

BGC

CAN汽车总线  
CAN automobile  
bus technology

# INTELLIGENT PUBLIC TRANSPORTATION SOLUTION

BGC(Beijing) Communication Co., Ltd.

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# About BGC



BGC Communication Co.,Ltd founded in 2009. BGC shares based on independent research and development of ITS hardware and software products, Committed to becoming the integrated solutions provider in intelligent transportation with the most core competitiveness. Now BGC have more than 240 employees (over 100 RD engineers), office area up to 4000 m<sup>2</sup>.

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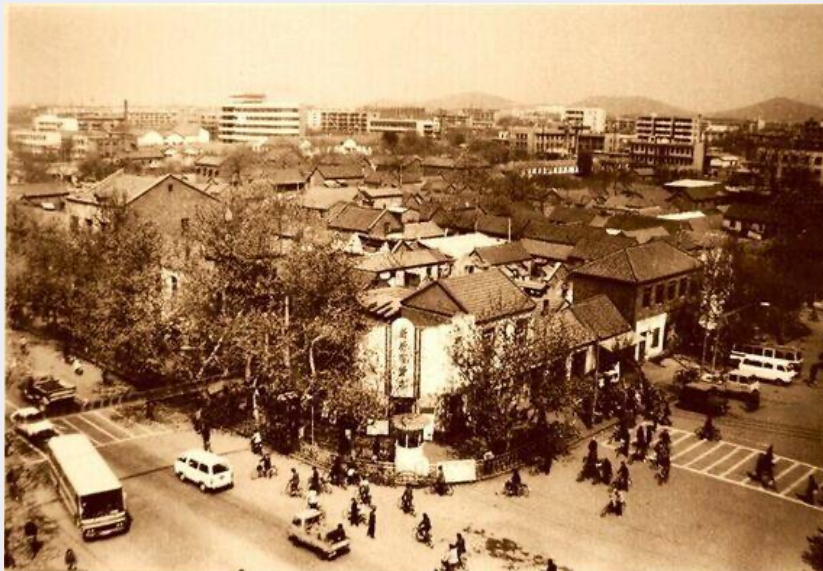
HR & Admin. Dept.

2

## Current Status and New Demand



# ○ Rapid Change of City and Transportation



**The development of city impacts the great change of public transportation!**

# ○ Difficulty of Public Transportation



- ❑ Lack of Big Data to support the dispatching and route planning
- ❑ Passenger takes long time for waiting
- ❑ Low working efficiency

- ❑ Lack of security preventive and early warning mechanism
- ❑ Terrible incident, causing serious personnel dead and injured

- ❑ Couldn't provide Internet +travelling service
- ❑ Passenger is unable to arrange his trip conveniently



- ❑ Public bikes all over the city
- ❑ Resolve the problem of final 1km travelling



- ❑ The construction of railways in more and more cities
- ❑ Transportation is more convenient and fast



