

# Development of NeXt generation Transportation Information System

교통체계분석연구단장 엄진기

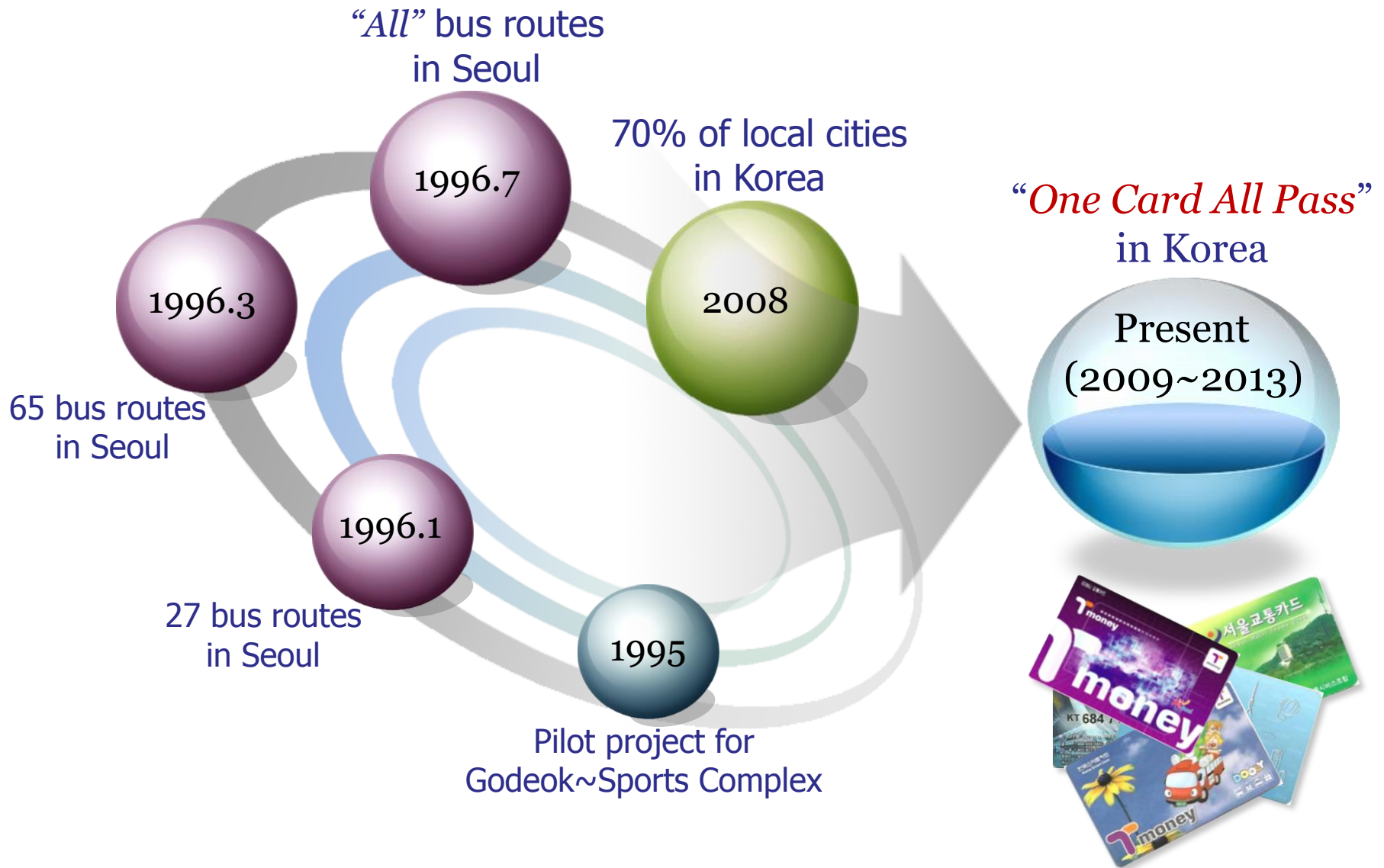


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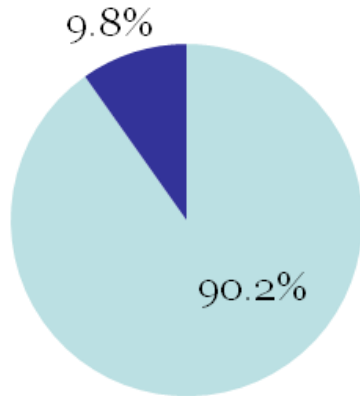
# History in Use of Transport Card



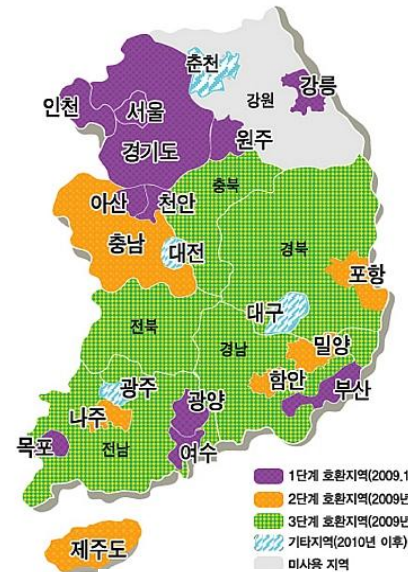
# Backgrounds

- Most SEOUL citizens use Transport Cards for the public transportation !!
- The usage is spreading to all over the country (50.6% for Korea).
- The Korean government : **'One Card All Pass'** project.

