IoT Platform for Global Fleet Management, Transportation and Logistics

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AGENDA

- Key aspects in global fleet management
- IoT
- IM2M network
- Interoperability
- Broadband connection & Cloud
- Optimized route for enhanced efficiency
KEY ASPECTS IN GLOBAL FLEET MANAGEMENT
TRANSPORTATION AND LOGISTICS

Customer Service

Information Management

Demand Forecasting

Warehousing

Transportation
Customer Service

“5R” to achieve successful delivery:

1) Right person
2) Right product
3) Right quantity
4) Right place
5) Right time
DEMAND FORECASTING

- Estimate the precise amount of products or services customers demand
- Enhance the freights delivery more efficiently
- Cloud: data distribution, analysis and predictions
- Gigantic storage ~ Big Data (>1TB)
TRANSPORTATION

- Physical movement of freights from one point to another
- Optimal route for efficient delivery
- Accounts for 40% to 60% of logistics cost
- Intelligent positioning system (e.g. switching from GPS to BeiDou)
WAREHOUSING

- Freights ~ type, size, physical status, etc
- Require different kinds of M2M devices
- M2M provides services of freights: registering and tracking, ....
- ZigBee, Bluetooth ~ potential wireless protocols for M2M
Information Management

- Logistics information (e.g. location, temperature, humidity, tyre pressure, ... etc.) sent to logistics center
- Inter-changeable data are shared via Cloud

Summary: M2M + Advanced IoT Platforms support global fleet management and transportation
INTERNET OF THINGS

- The Internet of Things (IoT) is one of the fastest-growing technology segment in Asia-Pacific.

- Based on the latest report by Frost & Sullivan, total Asia Pacific spending on Internet of Things is forecasted to reach US$9.96 billion in 2014 and will continue to grow at a CAGR of 34.1% to reach US$57.96 billion by 2020.

- Predicted that more than 80 billion of devices will be connected to the internet by 2020.
**IoT Platform - Logistics**

- IoT platform intra-connect M2M devices within local network (warehouse) for management of freights or human resources.
- Inter-connection between fleet on road and command center.
Internet of Things

- IoT is really connectivity ....
- ... to provide a connected world ...
- Wireless connectivity provides mobility
PROBLEM

- M2M devices communicate with one another efficiently ....

- Wireless is more favorable!

- But .....
What is interoperability and why need it?

IM2M Area Network

Brand A M2M Device

Brand B M2M Devices

... Brand N M2M Devices
CURRENT M2M NETWORK

- Different brands/types of M2M devices are used in logistics
- May choose **brand A** M2M device as well as **brand B** M2M device from economics or multiple-vendors point of view
- Operation conflict when M2M devices of various brands are used

**Loss of money !!**
WHAT TO DO ......

IM2M resolves the conflict !!
IoT Platform - Generic

- WiFi versus Bluetooth versus ZigBee
IoT Platform - Generic

- Need an open communication platform for data integration and development
- Scalable
- MESH
- ALL IPs
- Controls the Things intelligently by using Cloud computing, fuzzy recognition and seamless connection with other smart technologies
IoT Platform - Generic

- who is the right candidate?
- ZigBee seems the most feasible!
The right candidate

- ZigBee performs satisfactorily!
What happen without Interoperability?

- Why border?
- Can we use a single brand instead?
- YES! ... or NO!
INTEROPERABILITY?

What should we consider?
ZigBee Transceiver: Concept Block Diagram
System Linearity of M2M

- IP2 ?
- IP3 ?
- Gain ?
Sensitivity of M2M Receiver

Noise:

\[ F'_{IN} = \frac{\prod_{i=1}^{N} G'_{j}}{\prod_{i=1}^{N} G_{j}} \left[ 1 + \sum_{i=1}^{N} \frac{(F'_{i} - 1)}{\prod_{j=0}^{i-1} G'_{j}} \right] \]
WILL NOISE AFFECT SYSTEM PERFORMANCE?

- wideband LO noise
- local oscillator power
- wideband noise of mixer
IoT Platform for IM2M

- IoT Platform
- Cloud
- Temperature, humidity, tyre pressure, location etc.
- Warehouses
- Devices embedded vehicles (M2M + Mobile BB technologies + GPS)
Existing Logistics

- Vehicle’s speed, distance traveled, driving period, ad hoc acceleration/brake … etc. are important information - NOT available in prevailing market

No Optimal route

Efficiency

[Graph showing decreasing efficiency over time]
OPTIMIZING THE ROUTE IN TRANSPORTATION
OPTIMIZING THE ROUTE IN TRANSPORTATION
OPTIMIZING THE ROUTE IN TRANSPORTATION

- An IoT platform can dramatically increase the efficiency of fleet management and transportation
- e.g. Better human resources management (data updated automatically from Cloud) or less distance travelled
- IoT (IM2M + Cloud) is the way forward

IoT & Cloud ~ the big trend ...
Future IoT Platform

- Standard protocols
- Well defined architectures
- APIs
REFERENCES


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End

Thank You

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