

Transport Relevant Real-time / Big Data Management and Analytic Service Platform ~*SPATIOWL*~

October 29th, 2014

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FUJITSU LIMITED

- FUJITSU Corporate Overview
- Introduction of Transport Relevant Real-time / Big Data Management and Analytic Service Platform
~SPATIOWL~
- Case Study using Real-time Big Data
 - Taxi Probe
- Case Study using Open data
 - Disaster Evacuation Supporting System
- Latest Technologies
 - People Probe for Urban Transport
 - Trajectory Analysis

Fujitsu at a glance

Headquarters:
Tokyo, Japan

Established:
1935

President:
Masami Yamamoto

Employees:
170,000 worldwide

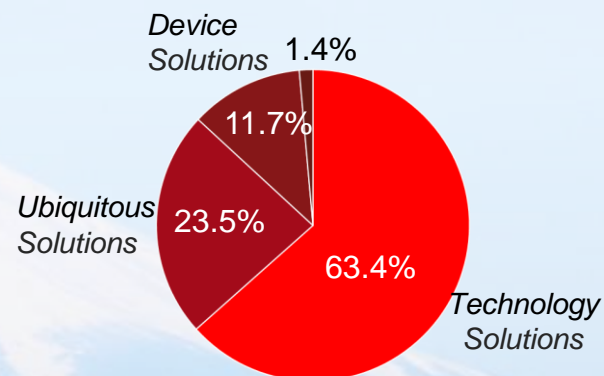
Net Sales:
US\$47billion

Principal Business Areas:

Device Solutions

- LSI
- Electronic Components

US\$5,748 million



Ubiquitous Solutions

- PCs/Mobile Phones
- Mobileware

US\$11,598 million



Technology Solutions

- Service, Solution, Infrastructure, System Integration
- System Platforms, System Products, Network Products

US\$31,301 million

World 3rd Largest IT Service Player

Introduction of Transport Relevant Real-time / Big Data Management and Analytic Service Platform ~*SPATIOWL*~

From Data Collection to Data Use (Concept)

Creating New Business

Solution to Problems

Feedback

Analysis, forecast, optimization

Real-time information (Event, SNS)

External information (Facilities, weather, etc.)

Sensing information (Probe etc.)

Map information

Sensing

Sensing

Big Data Analytic Platform
(SPATIOWL)

Location Information (Coordinate)

Cloud Computing

Case Study using Real-time Big Data

■ Collect typical urban traffic real-time big data “Taxi Probe”

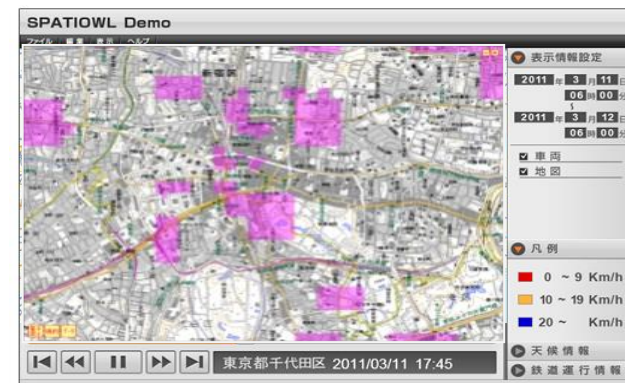
- **8,000 taxi** running in 3 urban areas
- **Data Volume: over 40TB** (20 billion cases / year)
- **Accumulative running data of total taxis in a single day is equal to the distance worth of 9 times of around the earth**



■ Contribute to “Efficient Urban Traffic Management”



- Visualize urban congestion level



- Indicate taxis to high demand area

Demonstration

- Tokyo downtown traffic condition before/after the earthquake on March 11th, 2011. **Red line** : Congestion