## Operation

### Bus Operator

APTMS

Remote Maintenance

ERP System

Passenger Counting

OBUs

## Security

### Monitor

CCTV Surveillance

Alcohol Testing

Flammable Detection

Driving Assistance

## Experience

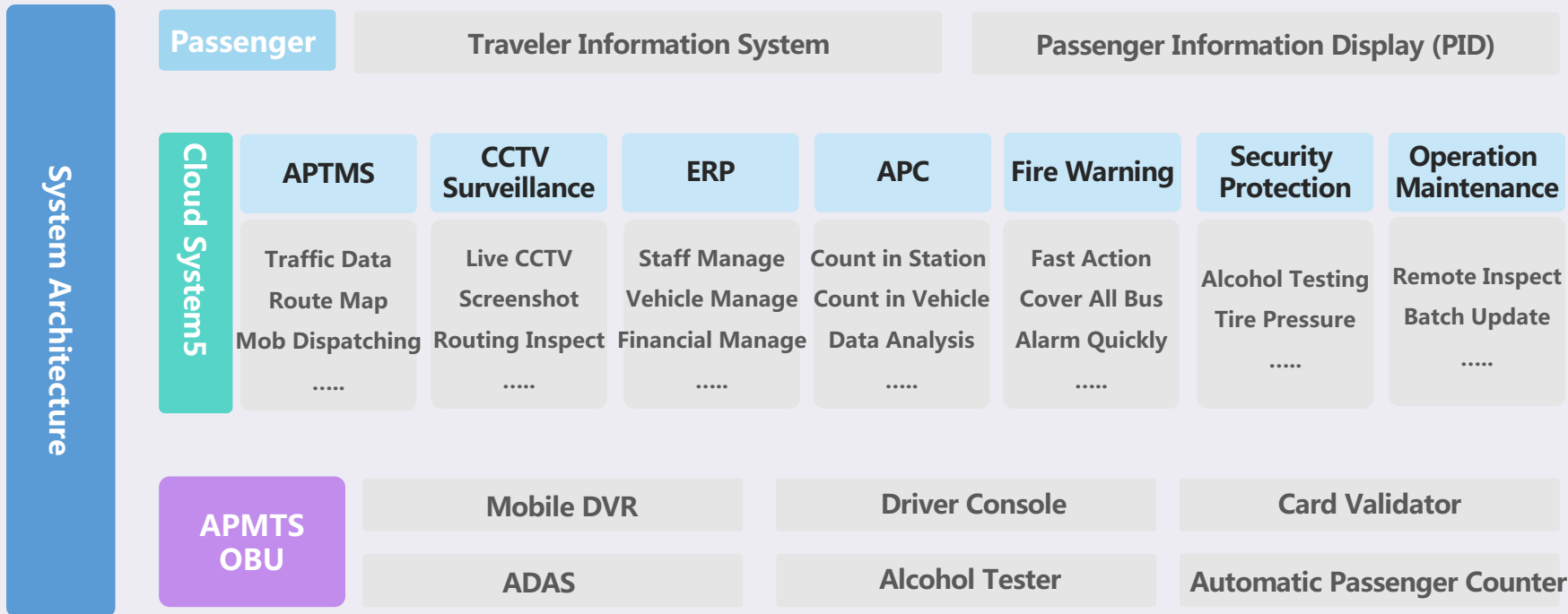
### Passenger

Commuting Service

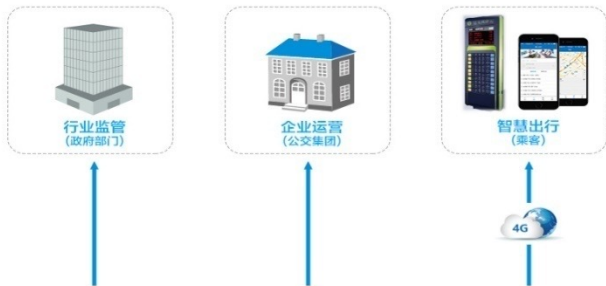
Mobile App

PID

# ○ Solution of Intelligent Public Transportation System



## Industry Application



## Cloud System



## APTMS OBU



## Front End



3

## Solution and Case Study



## Comprehensive and direct viewing

- Overall and direct view of the operating status
- Stress intervention in a fast and easy way



## Flexible Dispatching

- PC + Mobile dispatching
- Suitable for any kinds of environment



## Deep Analysis

- Generate kinds of report
- Support data analysis



# ○ CCTV Surveillance System

## Obtain Evidence & Monitoring

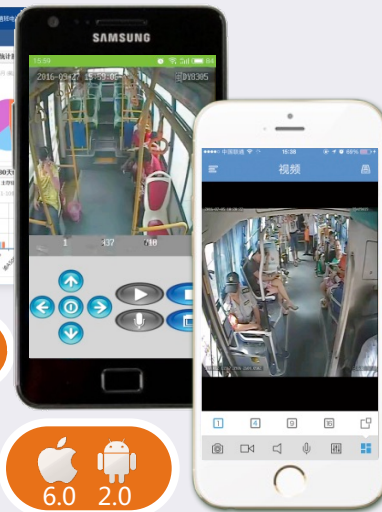
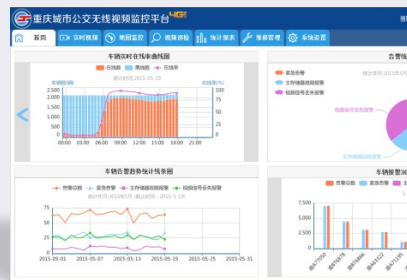
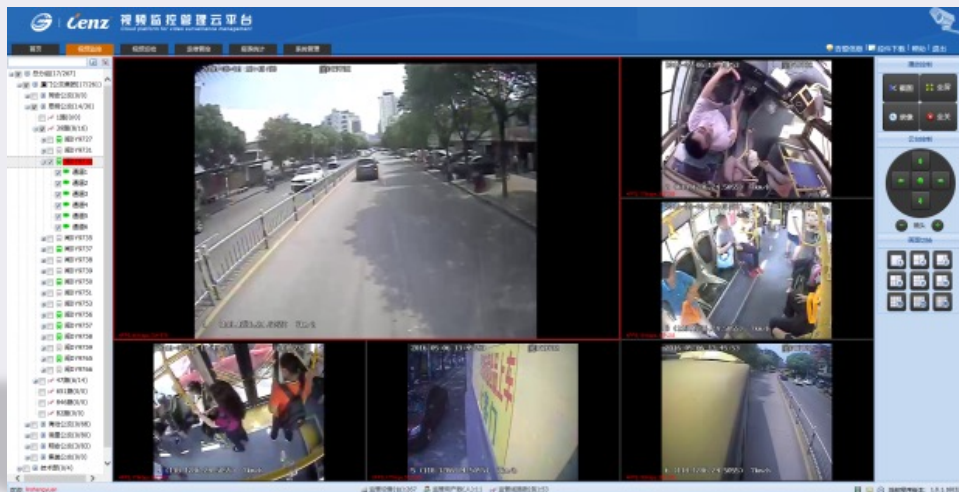
Retrieve from historical video, track behavior and obtain evidence

Provide live CCTV feed to monitor the suspicious routes

## Multiple Applications

B/S framework, operate in website

Provide mobile app



B/S framework



BACK

## Manage the human, finance and inventory to save the operation cost

Enhance the process management to prevent the unnecessary budget

Data sharing from the APTMS, seamless connection of each business



**Machinery**



**Maintenance**



**Security**



**Inventory**



**Customer  
Service**



**System  
Management**

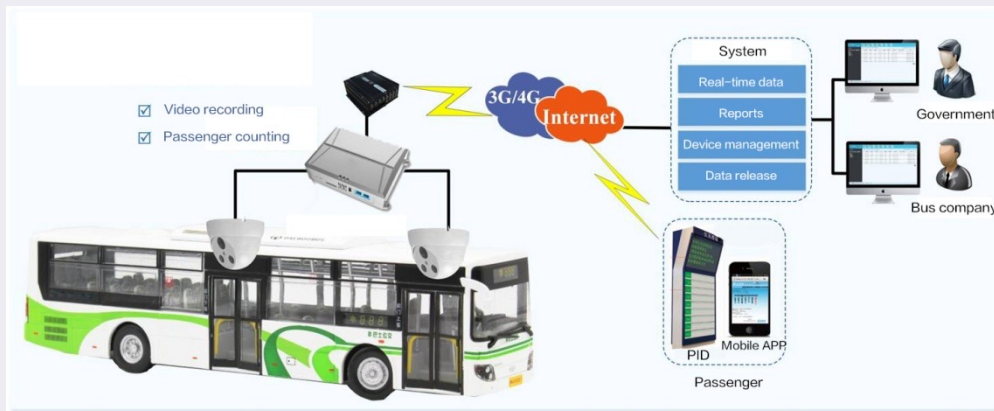
# Automatic Passenger Counting System

## Accurate Counting

Bus: calculate the getting on and getting off passengers  
 Station: calculate the numbers of passengers waiting in station

