IoT Week 2017

IPv6-based IoT Deployment in China

Xiaohong Huang

Beijing University of Posts and Telecommunications

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Agenda

- National Guideline to the development of information industry
- IPv6 updates in China
- IoT activities in China
- An example of LSP - Bicycle-Sharing service

The 13th five-year National Plan: Guild to the development of information industry

- Jointly released by the MIIT and the NDRC, the IoT industry and services is among the 9 key areas to develop
- For IoT, the guild pointed out: Enhancing modern information infrastructure, advancing BigData and application of IoT, encouraging integration of IoT with Mobile Internet for smart-cities, industry, agriculture and other sectors
  - strengthening the use of IoT technology in various areas
  - improving the ability of urban operation monitoring management, facilitating the formation of a unified sensing equipment management platform, enhancing urban operation data collection and information sharing, meeting the inherent requirements of rapid response to urban management for scientific decision-making

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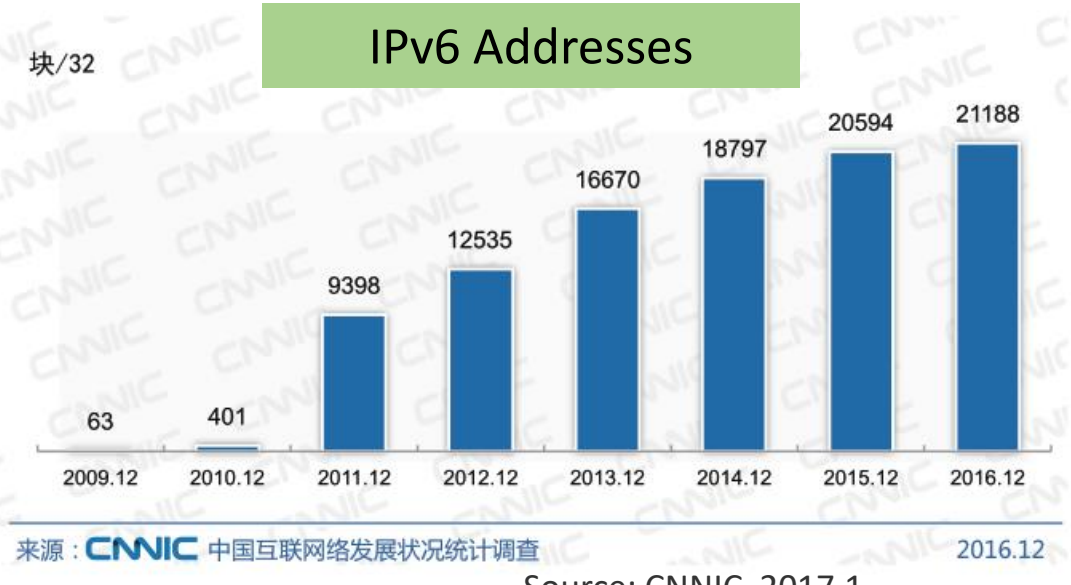
IPv6 Updates in China

- The number of Internet netizens in China has reached 0.731 billion, occupying 53.2% of whole population.
- Mobile Internet users are 0.695 billion, occupying 95.1% of whole netizens.
- IPv4 addresses: 338,100,000, no changes since year 2011.
- IPv6 addresses: 21188 /32, rise 2.9% than 2015