ITS Japan' s activity

Passed Road Map

Case Study using Open Data

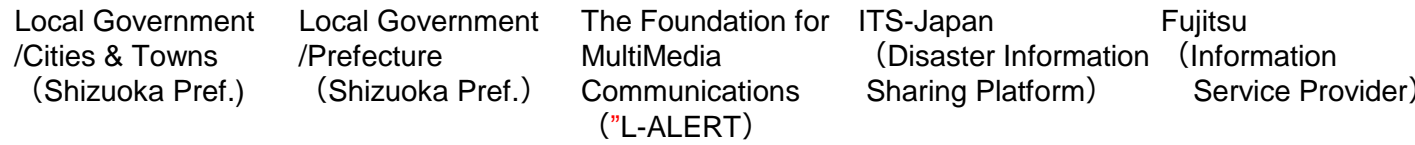
ITS-Japan Hybrid System (Disaster / Normal days)



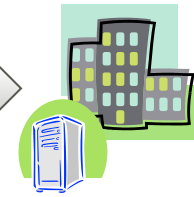
Joint Practice with Shizuoka Pref. Jun 4th 2014

L-ALERT

(Disaster Information Sharing System)



Upload disaster information
(Data input)



- Aggregate Shizuoka Pref's disaster information.
- Upload information to L-ALERT



- Aggregate disaster information of each pref.
- Share with media.



- Store disaster information based on "location information" (*)
- Store Shizuoka pref's river water level based on "location information"
- Provide data based on requests of information service providers.



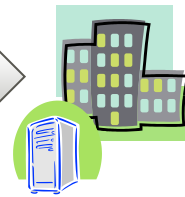
- Broadcast disaster information to "internavi center".
- Provide disaster information to Fujitsu smartphone.

Local Government Open Data

Local Government /Pref (Shizuoka)



Sensor Information
- Rain
- Water level



- Disclosing water-level of the rivers in Shizuoka Pref as "open data"
(Open Data Catalogue of Fuji-no-kuni)

* Store only Shizuoka Pref for this trial

Telematics



Inform disaster information to car navigation.



Inform disaster information through images & voice.



Smart Phones



Inform disaster information to pedestrians through images.



Usage Image with Fujitsu Smartphone

1.Normal

2.Inform evacuation order

3.Inform nearest evacuation facility

4.Inform details of evacuation facility



Usual
Browsing



When receiving evacuation order...

Inform **“Evacuation Order” Alert** and **cities /towns name of evacuation**



When tapping “Evacuation Order”...

Inform **the location around the smartphone user’s and nearest evacuation facilities availability**



In tapping evacuation centers on the map...

Inform **details of evacuation facilities**

Data Providing System	System Provider	Data
L-ALERT (Public Information Commons)	The Foundation for MultiMedia Communications	Evacuation order, Availability of evacuation facility
Open Data Catalogue of Fuji-no-kuni	Shizuoka Prefecture	River water-level information (Measuring location, water-level)

System Structure

■ Joint Practice with FMMC *(Jun 4th 2014)

*FMMC
Foundation for Multi-Media Communications

Platform for sharing disaster information (SPATIOWL)

The Foundation for
MultiMedia
Communications

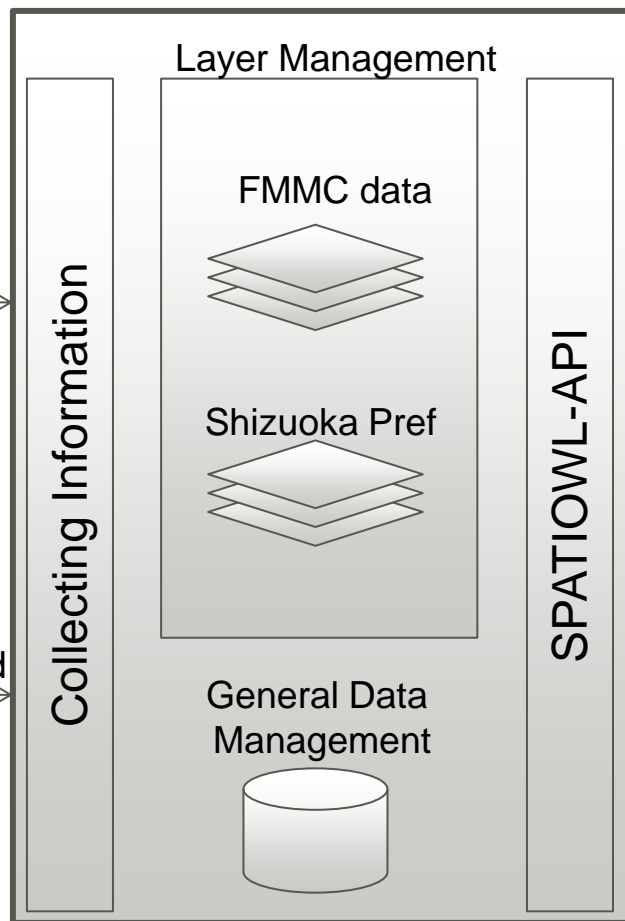
L-ALERT
(Disaster
Information
Sharing System)