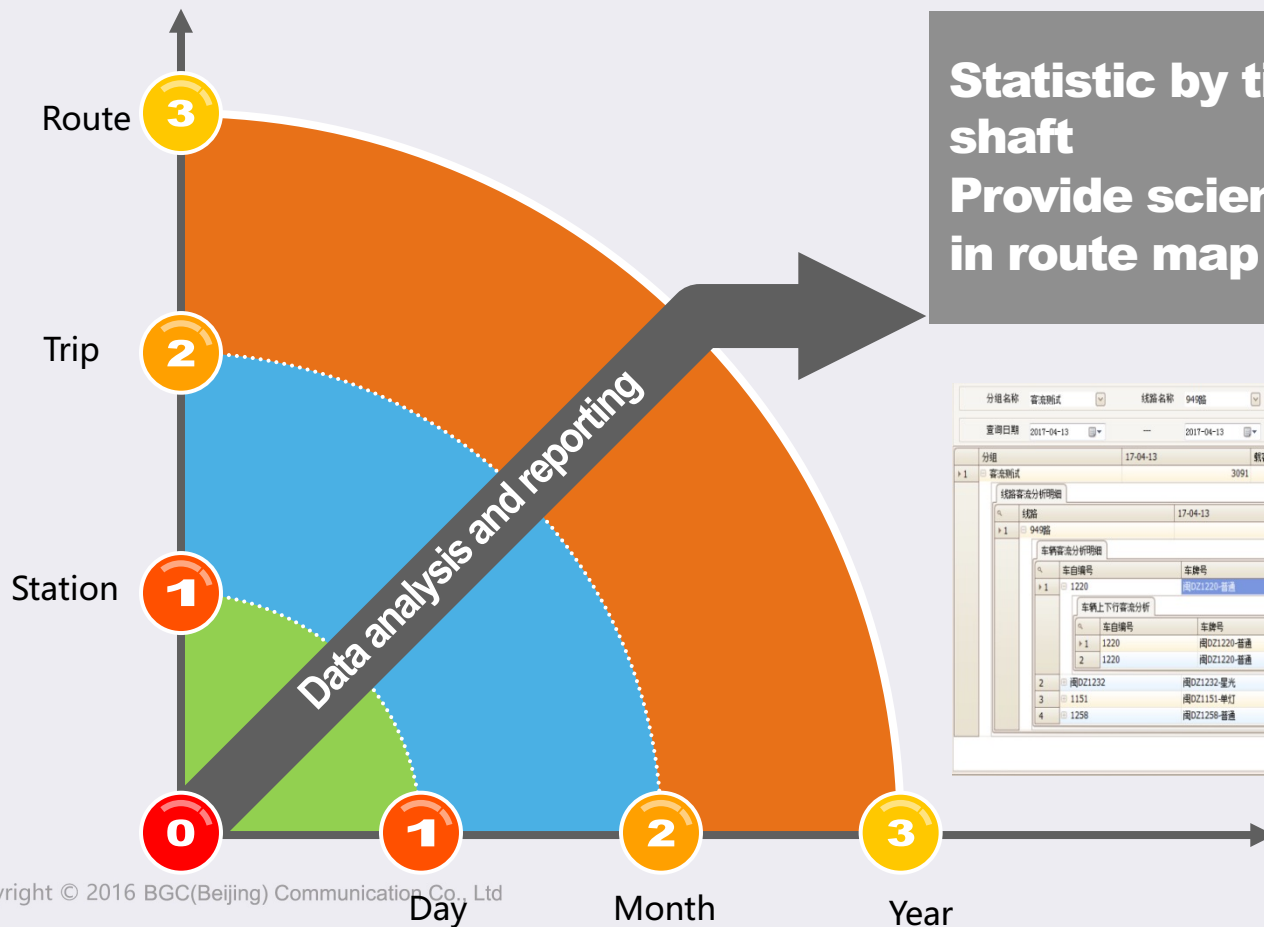
## Scientific planning by using big data

Generate kinds of reports for data analysis  
 Provide the scientific supporting to bus dispatching, operating and route planning





