Real Time Internet of Things Geographic Information System (IOTGIS) Platforms for Smart Cities

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Focus on
Software and System

Core technology:

- Scalable and elastic for massive simultaneous connections within whole city
- Seamless indoor & outdoor GIS
- Real time proximity data
- Management of IoT devices
- Big data analytic framework ready
- Smart navigation algorithm
- Mobile SDK ready
- Enabling proximity and environmental applications
Generic IoT Solution Overview

Various kind of services/applications (e.g. location, environmental, home automation, healthcare, etc.)

IoT devices
- Wearable Devices
- Environmental sensor devices
- iBeacon Proximity devices
- Home automation devices
- Healthcare devices

Gateway
- Mobile
- Embedded gateway

Devices Connectivity

Internet (Cloud servers)

Clients

ASTRI focus areas
Why our design bridging IoT and GIS?

- Only IoT devices deployment provides control and sensor data, for applications like sensor network, home network.

- IoT devices and sensor data attached with GIS information will add more dimensions and possibilities to IoT applications. Therefore, the connectivity could be real time with time stamps.

- Why GIS? it could be easily scaled up for different applications and locations.

- To cover various scenarios, esp. Smart City, seamless indoor and outdoor deployment with GIS information are vital.
Technical Challenge and Innovation

Technical Challenge
• Scalability on servers
• Real time data transfer
• Seamless indoor and outdoor GIS
• Indoor and outdoor positioning and navigation

Innovation
• Message queue design on servers and devices connectivity
  – Horizontal scale at backend
  – Low latency and data transfer from/to backend
• Flexible big data acquisition and analysis framework
• Proprietary design on indoor GIS format compatible to GIS in market
• Proprietary design on indoor positioning and navigation algorithms
System Architecture

ASTRI Smart Indoor & Outdoor GIS with real time capability (on Cloud)

Message Queue Manager (act as a bus)

Application Module  Big Data Framework  Management Module (device, security, etc.)  Indoor & Outdoor GIS  Database Interface  Database Servers

Gateway

Sensor

Sensor

Sensor

Mobile SDK (iOS/Android)
System Operation Infra-structure

Deployment of IoT devices

Tracking of IoT devices

Multi-site management of IoT devices

Seamless indoor/outdoor GIS for different applications

Multi-site management of IoT devices

Proximity & environmental applications

Real time proximity data applications

Big data analytics applications
MAGI Guide – Indoor Navigation @ Science Park (Demo)
Example Application: Smart Community

- Indoor & outdoor navigation guide
- Enquiry on nearby info (hyper meta data like multimedia) and real time special notice

Horizontal scale of cloud SW to support indoor and outdoor navigation
Example Application: Smart Parking

- Public parking (off street)
  - Data updated by ASTRI IoT sensor network

- Private parking

- Traffic
  - Data updated by Transport Department

- Internet
  - (ASTRI GIS server)

- Massive real time Traffic data align with Indoor and outdoor GIS

- Drivers with mobile

- Enquiry on nearby /destination car park availability
- Enquiry on parking info (fare, max height, etc.)
- Enquiry on update traffic and map info
End of Presentation
Thank you. Questions are welcome.

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