IPv4 Addresses

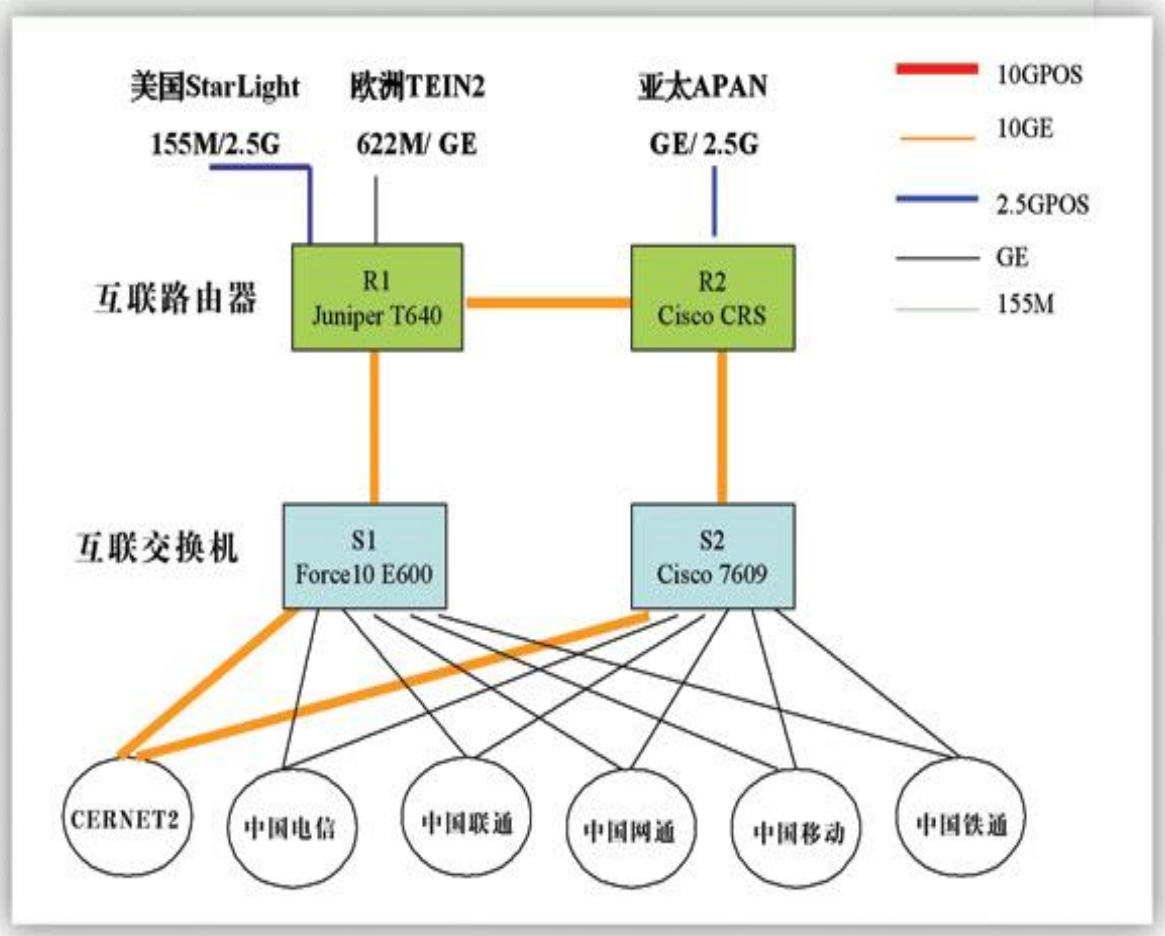
IPv6 Addresses



Source: CNNIC, 2017.1

CNGI Project – Government Framework

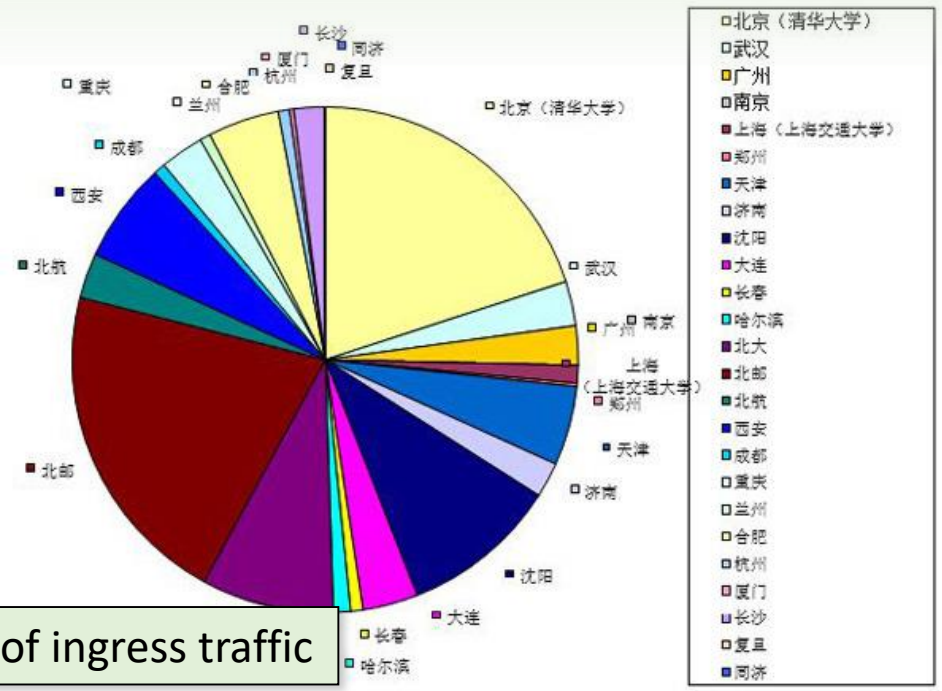
- *Demo backbone networks setup in 2007*
  - *6 core networks, China Telecom, China Netcom/CAS, China Mobile, China Unicom, CERNET, China Railcom*
  - *IPv6 Exchange Points set in Beijing and Shanghai*
  - *300 CPNs*
- *Massive and trial commercial deployment*
  - *Terminal and network equipment*
  - *Applications*



CNGI-CERNET2

- CERNET2 is one of the CNGI backbones
  - The largest network sponsored by CNGI
- CERNET2 backbone
  - Pure IPv6 backbone / IPv4 and IPv6 dual-stack campus network
  - Provide multiple applications
- CERNET2 / IX6 International exchange center
  - links to GEANT2/Internet2/TIEN3
- 25 CERNET2 Gigapops scattered in 20 major cities
- More than 700 organizations connected, serving more than 6 million users
- Provide various IPv6 information, teaching and research resources