Metropolitan Area



■ Card ■ Cash



\*source : Newsis

Vitalization  
in use of TC



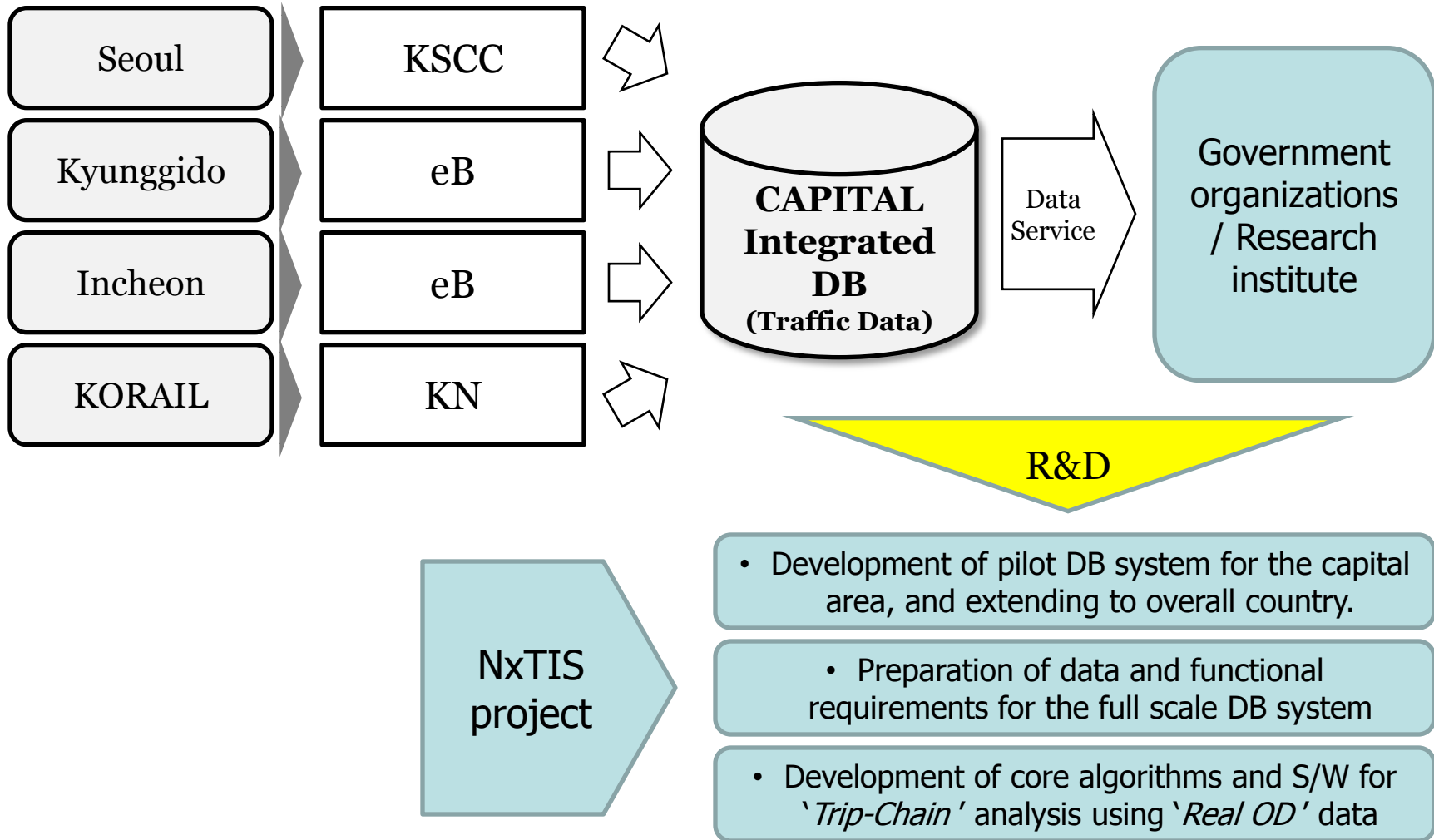
Huge size of TC data  
is generated



**Problem: How to use  
the valuable data?**

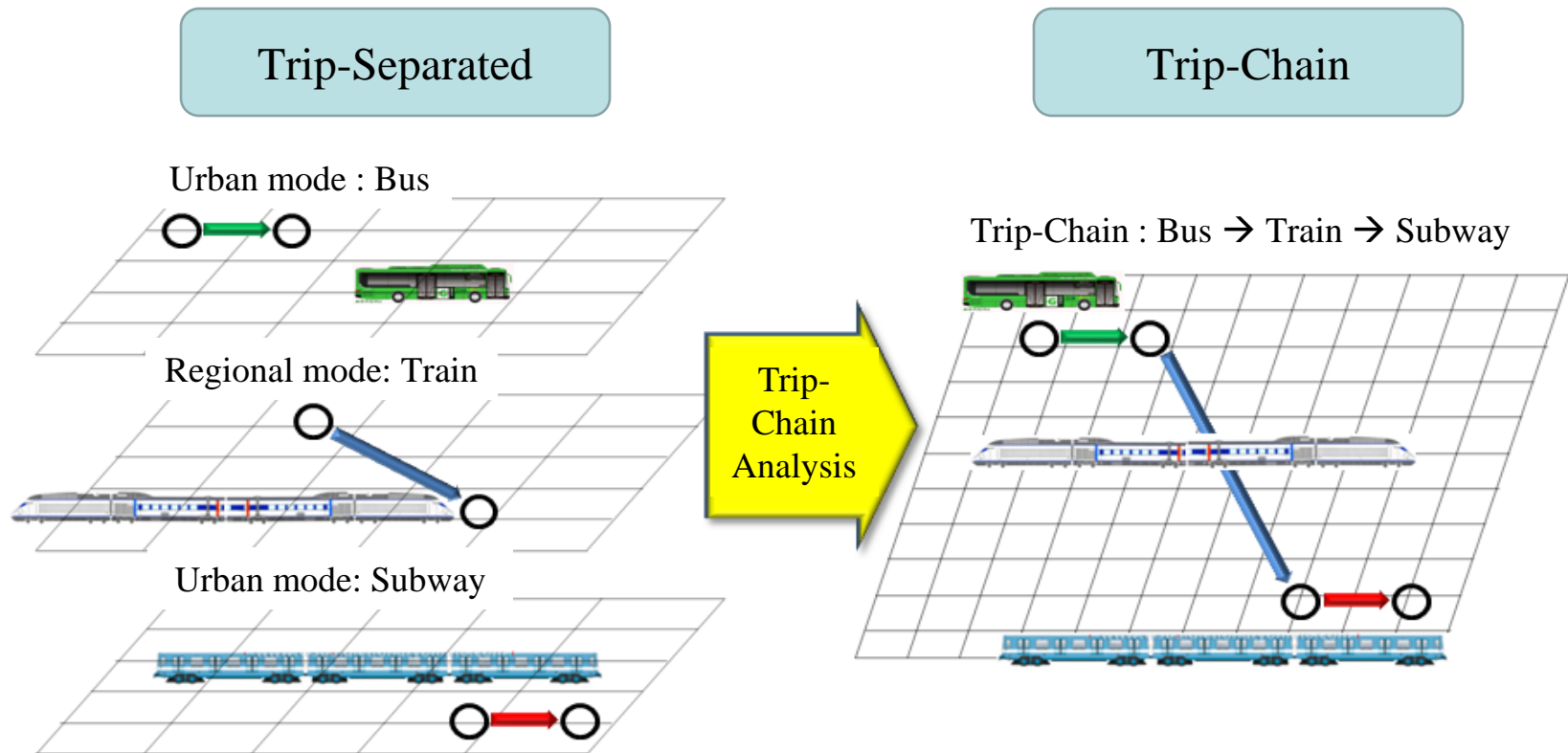
# Development of a DB system

## ● An integrated DB system for the capital area



# Backgrounds

- **(Definition)** Real OD data : a traffic data gathered from TC, and preprocessed for all transportation modes of an individuals' journey