SOAP push

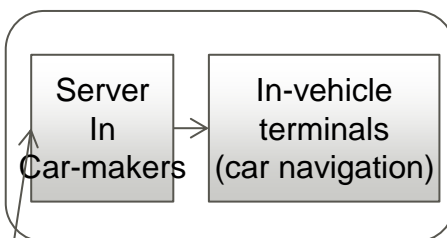
Shizuoka Pref

water-level
Information
of the rivers
(Open Data
Catalogue of
Fuji-no-kuni)

File download



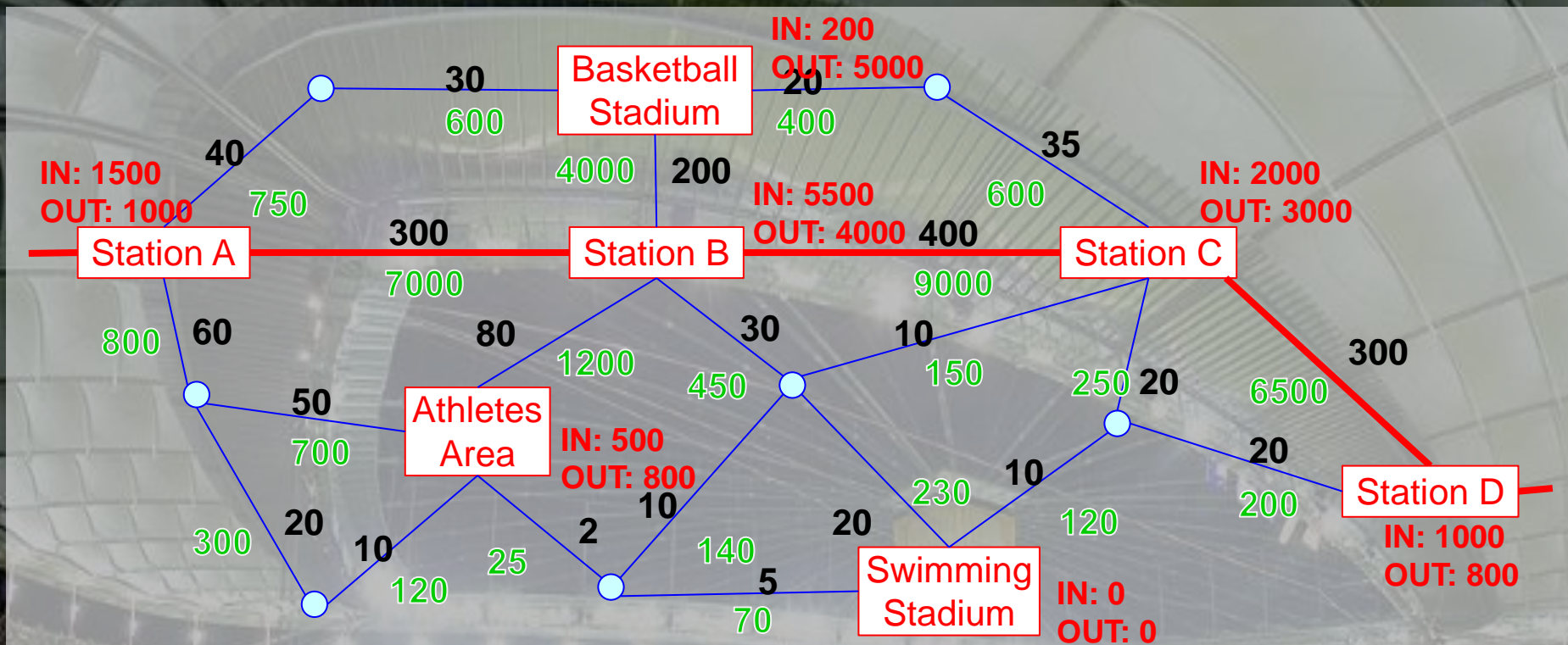
Web server
for providing
information



Fujitsu
SmartPhones

Latest Technologies

New Tech. 1 People Flow Estimation



of people detected
by **fixed sensor**



of people detected
by **smartphone**
(people probe)