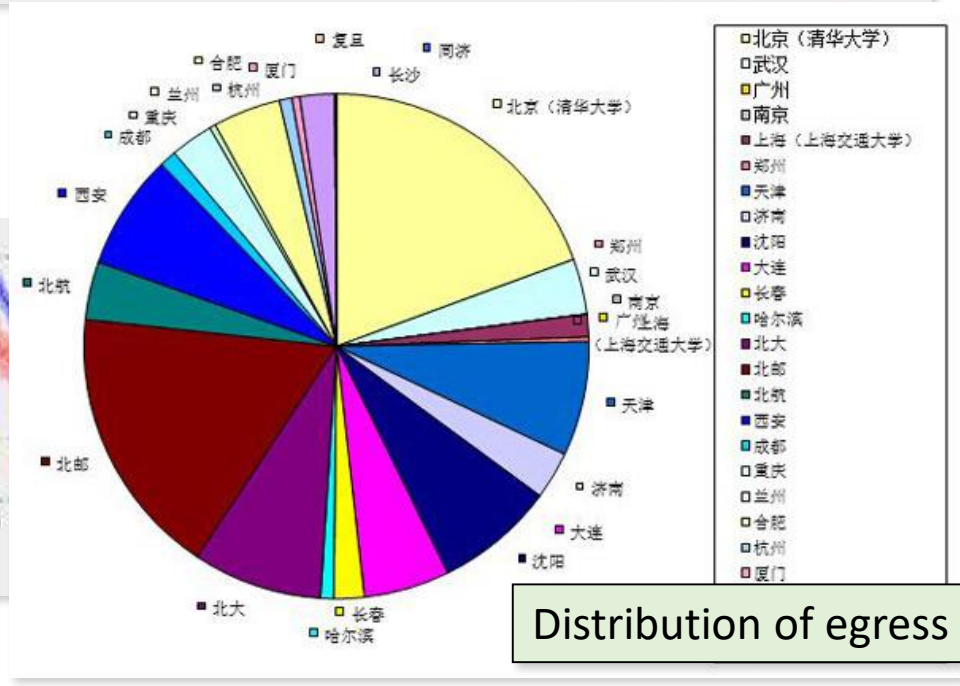
CERNET2 traffic monitoring September, 2016



Distribution of ingress traffic

Total traffic

Total egress traffic



Distribution of egress traffic

“Internet+” Mega Project

- “Education area oriented IPv6 demonstration network” is selected as one of the project
  - Bandwidth of backbone network will be up to 100Gbps
  - Construction of more than 40 network Giga pops
  - More than 10 million IPv6 users connected
  - Internet+ experiment and application demonstration
- The network aims to build the experimental platform for the “Internet +” plan
- Important infrastructure to promote the NGI research

http://www.sdpc.gov.cn/gzdt/201604/t20160413_798079.html
http://www.media.edu.cn/zyyy/szxy/201610/t20161012_1457214.shtml

NGI Innovation Projects Organized by CERNET

- Proved by MOE and in charged by CERNET network and information center and the advisor group of CERNET
- Started from year 2015
  - Support 108 projects
  - Support 84 universities
  - Invest more than 10 million yuan
- Support IPv6 education and innovation
- IPv6 network, IPv6 smart campus, IPv6 cloud, IPv6 mobile Healthcare, IPv6 IoT, IPv6 security, IPv6 intelligent manufacturing, IPv6 Internet Finance, IPv6 IoV

China Telecom

- Backbone network, i.e. 163 and cn2, IPv6 enabled
- 96% of BRAS/MSE supported IPv6, and more than 220 metropolitan area networks supported dual stack
- Import IPv6 to LTE network from year 2014, which was deploy in Jiangsu, Hunan and Zhejiang
- Most of the big IDC supports IPv6 connectivity
- IPv6 supported broadband users are more than 90 million, and active users are up to 4.4 million.

China Mobile

- Import IPv6 by taking advantage of LTE/Volte
  - Always on-line for LTE, big requirements
- IPv6 will be the important requirement for TD-LTE
  - All of the PCE will be IPv6 enable
  - Already built 146 4G base stations
- VoLTE is the future communication service. Each user will connect using pure IP, which needs a lot of IP addresses.
  - Apple promote new carrier update configuration in year 2016. From iOS9.2.1, all the apple phones will supprt VoLTE.