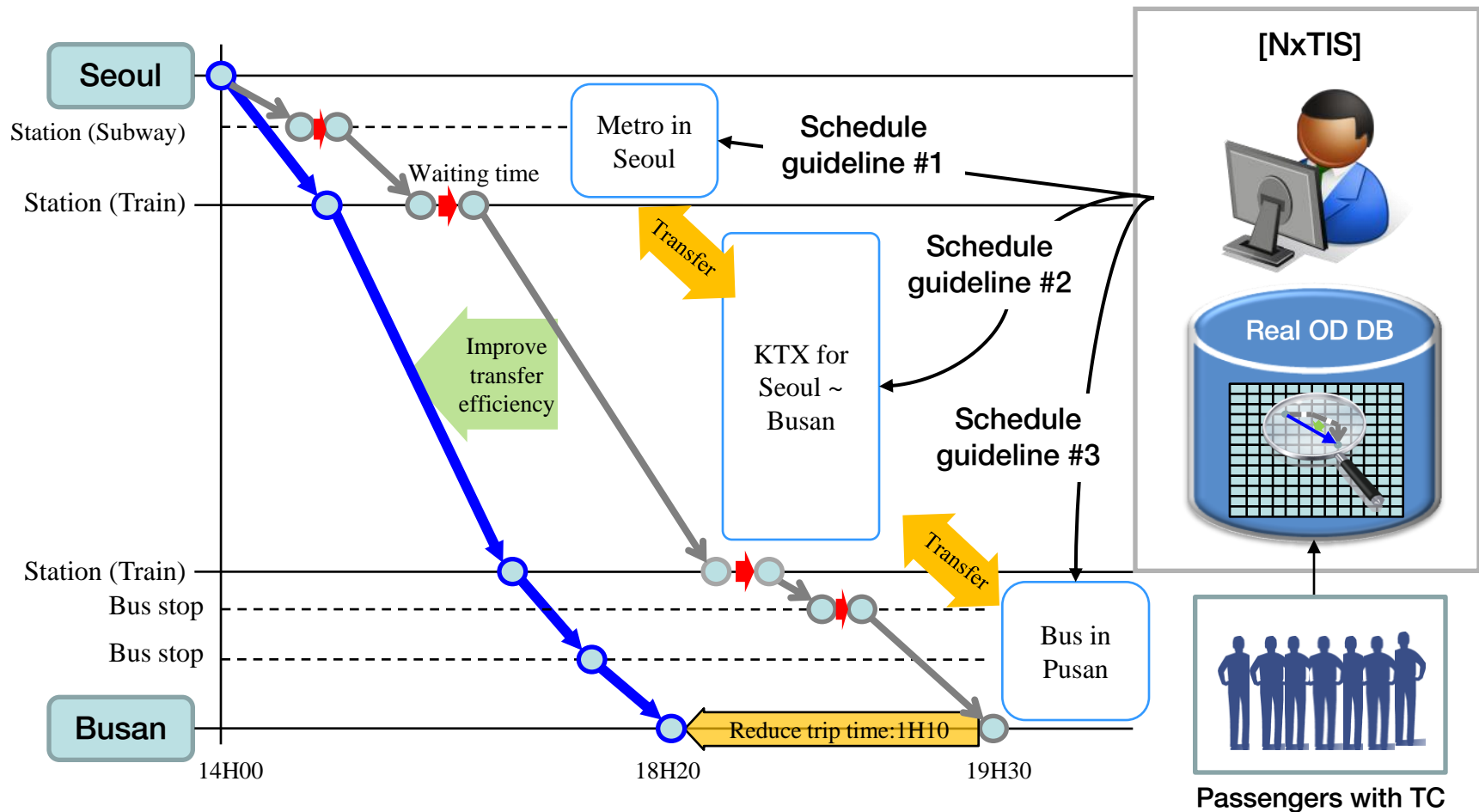


- Benefits of trip-chain analysis : (1) Possible to **identify passengers' traffic** in realistic.  
(2) Possible to **forecast OD demand** more correctly  
(3) Possible to **make decisions** more correctly

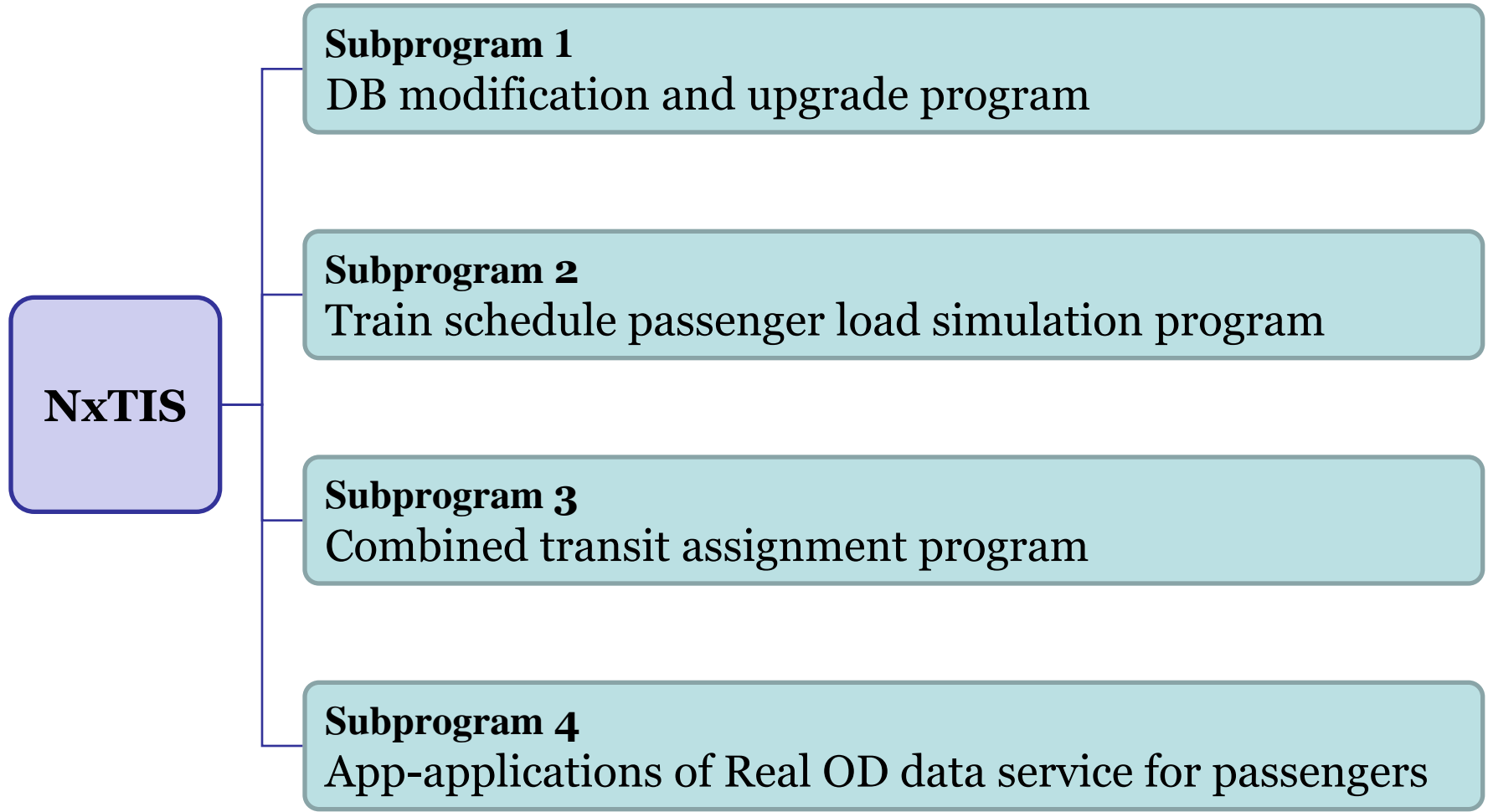


# Concept of Benefit

- NxTIS provides schedule guidelines to operators or local governments for improvement of transfer efficiency in the public transportation
- Concept of NxTIS based on real OD DB