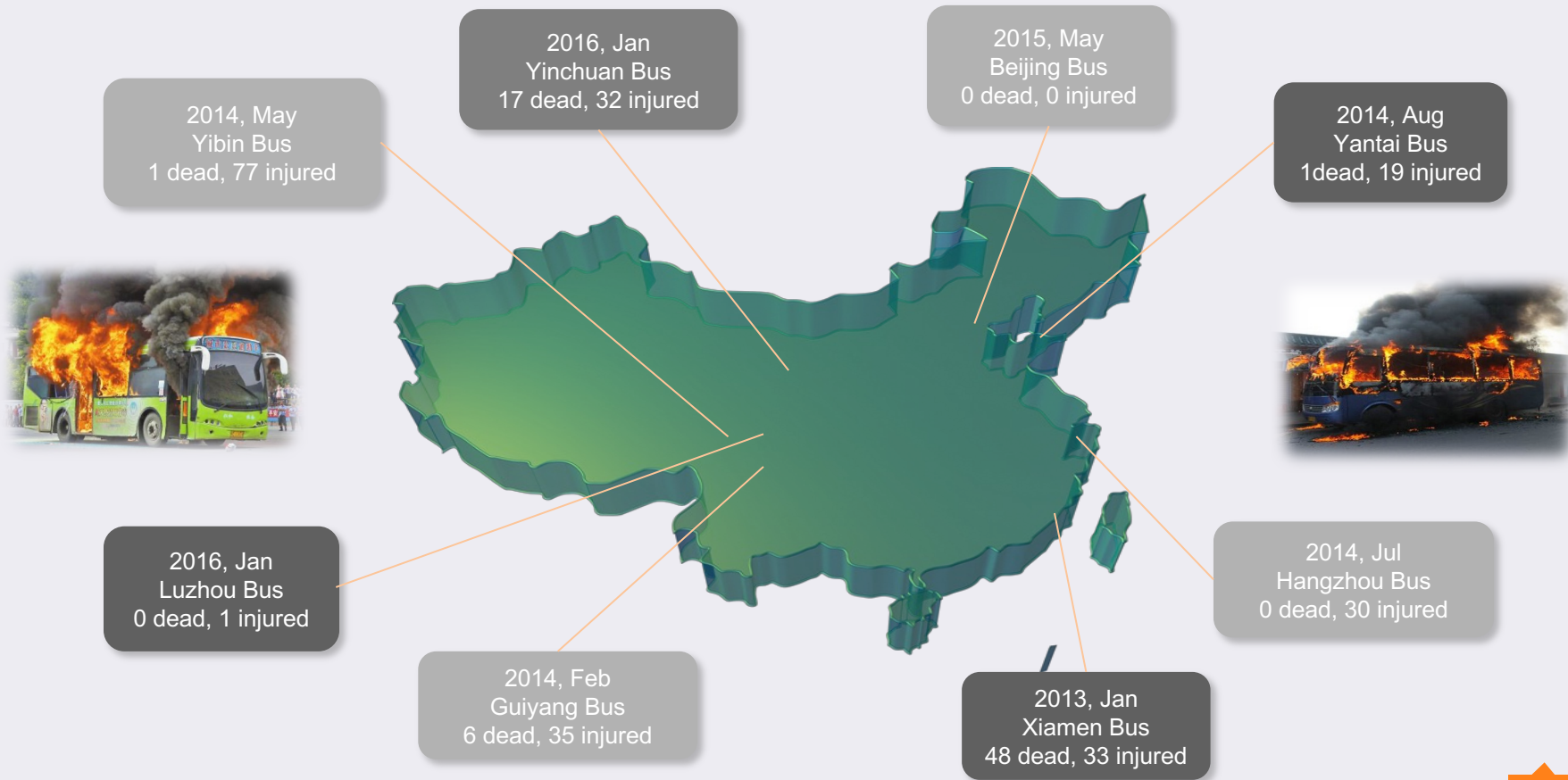
# Automatic Passenger Counting System



**Statistic by timer shaft and route shaft**  
**Provide scientific data supporting in route map planning**

分组名称	客流模式	线路名称	94路	查询				
查询日期	2017-04-13		2017-04-13					
分组	客流模式	17-04-13	客流合计(人次)	平均客流数(人/天)	平均满载率			
> 1	客流模式		3091	3091	3091	0.00%		
线路客流分析明细								
> 1	线路	17-04-13	客流合计(人次)	平均客流数(人/天)	平均满载率			
> 1	94路		3091	3091	3091	0.00%		
车辆客流分析明细								
> 1	车自编号	车编号	17-04-13	客流合计(人次)	平均客流数(人/天)	平均满载率		
> 1	1220	南DZ1220-普通		1104	1104	1104	0.00%	
车辆上下行客流分析								
> 1	车自编号	车编号	上下行	17-04-13	客流合计(人次)	平均客流数(人/天)	平均满载率	
> 1	1220	南DZ1220-普通	上行		613	613	613	0.00%
2	1220	南DZ1220-普通	下行		491	491	491	0.00%
2	南DZ1232	南DZ1232-星光			9	9	9	0.00%
3	1151	南DZ1151-单灯			673	673	673	0.00%
4	1258	南DZ1258-普通			1305	1305	1305	0.00%

# ○ Fire Warning System



# ○ Fire Warning System

Alert in 6 seconds, prevent the fire in bus, make time for rescue



**Monitor**  
Alert by sound and indicator light



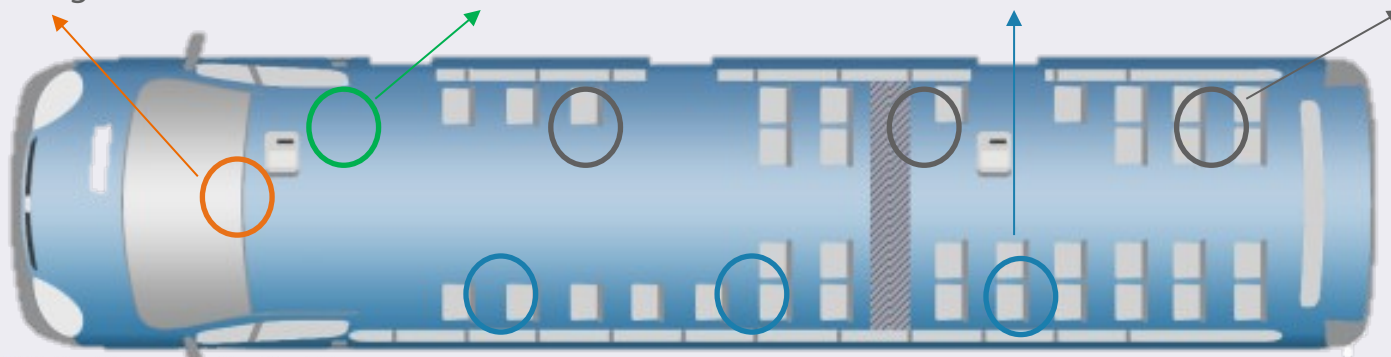
**MDVR**  
Send the data to Control Centre in real time