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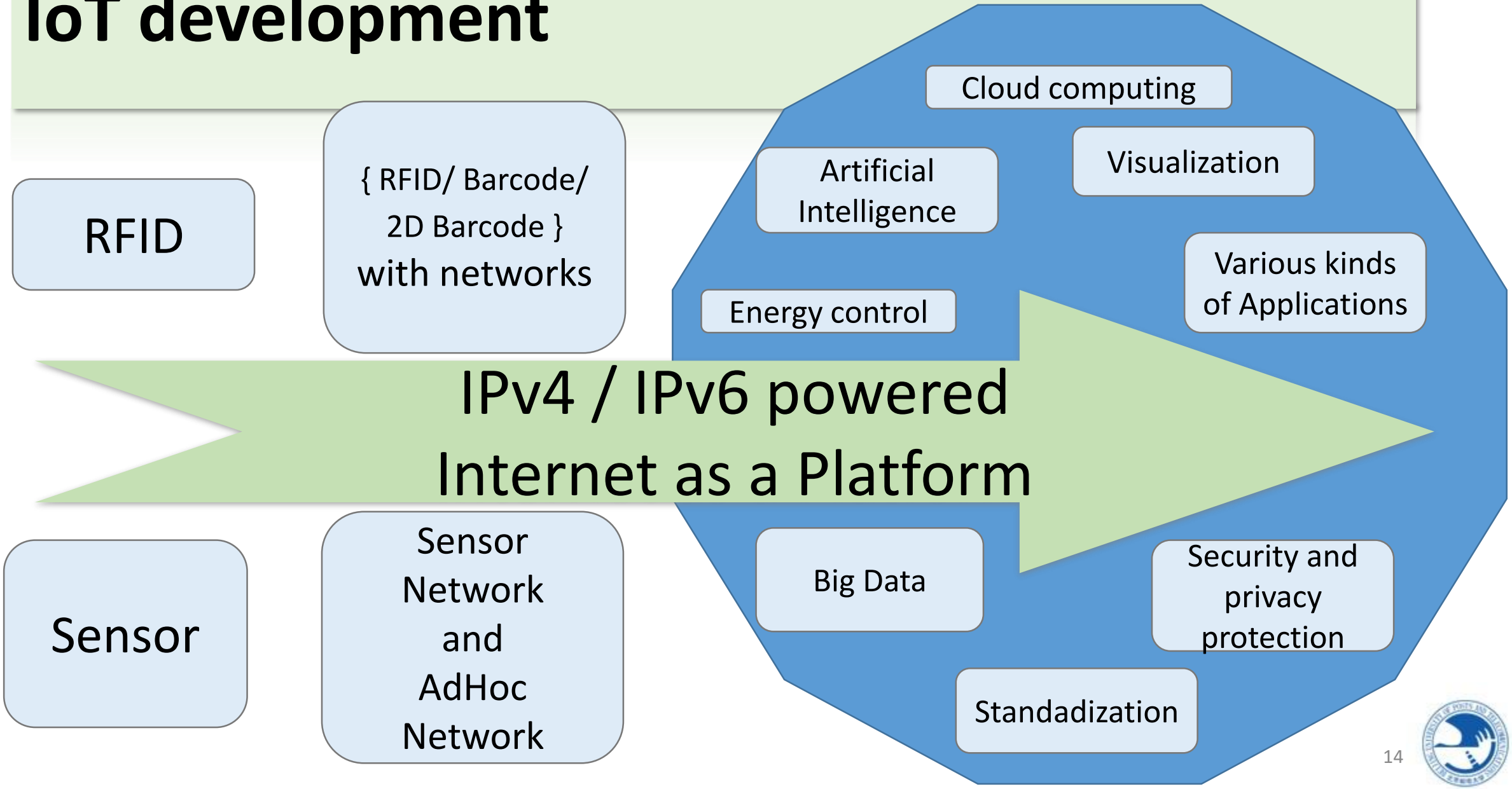
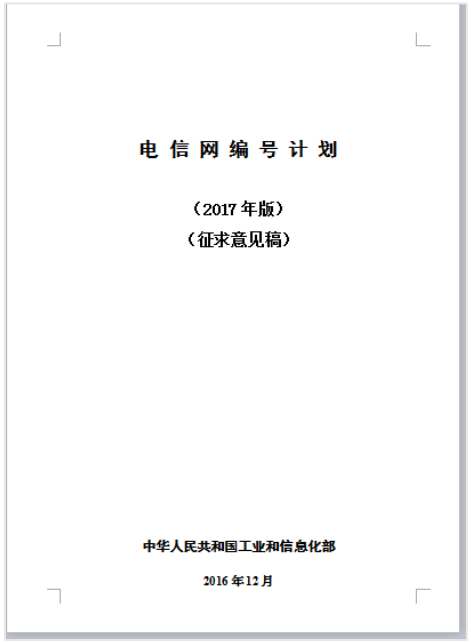
IoT development



MIIT issues new numbering plan for comment

- Ministry of Industry and Information Technology released the “Telecommunication network numbering plan, 2017” for comment
- 140~144 was designated for IoT network
- It is estimated that
  - manufacturing, network transmission, intelligent information service, the overall industrial market scale will exceed 1.5 trillion RMB, the number of M2M connections count to 1.7 billion.

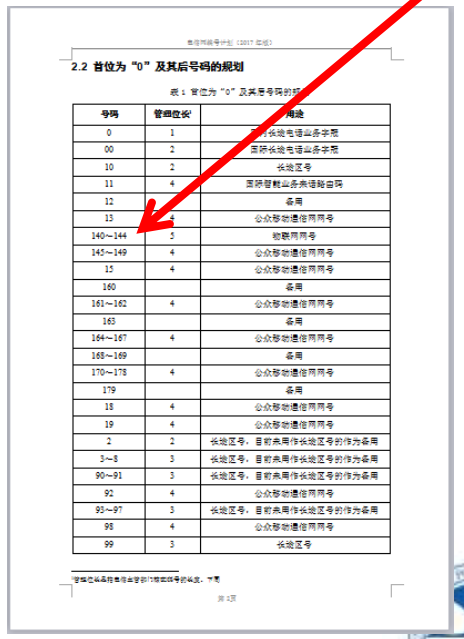

电 信 网 编 号 计 划

（2017 年版）

（征求意见稿）

中华人民共和国工业和信息化部

2016 年 12 月


2.2 首位为“0”及其后号码的规划

号码	管理位长	用途
0	1	国际长途电话业务字冠
00	2	国际长途电话业务字冠
10	2	长地区号
11	4	国际智能业务类话路由码
12		备用
13	4	公众移动通信网号
140~144	5	物联网网号
145~149	4	公众移动通信网号
15	4	公众移动通信网号
160		备用
161~162	4	公众移动通信网号
163		备用
164~167	4	公众移动通信网号
168~169		备用
170~178	4	公众移动通信网号
179		备用
18	4	公众移动通信网号
19	4	公众移动通信网号
2	2	长地区号，目前未用作长地区号的作为备用
3~8	3	长地区号，目前未用作长地区号的作为备用
90~91	3	长地区号，目前未用作长地区号的作为备用
92	4	公众移动通信网号
93~97	3	长地区号，目前未用作长地区号的作为备用
98	4	公众移动通信网号
99	3	长地区号

