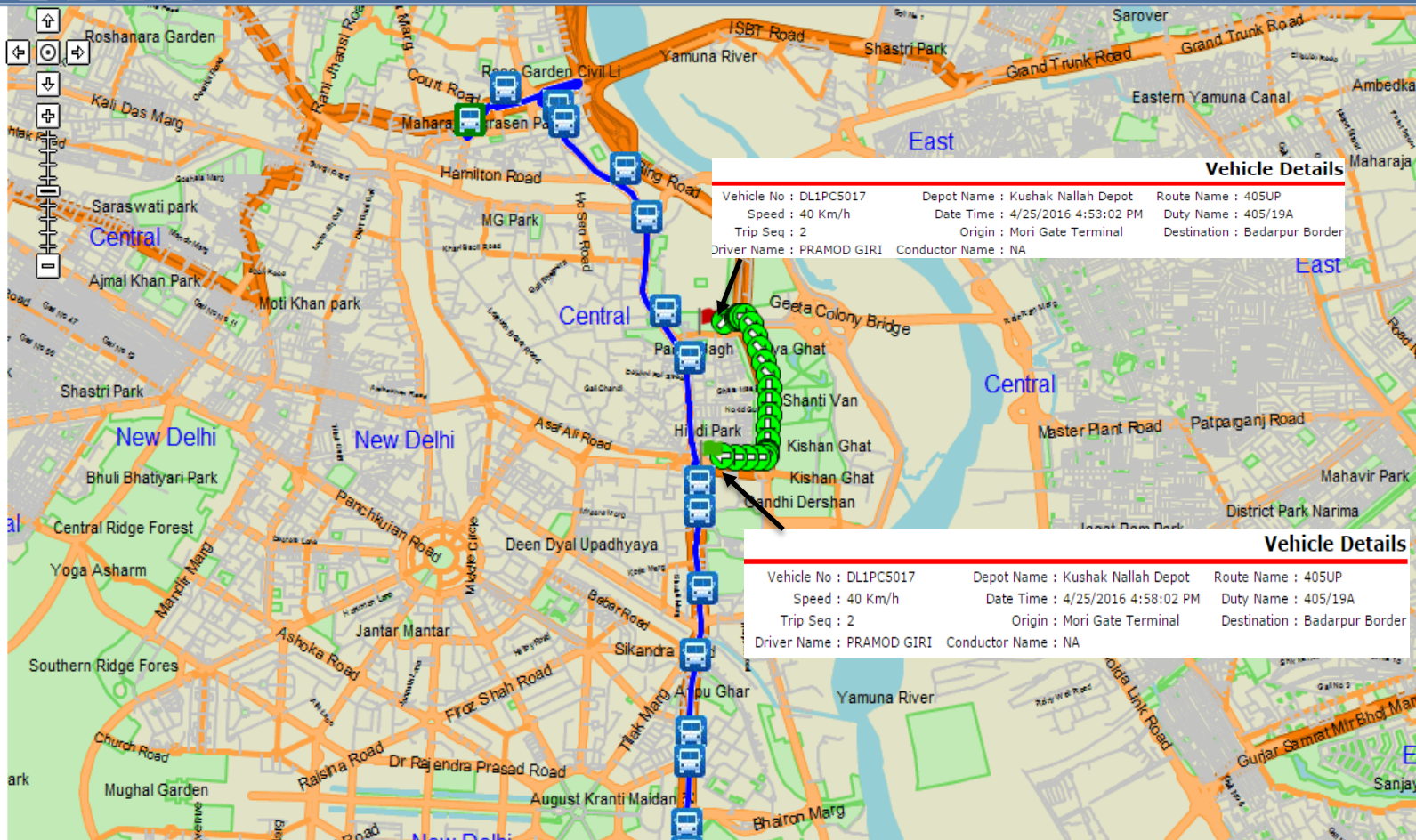
Conductor: NA

Trip Seq.: 2

Route Name: 405UP

Origin Stop: Mori Gate Terminal

Destination Stop: Badarpur
Border



Route Analytics

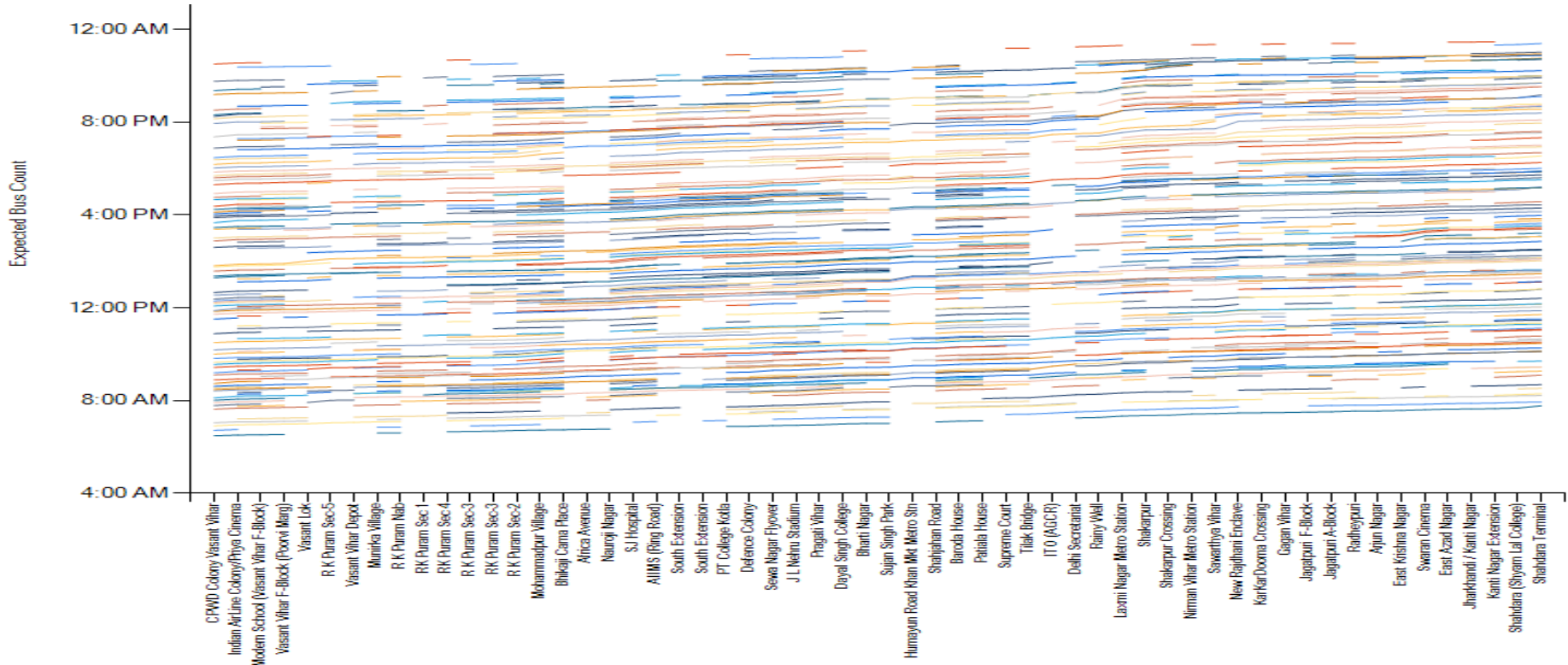
- Bunching Analysis
- Missed Bus Stop Analysis
- Route Deviation &
- Congestion

Space Time of a Route

Route No.

Date:

Space Time Graph



Thank You

Solutions Portfolio Transport Technologies



Transport Management Systems

- ITS – Intelligent Traffic Systems
- ISS – Intelligent Signaling Systems
- Smart Card Based Driving License Issuance
- Issuance of Vehicle Registration and eChallans
- Hand Held Based Enforcement System for Traffic Police
- HSRP – High Security Registration Plate



RFID Based Toll Systems

- ETC – Electronic Toll Collection Systems (RFID & Camera Based)
- Intelligent Parking and Access Control System
- Readers and Systems, Toll Tags



Vehicle Tracking Systems

- AVLS – Automatic Vehicle Location Systems (Including Wagon Tracking,
- Trucks In Transport Companies, Tankers In Oil Companies, PSVs)
- Weigh In Motion



Payment Solutions

- Hand Held Payment Devices
- Automatic Fare Collection Systems
- e-Payment Solutions – Mobile Based



Identity Solutions

- Smart Card Based National ID/Citizenship Card
- ePassport



Smart City Surveillance Systems (For Police)