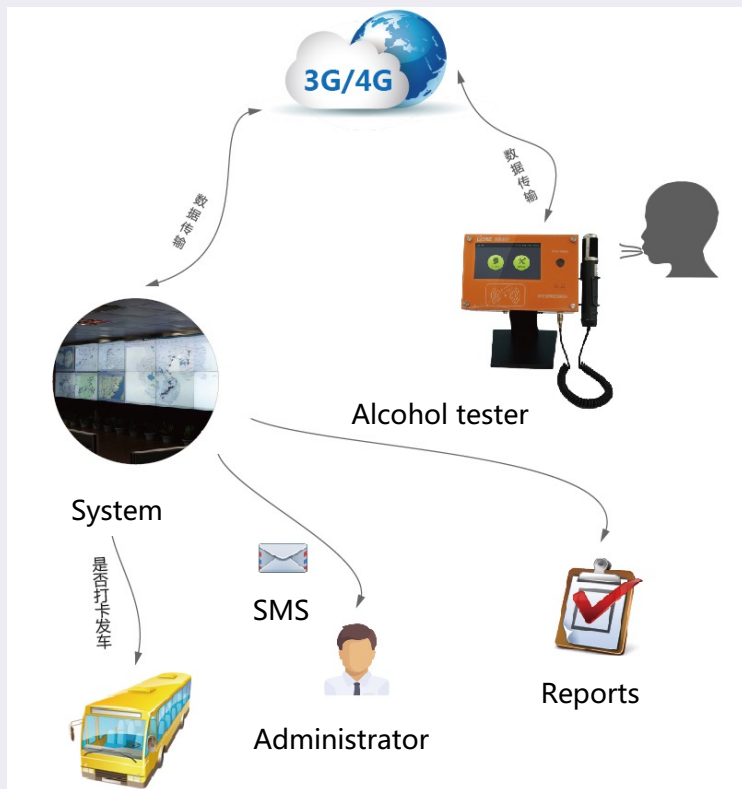
**Fans**  
Generate airflow, accelerate the detection



**Flammable Detector**  
Detect the flammable materials



# Drunk Driving Prevention System



## Verify the driver identification

Card validation + face recognition

Alcohol testing before start to work

**Advantage:** the system could work offline, and transmit data if there is internet connection



# ○ Tire Press Monitoring System

Make sure the safety driving of vehicles, especially in the remote area where the road condition is bad.

Realize the data collection, transmission, monitoring and alert of tire pressure and tire temperature.



Upgrade the firmware and configuration of OBUs;  
Monitor the working status of OBU remotely

The screenshot displays a software interface with a menu bar at the top containing icons for user management, vehicle management, and group management. Below the menu is a navigation bar with tabs for '车辆计划管理', '线路计划管理', '分组计划管理', '文件管理', and '版本号管理'. The main area is a data table with the following columns: 计划编号, 制作时间, 计划开始时间, 计划结束时间, 计划名, 车辆数, 文件个数, 合计, 下载中, 未下载, 成功数, 失败数, 下载率, and 失败率. The table contains 25 rows of data, each representing a specific OBU upgrade or configuration task.

