LG CNS
New Leader in Smart Card Payment Systems for Public Transportation
Improving operation efficiency while maximizing revenue

- With escalating energy prices in today’s economy, demands for public transportation and transit are increasing more than ever.
- Transport operators must address rising urban congestion while demands for higher efficiency in public transit, improvements in passenger welfare and optimizing fare revenues are growing.
- To ease traffic flows and above circumstances, improvements in operational excellence, revenue transparency, profitability, and the quality of service to passengers are crucial. It is imperative to incorporate new payment technology solutions.
- LG CNS’s Smart Card Payment Solution helps transport operators to realize higher efficiency, profitability, and convenience with customer satisfaction by delivering passenger-oriented new “unified fare payment technology”.
- Contactless RF media in the form of smart card is an innovative tool among the new generation of transportation payment systems.
- As a turn-key solution provider, LG CNS provides a range of smart card related equipments, solutions and application services to ensure success in the future of public transit.
The new payment system using RF media (Smart Card) is the key technical innovation of public transportation infrastructure.

**Your Challenges and Our Solutions**

**Passenger Satisfaction**

**Inconvenience of having to:**
- Queue to purchase tickets
- Carry cash and coins
- Aware of complicated fare system

**Efficiency & Transparency**

- Single payment with smart card, all-access facility
- No delay, speedy entry
- Seamless travel & transfers
- Greater customer satisfaction

- Manual fare revenue management
- Resource misallocation
- Accounting/bookkeeping errors

- Systemized fare management
- Reduction in operating costs
- Central reconciliation

**BEFORE**

**AFTER**
With proven expertise through major references in global cities, LG CNS provides end-to-end services and solutions for fare collection by integrating fare information and applications across the transportation types, transit and routes.

Our solution offerings:
- Holistic consulting services for system analysis & design
- Equipments supply & integration
- Back office application development & implementation
- System interface
- Data center implementation
- Operating & policy support system
- Post-hoc analysis and intelligence consulting
The integrated LG CNS back office and data center system provides smart card management, central reconciliation and settlement services to all public transport providers. With scalable infrastructure platform beyond fare management, our solution system is capable to interface with other applications including tolls, banking, mobile services, concessions, retail and security access control.

System features are:
- Dual structure system
- High performance architecture
- Multi-layered back-up system
- Enhanced security
- Operational excellence
**Equipments**

- **Bus**
  - Flexibility of payment methods
  - Dramatic reduction of costs by optimized bus operation through collected commuters' information
  - Automated fare collection

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**Without Conductor**

- Payment by smart card: card-tagging on the fare box
- Payment by cash: automatic bill & coin insertion (electronic data collection)
- Automatic transmission of revenue information (via cash & card) to the depot system

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**With Conductor**

- Card passenger: tagging on off-line terminal
- Connect it to depot PC for fare revenue data uploading

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**Validator for Card Passenger**

- Card passenger: card tagging on validator
- Automatic fare revenue transmission to depot system

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**Operator’s Control Unit (OCU)**

- Simple driver interfaces

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**BMS Terminal**

- Time interval between buses (within the same route)
- Stop arrival schedule
- Traffic conditions within a given operation route

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**Value Reloader**

- Installed at reloading agent’s shop

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**Off-line validator (battery operated)**

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Metro

- Convenient payment using credit card & single pre-paid card
- Real-time control and monitoring of equipments for enhanced operation
- Easy-to-use equipments for passengers

Station Management System (SMS)

Value Checker
RF Gate
Overhauled Gate
Ticket Vending Machine
Ticket Office Machine
Manned Value Reloader
Automatic Value Reloader

Taxi

- Convenient payment using credit card & single pre-paid card
- No need for drivers and passengers to carry cash
- Secure safety for both drivers and passengers

- Card tap-on at destination
- Real-time transaction approval
- Receipt print
In addition, LG CNS provides value-added business intelligence consulting services and solutions leveraging industry expertise, insights and analytics of collected data.