IoT practice in ChinaTelecom

- China Telecom is investing heavily into converged IoT infrastructure with Huawei and plans to have nationwide narrow-band IOT (NB-IoT) coverage using the 800MHz band by the end of the first half of 2017
- Over 400 NB-IoT base-stations already installed and covers the whole Yingtan city in JiangXi province, which is the first of its kind among other 12 cities for LSP trial in China
- ChinaTelecom released enterprise standard “NB-IoT equipment v1.0”
- ITS, logistics, security monitoring, public utilities, intelligent manufacturing, modern agriculture, financial and retail sectors, smart street lighting, video monitoring, intelligent financial POS information, waste management, smart manhole cover, Auto-parking and other LSP IoT services, following ChinaTelecom IoT enterprise standard v1.0

http://stock.cfi.cn/p20170214000330.html

First global NB-IoT based smart street lighting

IoT practice in ChinaMobile

- ChinaMobile has launched OneNET as an open cloud platform
- This IoT platform offers PaaS and SaaS business service, providing a variety of network access protocols, easy to connect to a variety of networked devices, smart home, smart car, wearable devices and could generate user applications quickly.
- ChinaMobile already working with Huawei, providing Intelligent parking business, has realized the parking online query, online booking, reverse search and online payment, and other functions
- NB-IoT and eMTC trials in Hangzhou, Shanghai, Guangzhou and Fuzhou, now 5000 stations
- By the end of 2015, over 65million IoT terminals registered with ChinaMobile


中国移动
China Mobile
智慧物联
2016年物联网
主办方：中国移动通信
时间：2016年
OneNet平台架构
全面布局能源监控、工业控制、家电监控、智能硬件、智慧农业等重点行业
能源云
工业云
家电云
智能硬件云
API接口网关（API管理）
事件驱动引擎
消息路由
开放能力
数据处理
数据存储
设备管理
鉴权管理
接入层
多种接入协议（RESTful，EDP，MQTT，Modbus）
EDP、MQTT、RESTful、Modbus多语言多平台SDK
应用域：
基于OneNET着力打造4朵行业云，根据行业需求快速实现定制化应用
平台域：
提供平台标准化协议接入：支持行业客户自定义多协议接入，具备七大核心功能，提供丰富的开发接口
车联
触压
应用
平台域
设备域
第三方应用平台
应用平台
应用孵化器
RESTful API,EDP,MQTT,MODBUS,Protocol Adaptor
资源管理
数据管理
事件告警
消息总线 实时处理消息，路由消息
DTU
DTU
PLC
PLC
PLC
PLC
PLC
PLC

IoT practice in ChinaUnicom

- China Unicom plans to start NB-IoT LSPs in more than six cities based on 900 MHz and 1800 MHz for field test and business model trials
- China Unicom plans to promote NB-IoT commercial deployment in key cities in 2017
- China Unicom already released its IoT service platform, deployment of NB-IoT private network will support Shanghai smart city construction, smart meters, smart parking, environmental monitoring, intelligent manufacturing
- Promote application of innovation, enhance the capacity and efficiency of urban operation management.
- More than 3000 base station will be built in 2017, covering the cities to meeting the requirement in the scale of hundreds of millions of "connectivity”