计划编号	制作时间	计划开始时间	计划结束时间	计划名	车辆数	文件个数	合计	下载中	未下载	成功数	失败数	下载率	失败率
1152	2017-11-22 14:...	2017-11-22 14:49:36	2017-11-26 14:49:36	848路700R...	14	1	14	0	0	14	0	100%	0%
1141	2017-10-15 12:...	2017-10-15 12:19:09	2017-10-16 12:19:09	10路升级乘...	5	3	15	1	5	9	0	60%	0%
1115	2017-08-23 12:...	2017-08-23 12:25:57	2017-08-31 12:25:57	791路车升...	43	4	172	0	0	172	0	100%	0%
1079	2017-08-04 12:...	2017-08-04 12:25:58	2017-08-07 12:25:58	848路转移...	14	2	28	0	2	26	0	92%	0%
1076	2017-08-03 16:...	2017-08-03 16:31:09	2017-08-07 16:31:09	115路转移...	14	2	28	0	0	28	0	100%	0%
1075	2017-08-03 15:...	2017-08-03 15:17:21	2017-08-07 15:17:21	80路新车转...	15	2	30	0	2	28	0	93%	0%
1073	2017-08-03 14:...	2017-08-03 14:12:29	2017-08-06 14:12:29	656路转移...	9	2	18	0	2	16	0	88%	0%
1070	2017-08-03 14:...	2017-08-03 14:02:15	2017-08-05 14:02:15	650路转77...	1	2	2	0	0	2	0	100%	0%
1068	2017-08-03 09:...	2017-08-03 09:30:34	2017-08-06 09:30:34	阿安公交64...	19	2	38	0	0	38	0	100%	0%
1055	2017-08-02 14:...	2017-08-02 14:45:29	2017-08-07 14:45:29	653路转移...	7	2	14	0	0	14	0	100%	0%
1052	2017-08-02 14:...	2017-08-02 14:18:55	2017-08-05 14:18:55	阿安公交65...	26	2	52	0	0	52	0	100%	0%
1051	2017-08-02 14:...	2017-08-02 14:12:58	2017-08-07 14:12:58	阿安公交64...	18	4	72	0	0	72	0	100%	0%
1050	2017-08-02 13:...	2017-08-02 13:43:36	2017-08-07 13:43:36	海池+路和1...	31	2	62	0	0	62	0	100%	0%
1048	2017-08-02 13:...	2017-08-04 13:29:09	2017-08-04 13:29:09	641路6065...	1	4	4	0	0	4	0	100%	0%
1045	2017-08-02 11:...	2017-08-02 11:15:24	2017-08-03 11:15:24	641路6005...	1	4	4	0	0	3	0	75%	0%
1044	2017-08-02 11:...	2017-08-02 11:09:00	2017-08-04 11:09:00	阿安公交68...	28	2	56	0	0	56	0	100%	0%
1043	2017-08-02 10:...	2017-08-02 10:32:17	2017-08-03 10:32:17	阿安612路...	5	2	10	0	0	10	0	100%	0%
1041	2017-08-01 10:...	2017-08-01 10:44:36	2017-08-02 10:44:36	680路2981...	1	4	4	0	0	4	0	100%	0%
1040	2017-08-01 10:...	2017-08-01 10:13:12	2017-08-02 10:13:12	653路5031...	1	4	4	0	0	4	0	100%	0%
1038	2017-07-31 14:...	2017-07-31 14:17:59	2017-08-18 14:17:59	集工APP程...	1	1	1	0	0	1	0	100%	0%
1001	2017-07-20 09:...	2017-07-20 09:29:43	2017-07-23 09:29:43	莆田大承程...	5	4	20	0	0	19	1	100%	5%
989	2017-07-18 09:...	2017-07-18 09:36:16	2017-07-20 09:36:16	莆田大承升...	4	4	16	0	0	16	0	100%	0%
988	2017-07-17 14:...	2017-07-17 14:40:48	2017-07-28 14:40:48	莆田大承程...	1	4	4	0	0	4	0	100%	0%
987	2017-07-17 14:...	2017-07-17 14:31:09	2017-07-29 14:31:09	莆田大承升级	9	4	36	0	0	36	0	100%	0%
978	2017-07-13 17:...	2017-07-13 17:28:03	2017-07-22 17:28:03	莆田出租升...	3	4	12	0	0	12	0	100%	0%
197	2016-07-29 16:...	2016-07-29 16:43:01	2016-08-05 16:43:01	10路主程序...	20	3	60	0	42	18	0	30%	0%
25	2015-06-09 10:...	2015-06-09 10:24:44	2015-06-20 10:24:44	集美core2...	77	1	77	17	15	40	5	58%	6%

Improve the travelling experience, arrange the travelling schedule

Provide the accurate and in-time traffic data such as transfer plan, bus location and road condition to passengers



# Traveler Information System

Improve the city image, benefit the citizens

The informative construction of the bus stations will be the city interface

Service the elders whom is unable to use smart phone

101路

距离本站 7站

开往: 柯桥客运中心

小任家 临时(盛) 亚太制药 柯桥区 华联国际 服轻区 亲馨柯

平水(兴) 盛峰壶 澄澄路(世) 新服南 港品科行商 交体服市驾迎(客)

公沈尹福塘 下峰纺筋 清海湾南柯碧纪装岸北越药技政贸华警考务场桥驾轻运

交家家全瓷东马纺织路壶水山路村村东水广市公市路品中中城都大中大小一桥纺中

站岬岬环厂园湾织-口筋闸村村口口仓苑场场园场口监心心(苑队心楼北区村城心)

首班: 05:35 末班: 17:10 下一站: 亲馨家园(轻纺城) 路况: 一通畅 一缓慢 一拥堵 载容量: 一较少 一较多 一拥挤



## Introduction of Intelligent Digital Station Board Function (Style for Indicative Function only) :

### Noise and temperature acquisition and release

1. Automatic acquisition and distribution of noise decibels;
2. Automatic collection and release of humidity and temperature ;

### LCD Large Screen Display

1. Government announcements;
2. Vehicle arrival information prompt;
3. Publication of public transport management information;
4. News summary;
5. Weather forecast and time prompt;
6. Public service advertisement;
7. Financial information;
8. Road information;
9. Emergency events;
10. Other information.

### Bilingual voice TTS

1. Tips for arrival of vehicles;
2. Civilized language;
3. Volume remote control..



### Surveillance camera

1. Traffic video surveillan
2. Anti-terrorism, riot prevention and comprehensive public security monitoring.

### LED forecast screen

1. Vehicle forecasting;
2. Distance prediction;
3. Comfort prediction.
4. Can scroll in any partition
5. Support button flip function

### Passenger Feedback Suggestion Button

Keyboard complaints and background records can be made for bus lines with poor dispatching.

### Remote Monitoring Charging Management System

It can monitor the charge and discharge management of storage battery remotely, protect the storage battery and prolong its service life.



### Backside rolling advertising light box

Continuous rolling of 4-6 pictures

### The backside lamp box is illuminated by LED cold light source

Save energy consumption by 90%, increase life by 3-5 times, and make light source more uniform.



# Electronic Station Plate Forecasting Station Subsystem (LED)

线路	线路信息	站距
420	首发时间8:00	2站
870	下站:西郊公园	1站
223	末班车21:30	3站
707	发车间隔 15分钟	1站

43cm

82cm

人民网讯 嫦娥一号卫星拍

LED屏显示12x5个汉字，第1到4行显示车辆预报站信息，第5行以走马灯方式显示公众信息。



The LED forecasting station system can display more information of the forecasting station by adopting the rolling technology of arbitrary divisions of the LED.