# The Configuration of NxTIS





# Subprogram1 : DB modification and upgrade program

## Construction of public transportation information system

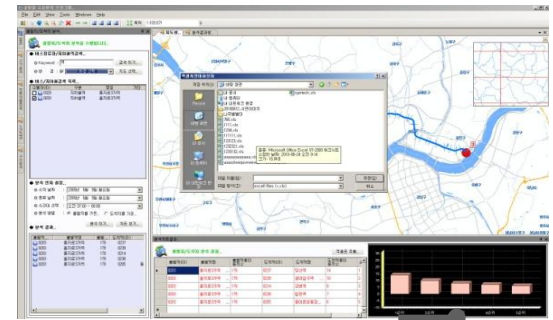
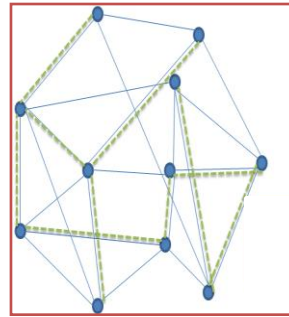
### ① Construction of real OD DB



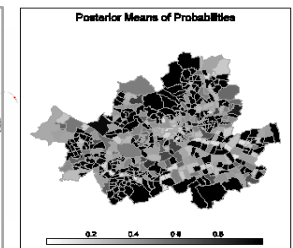
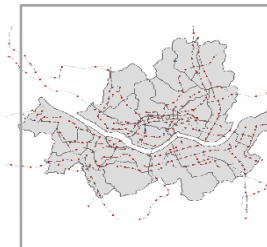
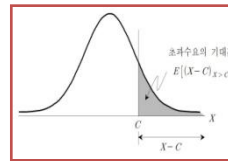
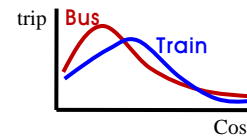
GIS Map

### ② Definition of DTM and traffic analysis

※ DTM : Disaggregate Transport Market



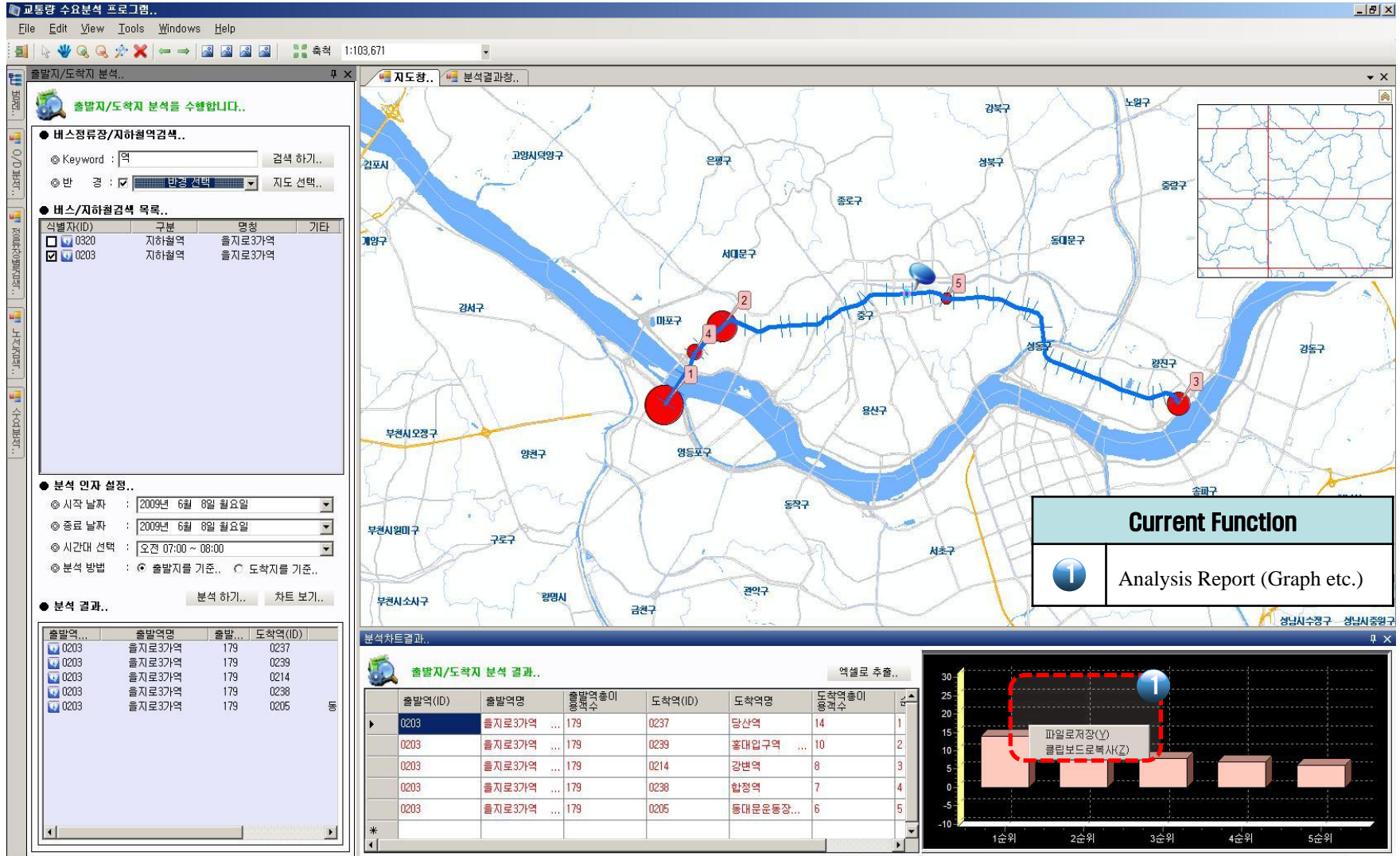
### ③ Advanced demand analysis



- Trip Length Frequency Distribution Model (TLFD)
- Spatial Correlation Model for Mode Choice

# Subprogram1 : DB modification and upgrade program

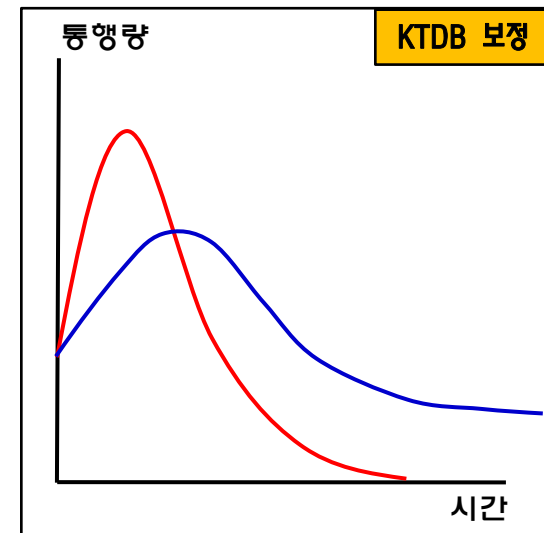
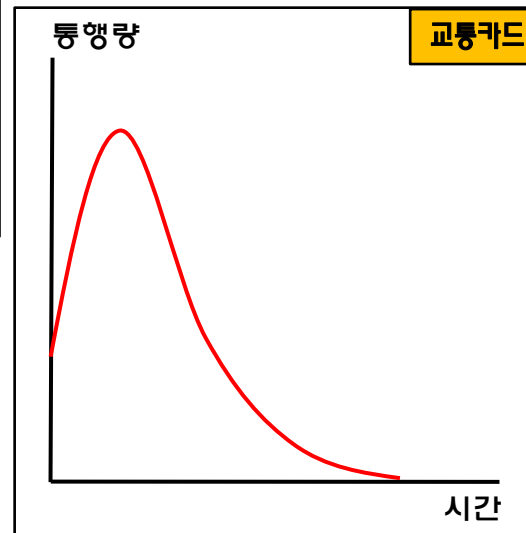
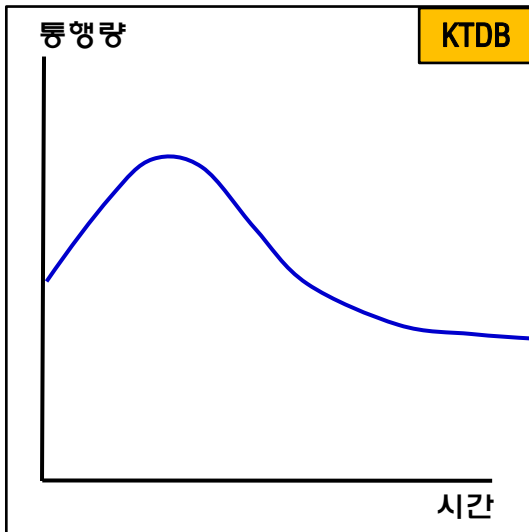
## GIS based traffic analysis with Real OD data