1. **Demand Analysis**
   - **Demand Analysis by Round Trips**
     - Analyze the number of daily boarding & alighting passengers of each bus
     - Analyze the number of boarding, being aboard & alighting passengers of each bus by bus stops for a round trip
   - **Demand Analysis by Routes and Bus Stops**
     - Analyze daily and hourly route patterns
     - Forecast daily demand for passengers by routes and bus stops
     - Forecast hourly demand for passengers by bus stops
   - **Establishing OD Table by Regions**
     - Determine OD (origin-destination) data by routes for a specific duration

2. **Bus Operation Analysis**
   - **Analysis of Travel Time**
     - Analyze travel time of buses by days of the week and seasons
   - **Analysis of Travel Speed**
     - Analyze average travel time by routes and time periods
     - Analyze time delay and traffic congestion by routes
     - Analyze the rate of overlapping bus stops with other routes

3. **Optimum Bus Allocation Management**
   - **Estimation of the Demand for Buses and Passengers**
     - Adjust intervals of bus allocation by means of the number of passengers
   - **Simulation of Timetable by Routes**
     - Timetable preparation by routes and day after analyzing passenger demand data and operation data
     - Differentiating intervals of bus allocation

4. **Bus Route Alignment**
   - Apply regional OD data
   - Apply demand for passengers by routes and bus stops
   - Rerouting decision through analyzing passenger demand peak and route characteristics
Case Study: **New Smart Card System for Public Transportation in SEOUL**

**About Seoul**
- Area: 605 km²
- Population ('05): 10.3 Million
- Vehicles ('05): 2.8 Million

**Background**
- Greater transparency in fare revenue management and operational excellence via integration of various transport modalities
- Provides multi-functional services to citizen using single card for convenient transfer to increase citizen's satisfaction
- Detailed traffic demand forecast and optimal transport policy-making
- Save management cost through unified settlement system

**Implementation Duration**
- 9 months

**Scope**
- Implementation of integrated solution for “Single Payment System” using smart card
  - Interacted 765 Bus Routes / 9,540 Buses
  - Connected 9 Metro Lines / 391 Stations / 73,000 Taxis
  - Processed over 25 million transactions / day

**Featured System**
- Equipments: RF Validator & Equipment Standardization
- Smart Card: implementation of international standards (ISO14443 Type A/Type B)
- Architecture: Open architecture, Non-stop services (365 days & 24 hours)
- Services: Multi-functional service provisions (e.g., transport, shopping, and civil service, etc)

**Role of New Payment System**
- To provide support for municipal administrators reliable business analytics for accurate policy-making decisions
- To enhance the quality of service and the level of passenger satisfaction

**Benefit Analysis**
- Increase in the Number of Passengers
  - 9% growth in the number of passengers in July 2005
- Surge in the Volume of Transfer Transactions
  - 71% growth in the volume of transfer transactions among mass transit passengers (up by 761,000) per day
- Revenue Growth
  - 11.9% increase in daily revenue (up by US$ 0.68 million) since December 2004
  - 8% revenue growth in yearly figures from 2003 to 2005
- Greater Satisfaction for the Denizens
  - Upon a satisfaction survey of mass transit commuters (2,398 respondents); regarding the Bus services in particular, the number of contented citizens post Smart Card System has risen by three folds.
What Benefits?

Citizen

Customer-oriented Environment

- Single Payment System
  Multi-functional service availabilities

- Seamless Travel
  Fast, secure and convenient transfer

- Speedy Traffic Services
  Saves time & money

Government

Greater Public Welfare, Reduced Subsidy Burden

- Financial Benefits
  Subsidy reduction to transport operators

- Smart Public Transportation
  Superior central control via integrated solution

- Enhancement of Public Welfare

Transport Operators

Revenue Increase

- Cost Savings
  Reduction in operating costs

- Systemized Fare Revenue Management
  Real-time income monitoring

- Revenue Growth
  Increase in passenger volume
LG CNS and its 7,300 IT professionals have been providing superior IT services to more than 5,000 satisfied private and public enterprise clients around the world for the past 20 years.

Dedicated to clients’ growth, LG CNS provides expertise on front-end consulting and IT services for reliable system and network integration, e-business, e-outsourcing and other industry specific solutions.

Known as an outstanding IT services provider in China and Southeast Asia, especially for public services systems, LG CNS is servicing global clients in the United States and European countries, with seven subsidiaries and R&D Centers in China, India, US, Europe, Indonesia, Brazil and Japan. Since inception in 1987, LG CNS has attained an impressive 33% CAGR, nearly doubling sales every two years. In 2007, our revenue was over US$2 Billion dollars. Helping clients address their business issues and maximizing productivity and work efficiency through in-depth solutions, LG CNS is the first provider offering clients the most innovative solutions and services to multiply their value for years to come.

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