http://www.10010.com/pushpage/59800000205801.11.html

IPv6 based IoT demonstration in State Grid

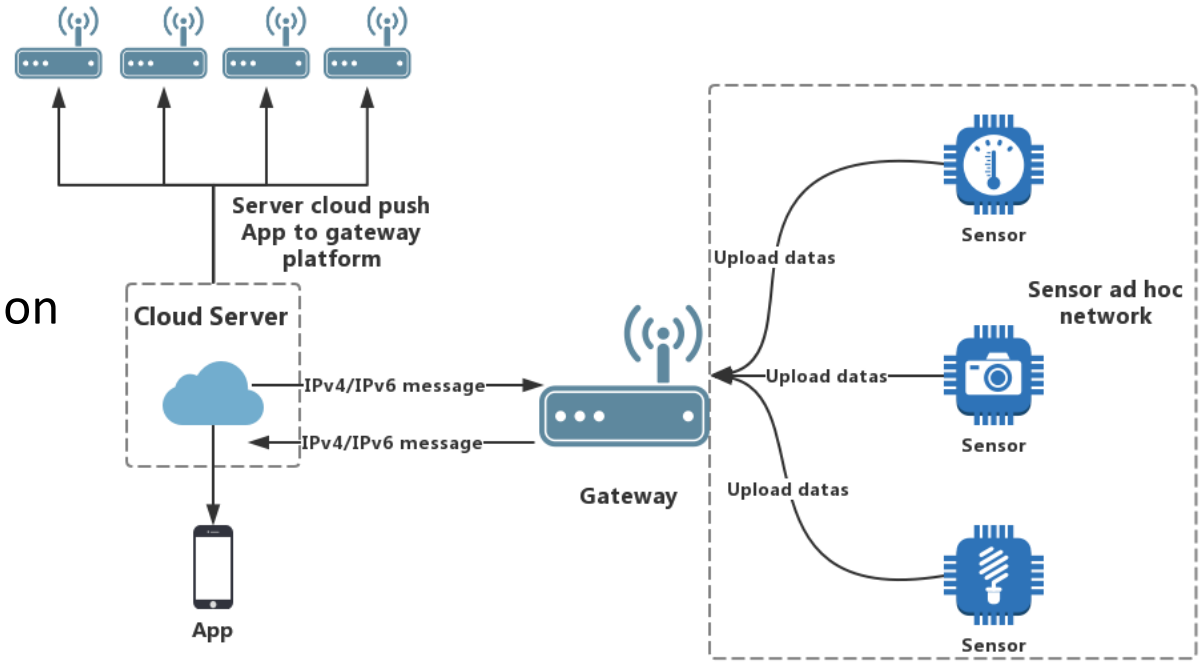
- Supported by CNGI project
- IPv6 based sensor development
  - Support IEEE 802.15.4/WiFi
  - Transmission speed is no less than 250kbps
- Application scenarios investigation
  - Network construction technologies in power transmission status monitoring
  - Together with Mobile IP technology, IoT is used in power line monitoring, mobile meter reading

IPv6 based LBS service platform

- Supported by CNGI project
- IPv6 based LBS service platform
  - 800TB location service database
  - 20million POI information
- Various applications
  - Smart car parking
  - Meteorologic service
  - Logistics service

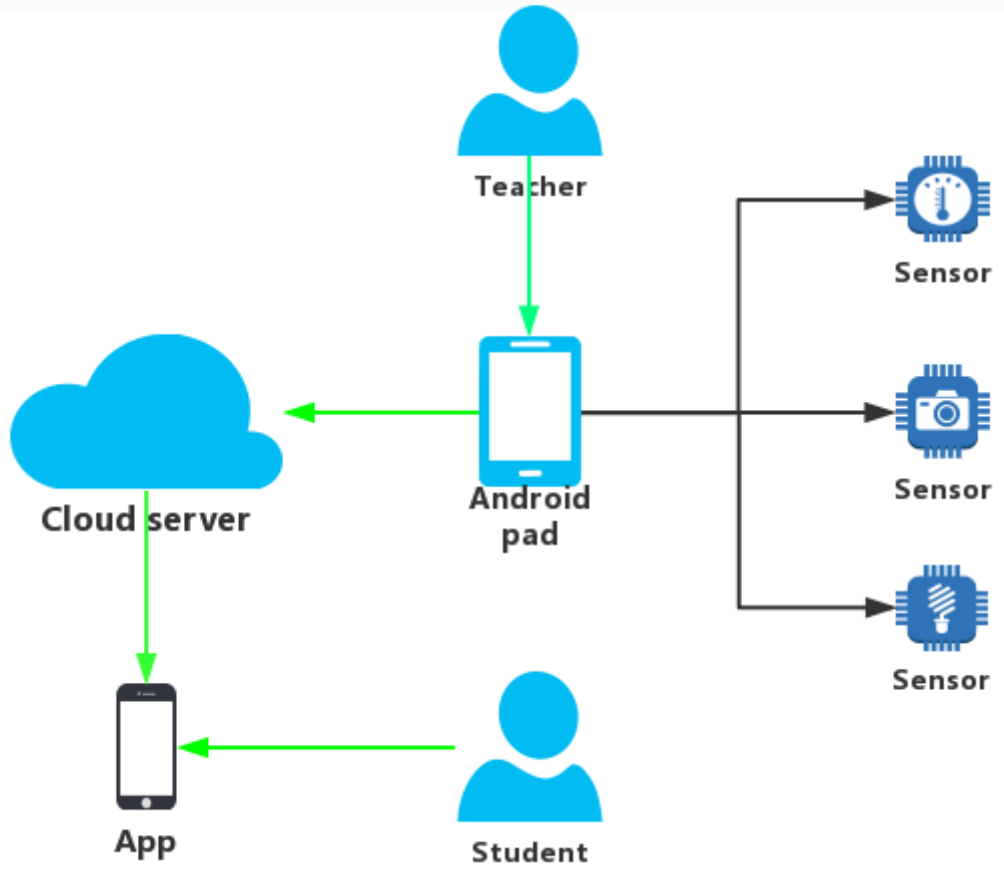
IPv6 based IoT platform in BUPT

- Android based gateway + Cloud
- Gateway
  - North: uniform access of various wireless technologies
  - South: IPv4/IPv6, CoAP
- Cloud
  - App push to support automatic function update and deployment
  - Big data analysis
- Support restful architecture
- Support heterogonous devices: IP, non IP
- Data representation: XML/JSON
- Open platform: easy to extend to different scenarios



One case: Smart classroom

- Easy monitor and control:
  - temperature, humidity, number of students, light, air conditioner, devices
- Easy update and deployment of functions
  - Intelligent sign in
  - Automatic information collection of classroom
  - Interactive discussion
  - Distance classroom
- Cloud based big data analysis
  - Intelligent teaching information for different dimension analysis
  - energy consumption, teaching quality, course recommendation etc.