# Subprogram1 : DB modification and upgrade program

## ● TLFD analysis for KTDB OD modification

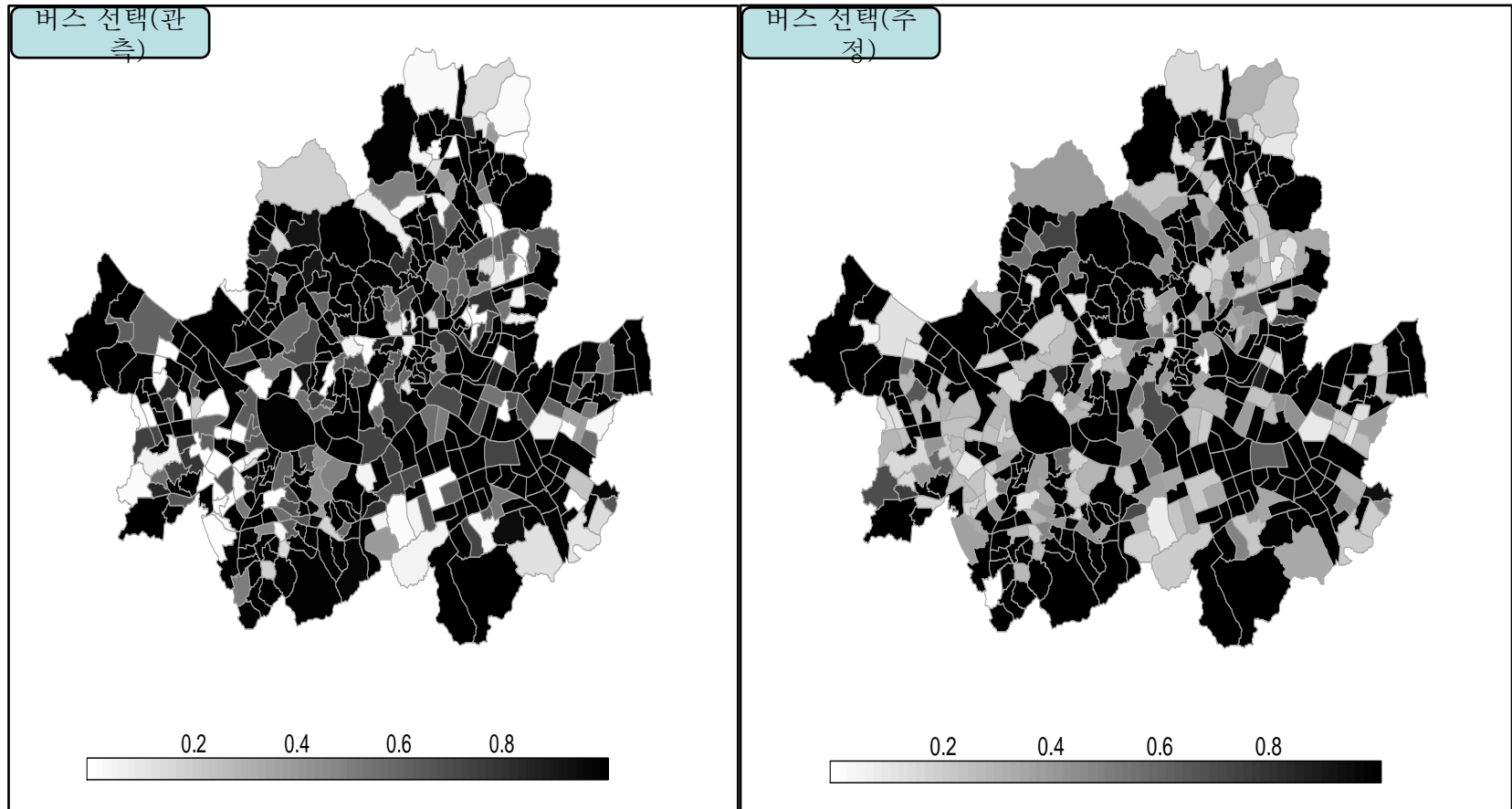
- Comparison of KTDB OD distribution against TLFD from card data
- Develop distribution model for OD modification



# Subprogram1 : DB modification and upgrade program

## Mode choice

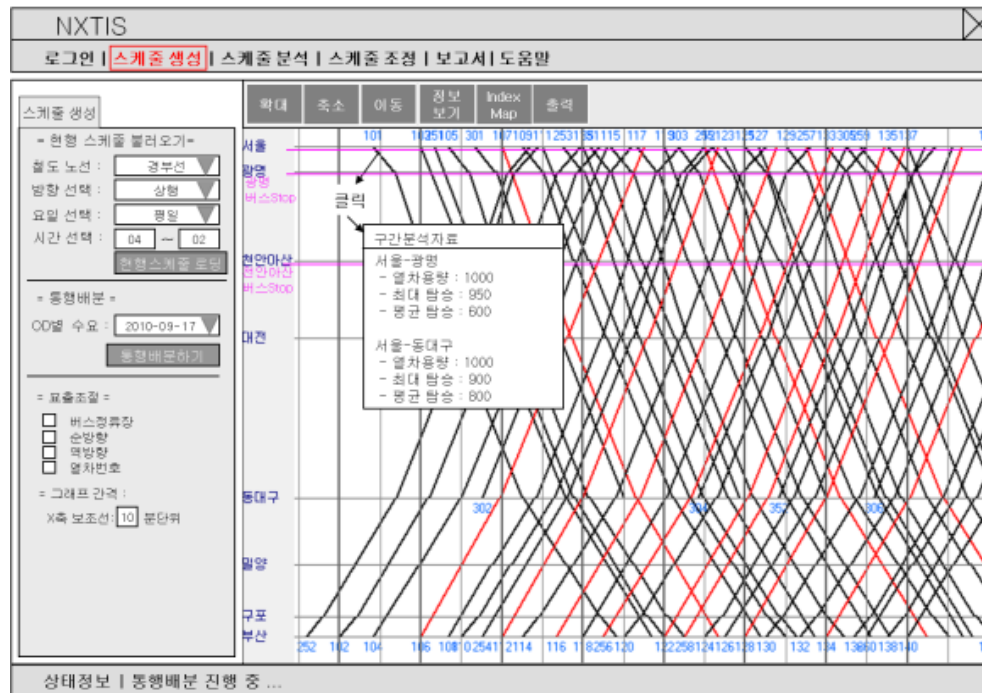
- Modification of transit mode choice based on cost/time from card data