Flow
Estimation

Estimated # of
People Flow

● : Retention point
and route

□ : Fixed sensor

— : Railway

Data Collection

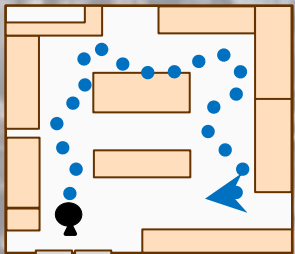
Pre-processing for Analysis

Visualization & Analysis

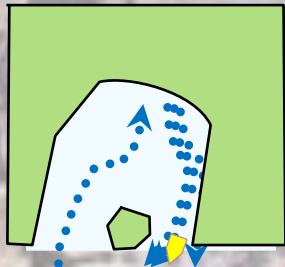
Vehicles



Pedestrians



Ships/Aircrafts



Map-matching

- Road network data is necessary
- Precise analysis based on actual roads



Road Network Data

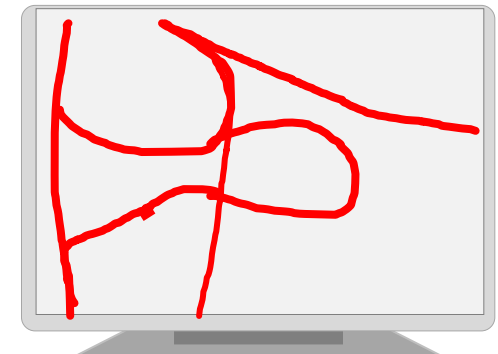


Trajectory Analysis

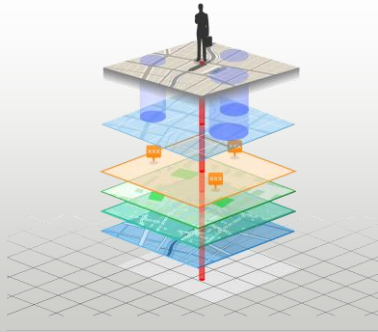
- Road network data is **not** necessary
- Cover the area where road is destroyed by disaster, or inside the building



Virtual Road



Transport Relevant Service Platform ~SPATIOWL~



- ***Know-how based on 30 years proven experience of ITS and telematics***
- ***Real-Time Big Data Handling Capability***
- ***Original Analytic Algorithm***
- ***Scalability (if Cloud)***

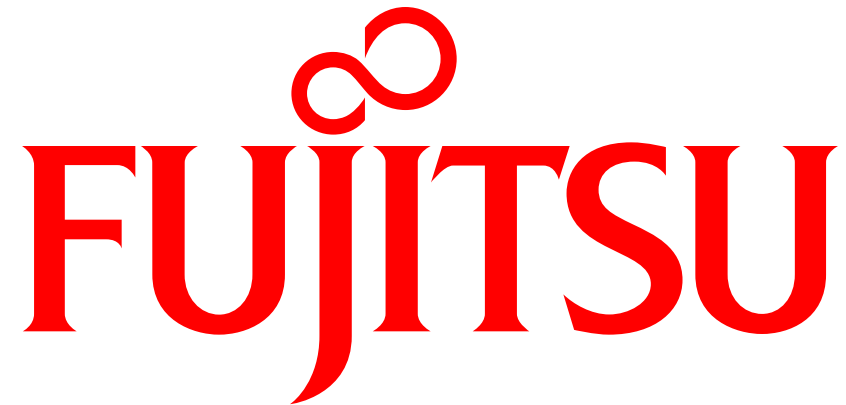
Multi-modal
Transportation

People Flow for
Large-scale Event

Evacuation Guidance
for Disaster

Contribute to a Sustainable and Efficient Traffic City in the Future





shaping tomorrow with you