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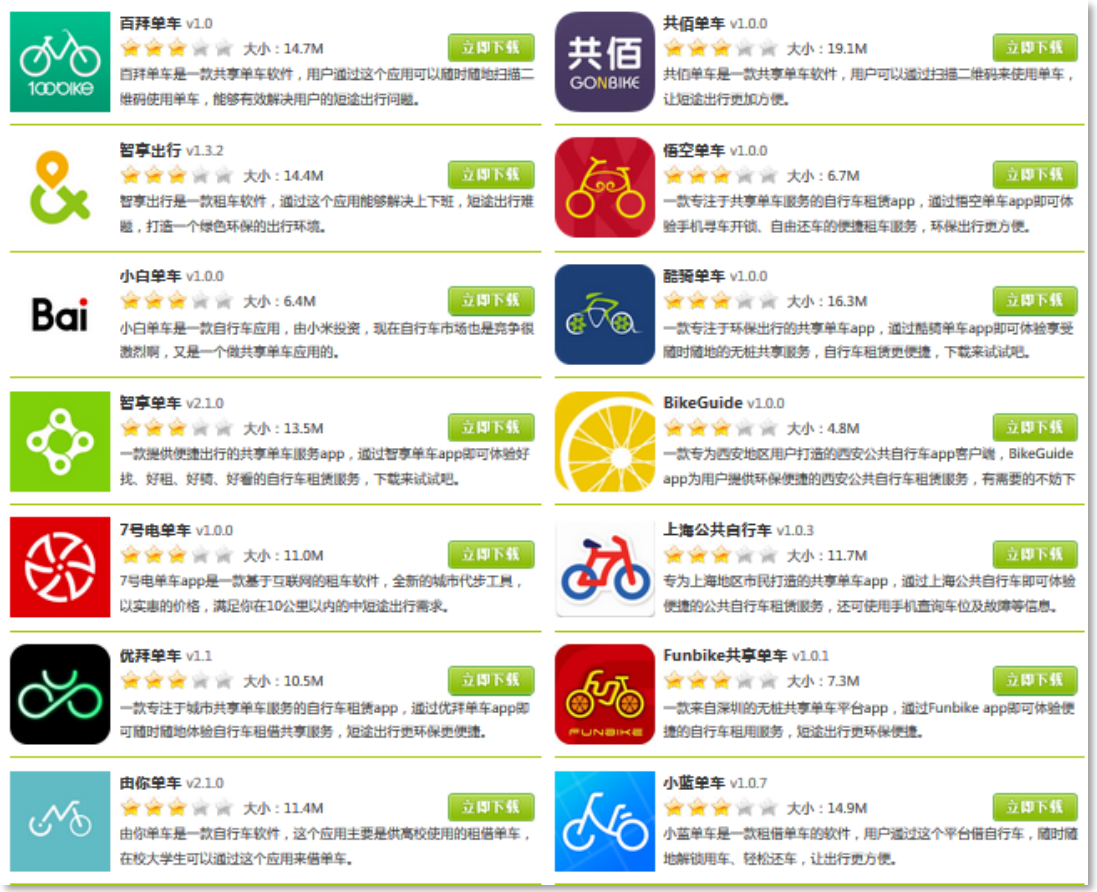
A LSP example - Bicycle-Sharing Service

over 30 APPs of Bicycle-Sharing service providers, 2017



Volumn, coverage and services

According to the report, there are 18million bicycles sharing users, there will be over 50 million users by the end of 2017. 比达咨询 -《2016中国共享单车市场研究报告》

- Mobike Co. provides their service in more than 20 cities.
- There are over 100000 Bikes each in Beijing, Guangzhou, Shanghai ...
- WeChat user can use the service by scanning QR-Code via the Small-Program
- The production capacity will reach 10million in cooperation with Foxconn

http://business.sohu.com/20170123/n479433941.shtml

- Ofo Co. has offered 300million services since Jun.2015
- Registered user over 20million, 1 million Bikes put into service in over 33 cities in China, USA, UK and Singapore
- 1st generation uses mechanical lock, 2nd generation uses smart lock