# Subprogram 2: Train schedule passenger load simulation program

## Functions of the simulation program

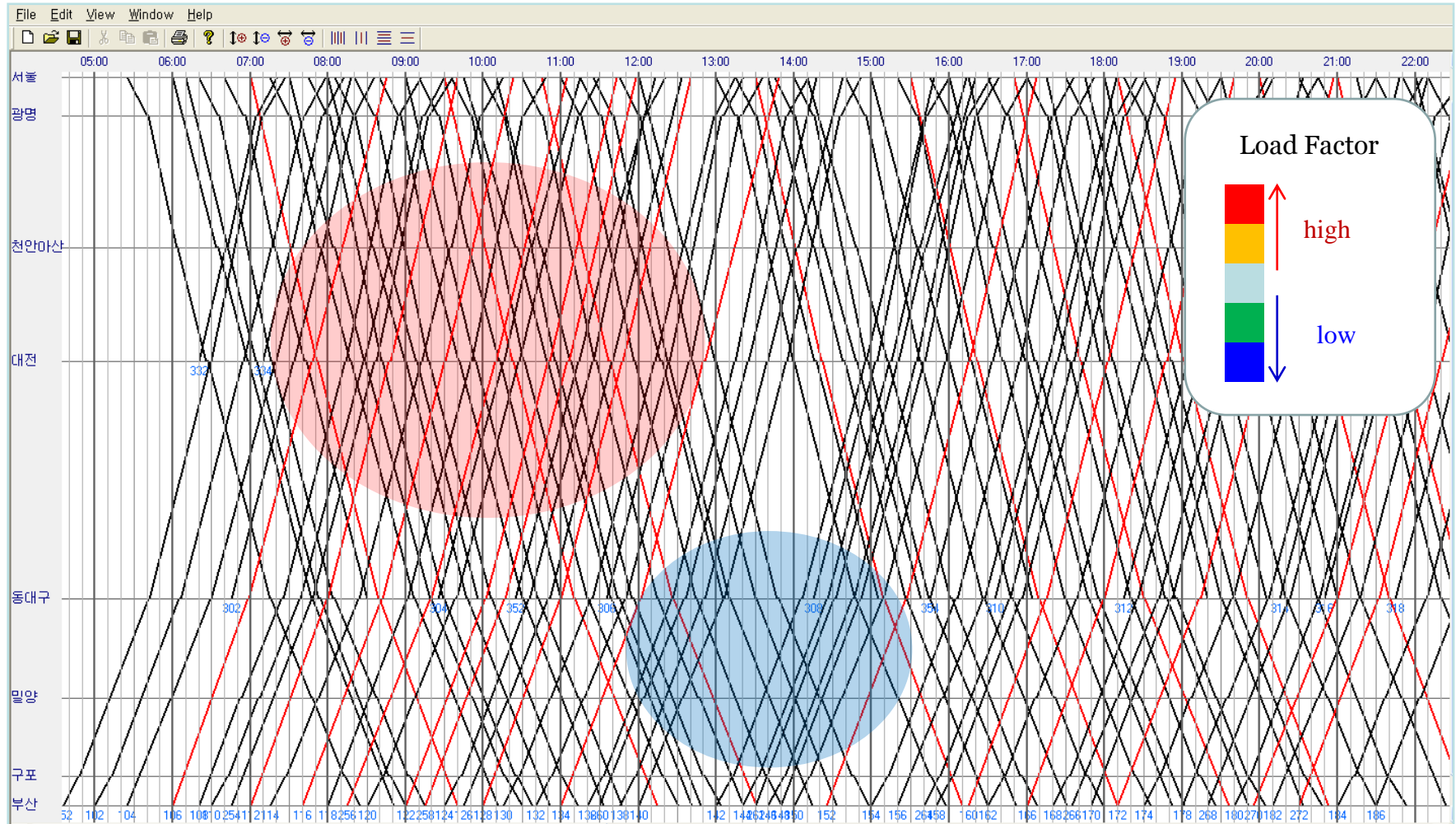
- Generate an initial train schedule / open an existing train schedule
- Management of modification of train schedule to simulate changes of passenger load
- Schedule based transit assignment : estimate passenger transfer between bus–train or train–train, and analysis of load factor for individual train/sections
- Recommend a train to be modified firstly, and direction/amount of modification.