It can send vehicle forecast station information and text information remotely, and the electronic station sign will buzz to alert waiting passengers when it gets new information.

## Rolling LED Display Function in Arbitrary Zones

LED智能公交电子站牌		
线路	线路信息	站距
420	首发时间8:00	2站
870	下站: 西郊公园	1站
115	驶离车站	
47	首发时间9:00	5站

今日

Brightness can be controlled by time intervals, timing and remote control, a total of 16 levels of brightness.

Scroll over any partition to display any font and more text

The system collects temperature and humidity in real time and displays them on the LED screen.

# Electronic Station Plate Forecasting Station Subsystem (LED)

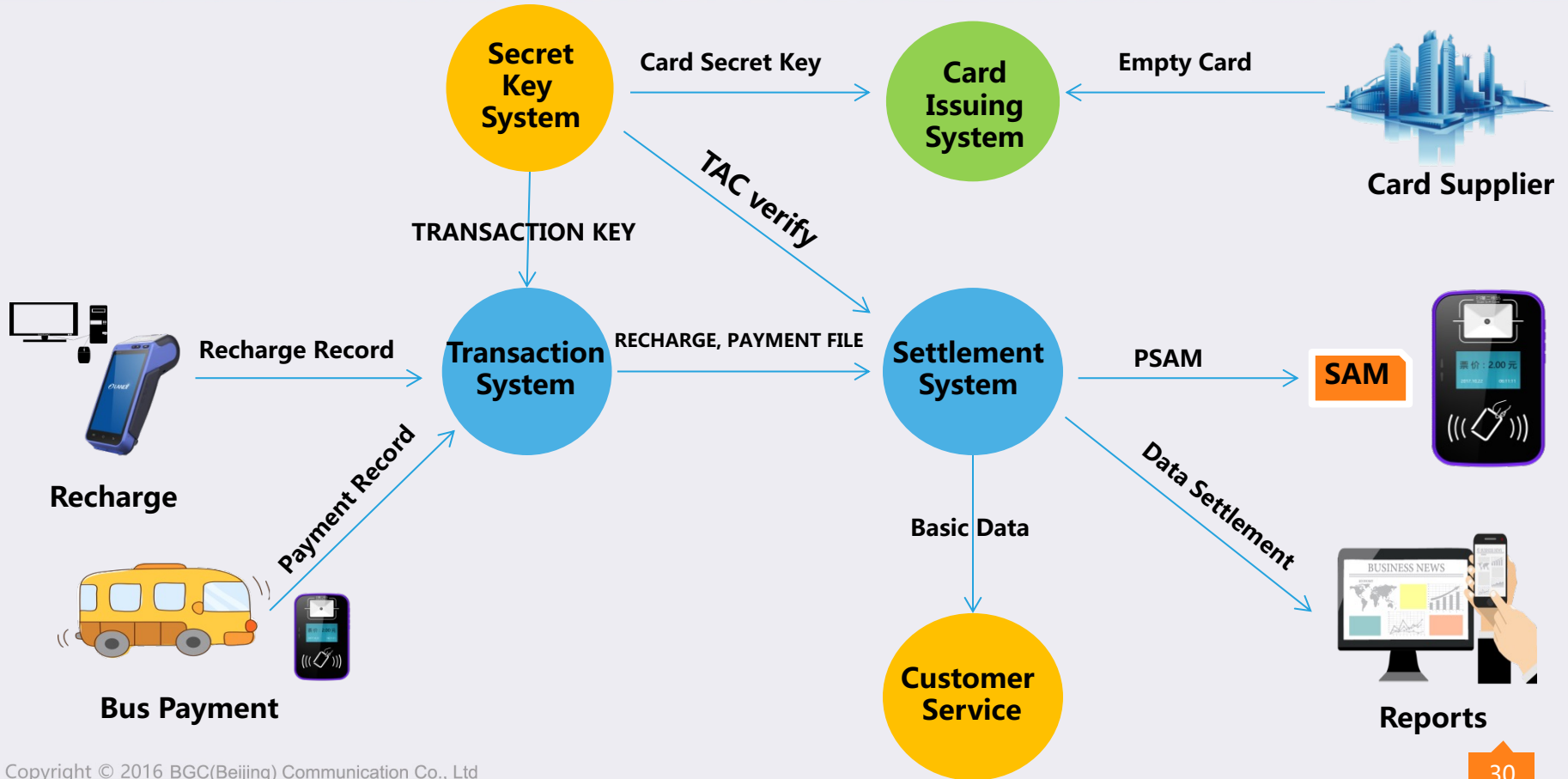


The information of forecast station can also be displayed by full dot matrix double primary colour on the edge of each line, which is more intuitive and can display more information.