http://finance.sina.com.cn/roll/2017-02-10/doc-ifyamkqa5471680.shtml

http://a.mini.eastday.com/html/2017/caijing_0301/3130512_4.html

Investment

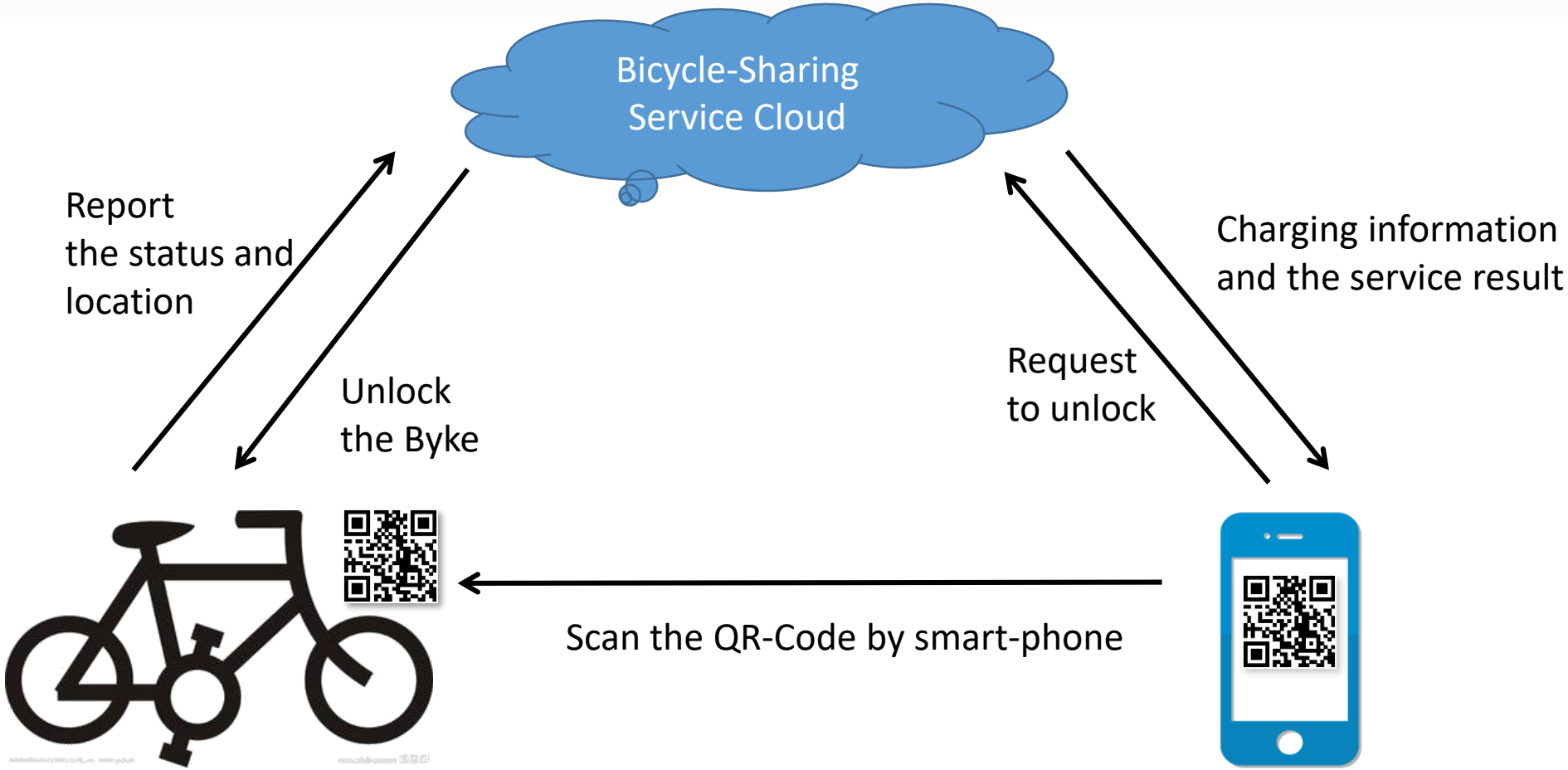
- OFO story
  - Cooperate with ChinaTelecom and Huawei, NB-IoT solution will provide good coverage, ultra-low energy requirement, better QoE
  - In D rounds of investment, OFO received 450million US$ in March 2017

- Mobike story
  - Cooperate with ChinaMobile and Ericsson, by using CAT-M1 and NB-IoT
  - Over 300million US$ in D rounds of investment received in early 2017

http://sh.xinhuanet.com/2017-03/02/c_136096248.htm

http://tech.sina.com.cn/t/2017-02-24/doc-ifyavwcv8679329.shtml

How the Bicycle-Sharing system works



Sensor embedded bicycle lock

- OFO, Mobike, XiaoMingBike, more than 20 service providers now in China
- With different business models, SIM card, GPS/BD chip, and other IoT chips installed on each bicycle

- Chips inside:
  - Battery
  - Motion
  - Geo location
  - Vibration
  - Accelerometer
  - Communication
  - Temperature
  - Light
  - ...


●●●○○ 中国联通 4G 09:41 96%
mobike 摩拜单车
理想国际大厦
中国化工博物馆新馆
彩和坊路
海淀北一街
海淀北二街
中国普
泰鹏大厦
基督教堂
朔黄发展大厦
海淀大街
中关村广场购物中心A区
尔多斯
利宅院
中钢国际
微软中国研发总部
新东方大
潮江春
扫码开锁


mobike
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扫码骑走


●●●●○ 中国联通 4G 09:35 98%
行程详情
分享
摩拜单车
朔黄发展大厦
银科大厦
西屋国际公寓
起
神州数码大厦
849
骑行距离(米)
自行车编号：0100018787
28
骑行时间(min)
100
节约碳排量(g)
272
卡路里(kCal)


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09:36
97%
ofo 共享单车
您周围车辆数量约为:48辆
马上用车


泡泡网 PCPOP.COM


ofo
27512


●●○○○ 中国联通 4G
09:37
97%
订单详情
行程消费
¥0.00
所骑车辆车牌号
27512

Shared everything?

- Shared electronic bicycles
- Shared cars
- Shared umbrella
- Shared portable power bank

Let's work together
for a better world ！