# Subprogram 2: Train schedule passenger load simulation program

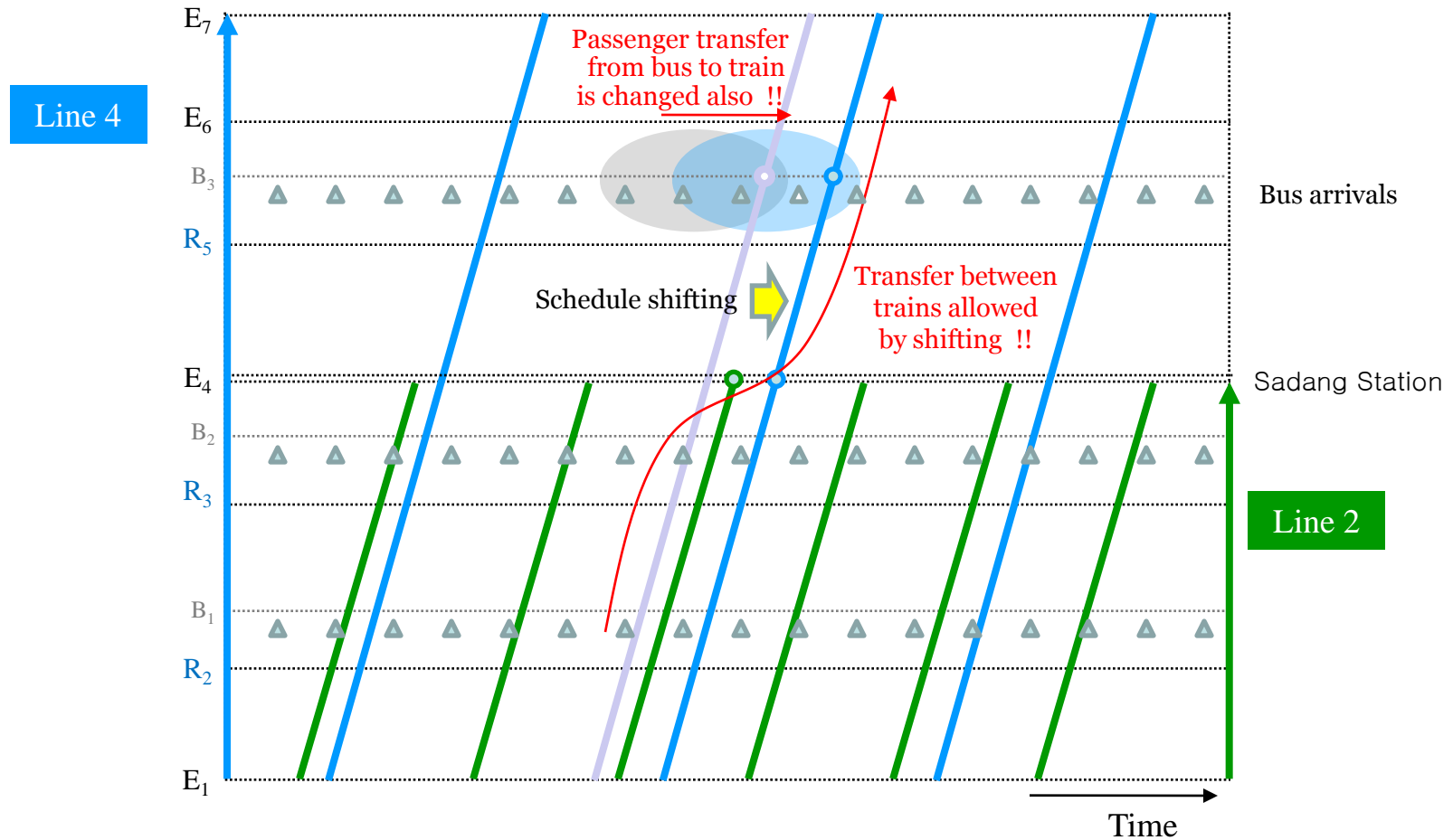
## Passenger load analysis





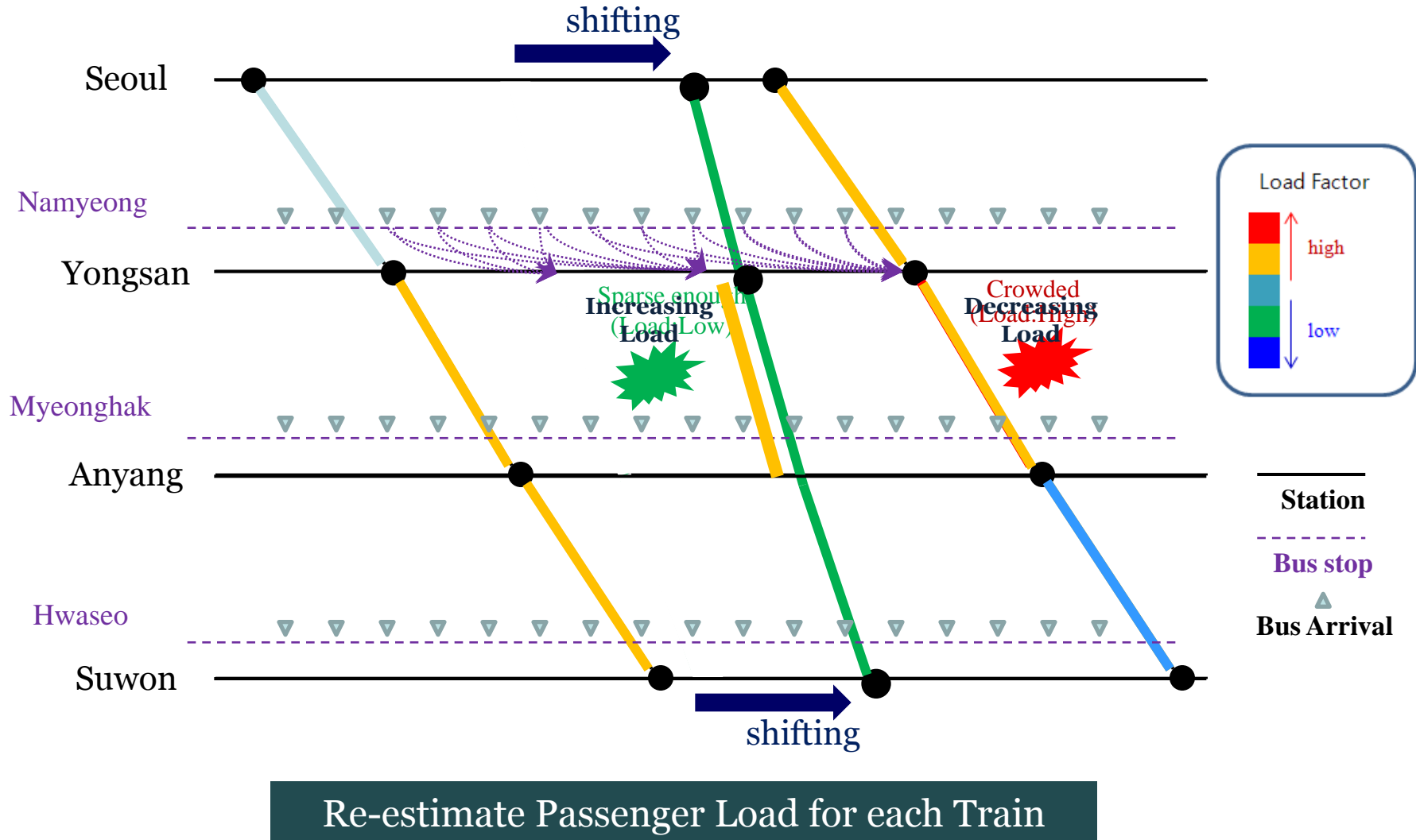
# Subprogram 2: Train schedule passenger load simulation program

## Passenger load simulation



# Subprogram 2: Train schedule passenger load simulation program

## Simulation Process



# Subprogram 3: Combined transit assignment program

## Functions of the combined transit assignment program

- Combined transit assignment using the trip-chain knowledge
- What-if analysis of the combined transit assignment
- GIS based MMI (Man Machine Interface)

NXTIS

로그인 | 동행배정조회 | 동행재배정 | **정보검색** | 보고서 | 도움말

정보 검색

확대 축소 이동 정보 보기 Index Map 출력 정류장 이동 정류장 생성 작업 저장

= 데이터 설정 =

- 데이터 선택: 데이터1 [확인]

= CO 설정 =

시작위치: 종각 [확인] 종료위치: 중무로 [확인] 동행배정조회하기

= 시작위치 조회 =

종각 [확인하기]

No	종류	구분
1	종각	지하철
2	종각버스정	버스
3	종각역	지하철
4	종각1	버스
5	종각병원	버스
6	종각역1	지하철
7	종각버스	6

323456

클릭하여 기존 저장했던 데이터를 로드합니다.