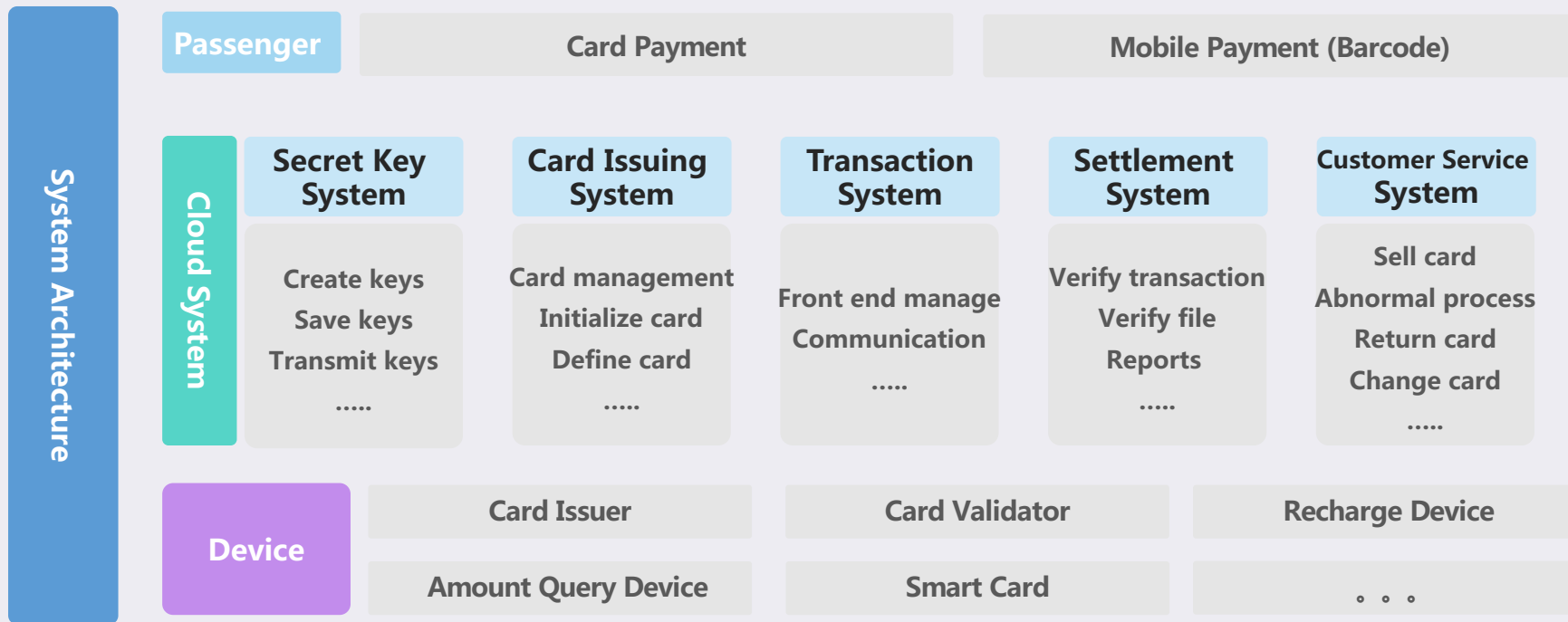
LCD Multimedia Prediction Station Publishing System  
Display Effect, Arbitrary Zoning

# Automatic Fare Collection System





# Automatic Fare Collection System



# Success Cases

## Customer Demand

Shen Fu intercity buses carries about 280 daily shifts, and the average daily delivery of 20,000 passengers.

## Project Contents

1. Adopted Lenz fleet management system, CCTV surveillance system, ERP system, drunk driving prevention system and mobile traveler information system.
2. Install the APTMS OBUs in more than 600 buses.



## Project Accomplishment

Average bus waiting **10 minutes** ↓  
By route map and mobile dispatching system

Empty loading **30%** ↓  
By data analysis and automatic schedule planning

Accident in 2017 **0**  
By implementation of drunk driving prevention system

# ○ Fuzhou Public Transport Group

## Customer Demand

1. The traditional paper-timetable limits the dispatching efficiency a lot, which requires huge numbers of staff and resources
2. Lack of data to enhance the management, improve the service
3. Lots of vehicles, hard to maintain at the same time

## Project Contents

Fuzhou Pubic Transport Group implement the whole ITS solution provided by Lenz.

Installed 2,100 buses from 2015 to 2017.



## Project Accomplishment

**Efficiency** 20% ↑  
 Realize the automatic schedule planning, mobile dispatching

**Punctuality** 13% ↑  
 By route map and flexible change of bus trips

**Complaints** 30% ↓  
 By data analysis reports and video surveillance

20 days — 15 hours  
 Upgrade 2000 buses

# Wuwei Public Transportation

## Customer Demand

Wuwei Bus acquired three privately owned public transport companies and needed to unified manage and operate those four companies' old and new vehicles. At the same time, bus will be made into a city business card to enhance the experience of both citizen and tourist.

## Project Contents

1. Implement the whole Public Transportation System
2. Install MDVR, driver console, APC and card validator in 378 buses
3. Installed PID in 112 bus stations



## Project Accomplishment

Manage **4** companies

By ERP system to get through the data and business

Efficiency **30%** ↑

By automatic schedule planning and mobile dispatching

Route planning **Original data** Realize **Mobile Payment**

Obtain passenger counting data for dispatching

Support payment by Wechat and Alipay



## Implement more than 300 projects in hundred of cities



北京公交集团

- ◆ Beijing Public Transport
- ◆ Project time: 2015
- ◆ FMS, APC



- ◆ Shanghai Public Transport
- ◆ Project time: 2016
- ◆ Whole solution



- ◆ Jinan Public Transport
- ◆ Project time: 2014
- ◆ FMS, CCTV Surveillance



新福利服務 創新求進步

- ◆ Macau Transmac
- ◆ Project Time: 2015
- ◆ Whole solution



- ◆ Dalian Public Transport
- ◆ Project Time: 2007
- ◆ APTMS OBU



- ◆ Fuzhou Public Transport
- ◆ Project Time: 2014
- ◆ Whole solution



- ◆ Xiamen Public Transport
- ◆ Project time: 2008
- ◆ FMS



- ◆ Chenzhou Public Transport
- ◆ Project time: 2014
- ◆ Whole solution