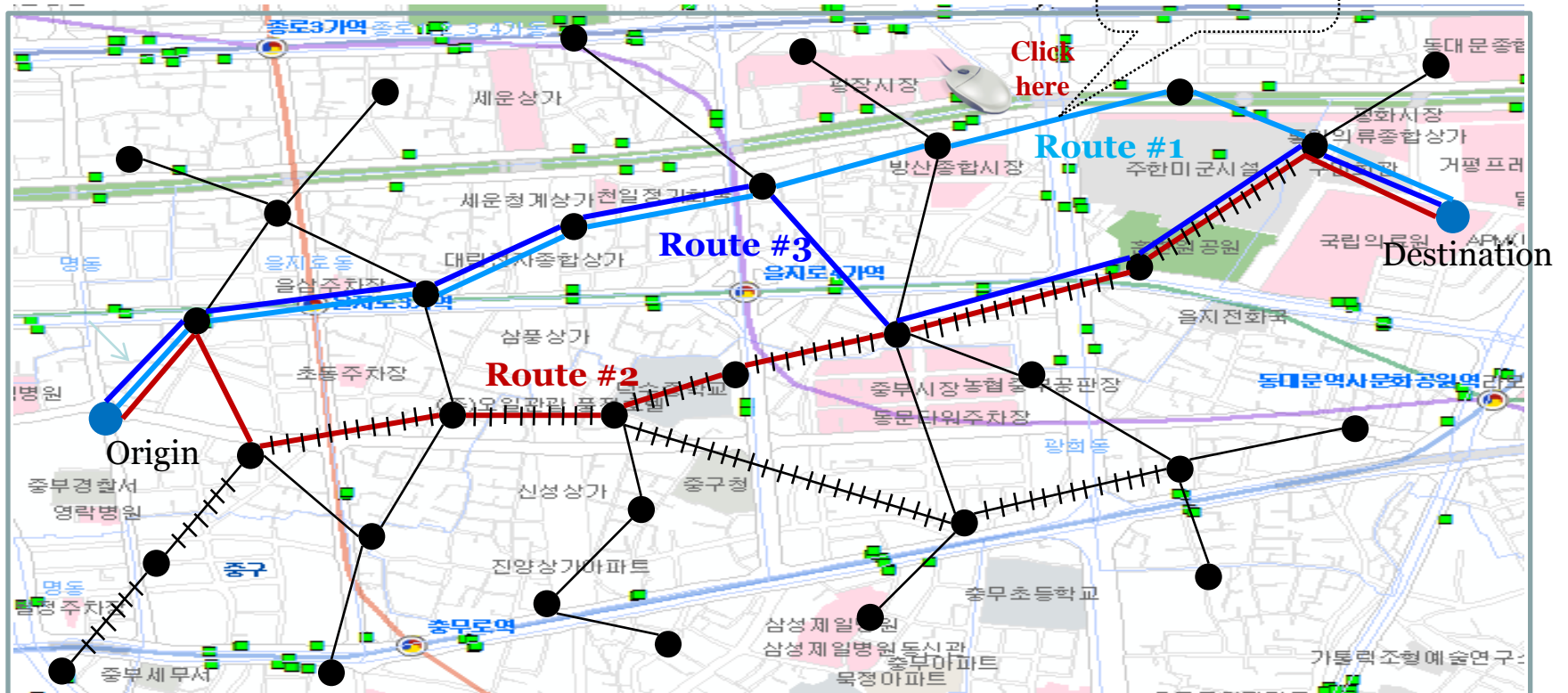
조치결과

노선	수단(환승)	소요시간(분)	요금(W)	예측통행량(명/일)
노선1	버스	15	1000	800
노선2	버스-전철-버스	18	1100	250
노선3	버스-전철-버스	19	1100	300

상태정보 | 데이터 변경중 ...

# Subprogram 3: Combined transit assignment program

## Combined transit assignment and what-if analysis



Route	Transport(# of Transfer)	Travel time	Fare(W)	Traffic forecast (man/day)	Historical traffic (man/day)
#1	Bus(0)	38'	1,200	600	700
#2	Bus-Bus-Train-Bus(3)	40'	1,400	200	150
#3	Bus-Bus-Train-Bus(3)	35'	1,400	500	450

# Subprogram 4: App-applications of Real OD data service

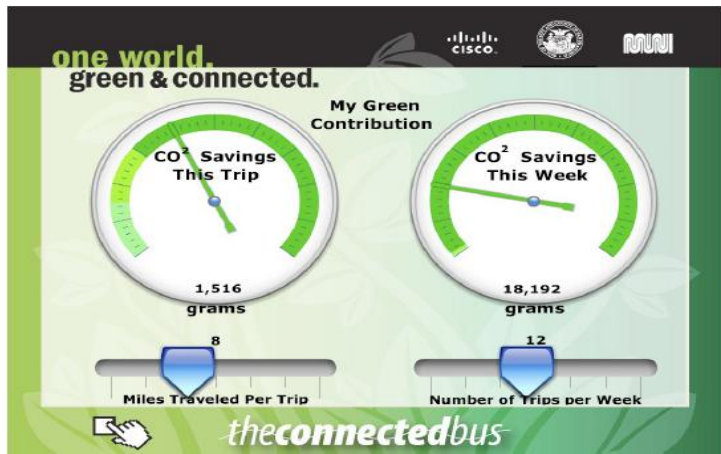
## App-applications in smart-phone environment

### Smart transportation service



- Route and schedule information
- Current travel condition
- Travel optimization
- Travel vehicle arrival
- Mapping and guidance
- Real-time location information
- User travel analysis

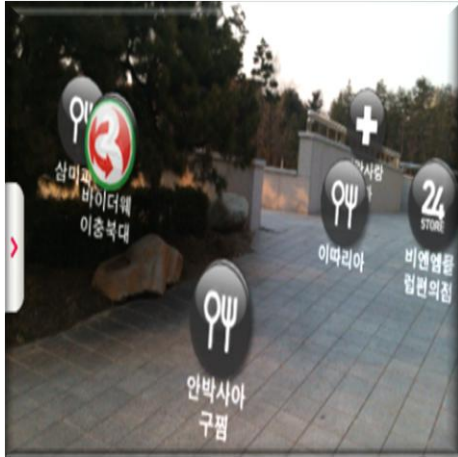
### Carbon mileage calculation



Carbon, time,  
and financial incentive

# Subprogram 4: App-applications of Real OD data service

## Development of an applications based on augmented reality



A providing system of travel info. using augmented reality

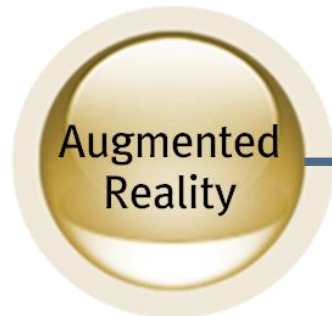
Augmented reality



Portable camera



Detailed  
travel  
Informations



Provide a real-time video images, which is not stored

Provide TRNSP & Neighboring Info.



# Technology Roadmap

## Vision: Next Generation Transport Information System for better Public Transportation Systems

		2010 Software Design	2011 Core Algorithm	2012 System Integration	2013 ~ 2014 Test & Realization
Prospect of Environmental Change		Road oriented transportation system (Un-sustainability)		Railway oriented transportation system (Sustainability)	
		Rail Infra Expansion (3,125Km → 4,792 Km)		Transfer optimization by composite public transportation	
		Value-add IT upsweep based on individual transportation information		IT field activation based on D2D information	
Technical Growth	Energy	Sub1: Real OD based traffic analysis program			Green milege : 250 million dollars/year
	Share	Sub2: Train schedule passenger load simulation program			Railway utilization : 5% improvement
	Jobs	Sub3: Combined transit assignment program			Job creation in IT : 149men/year
Driving Power	R&D	NxTIS : development of core algorithms and S/W			Test bed and simulation
	Role	<ul style="list-style-type: none"> <li>Government : Support R&amp;D (Research institute initiative)</li> <li>Private: Search new enterprise and job creation using privateD2D transportation information</li> </ul>			
Ripple Effect		<ul style="list-style-type: none"> <li>Green and energy-efficiency transportation system</li> <li>Improvement train transportation share (5%) → Reduce indirect social cost</li> </ul>			<ul style="list-style-type: none"> <li>Job creation in new IT based on transportation information</li> </ul>