

CIU 2015 (March 18, 2015)

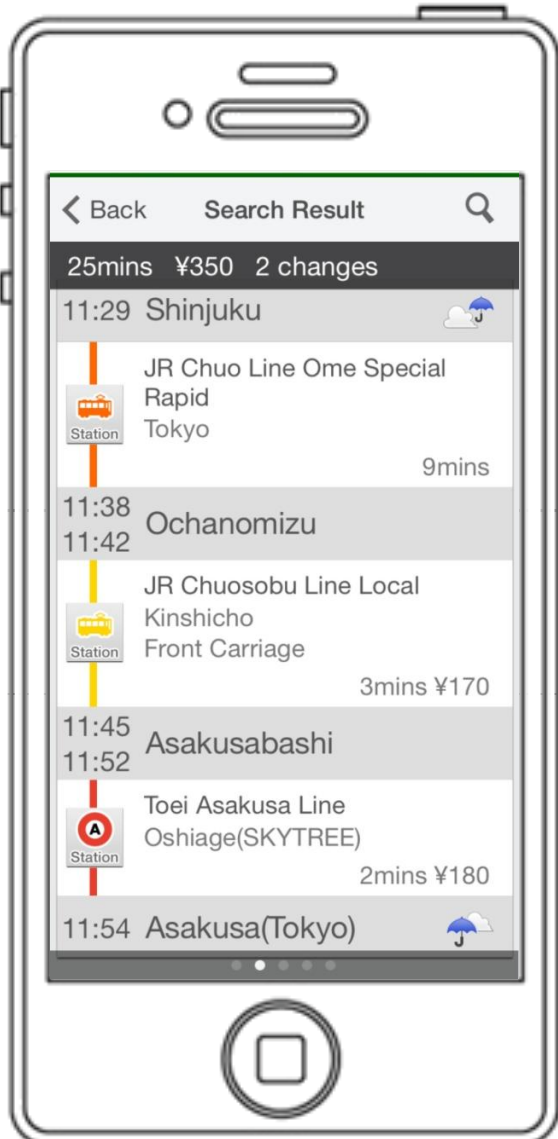
Detecting Sudden Rises in Traffic Demand Based on Route Search Request Log



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NAVITIME JAPAN Co., Ltd.**

About NAVITIME

A Multi-modal Navigation Service Provider on Mobile Phone



← **Route Search Service**

↓ **Automotive Navigation**



Founded : March 1, 2000

Scale of Our Services



NAVITIME

4 million Dues-paying Members
26 million Monthly Unique Users

As of September 30, 2014.

Our Business Domain

Consumer Services

Domestic Apps.



Inbound App.



International Apps.

Business Solutions

Web Media

Telematics

Transport Consulting

Business NAVITIME

ASP

Our Data for Traffic Analysis

Big Data

Today's Topic

Traffic Demand

Route Search Request Logs



Route Choice

Route Choice Logs



Travel Record

Probe Data at 1 sec. interval



Master Data

Road Traffic

Road Network Data



Public Transport

Timetable, Station Data

祇園(京都市)/熊野神社前(京都市)				
平日				
06	20	50		
07	11	26	35	45

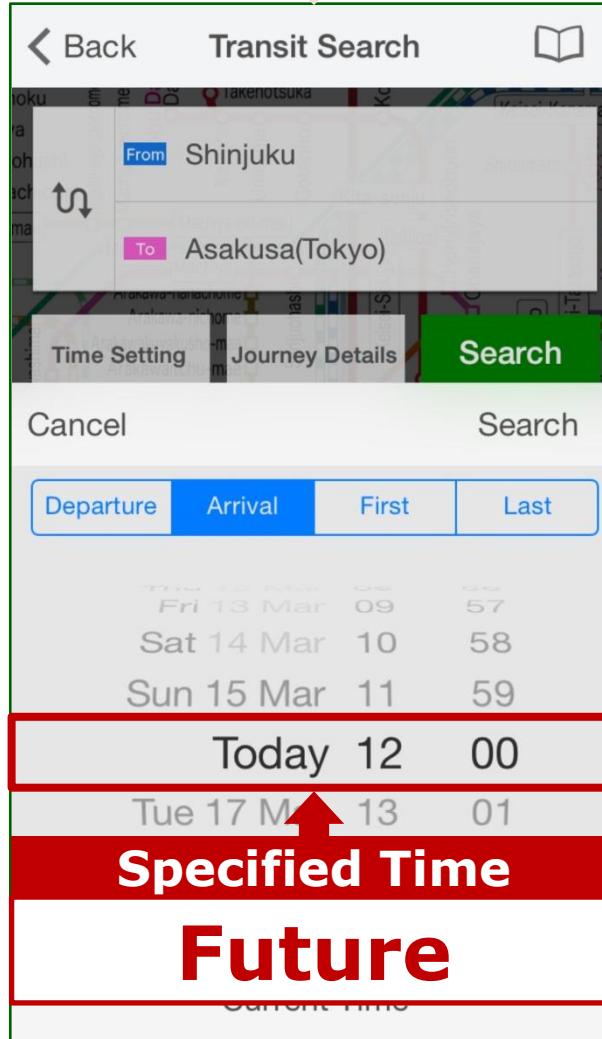


Route Search Request Logs

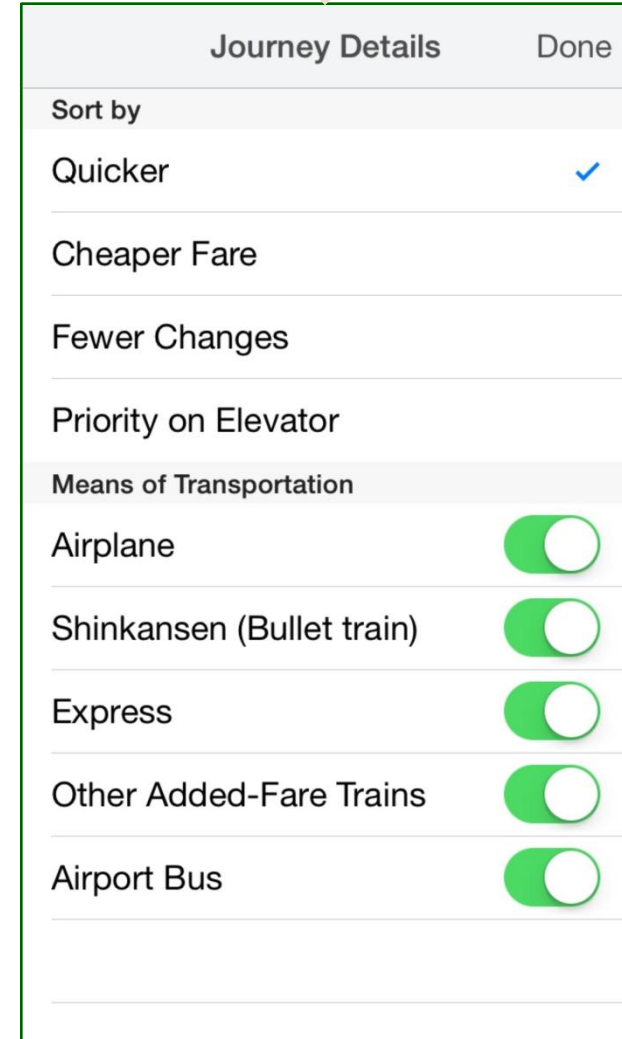
Origin & Destination



Time Setting



Journey Details

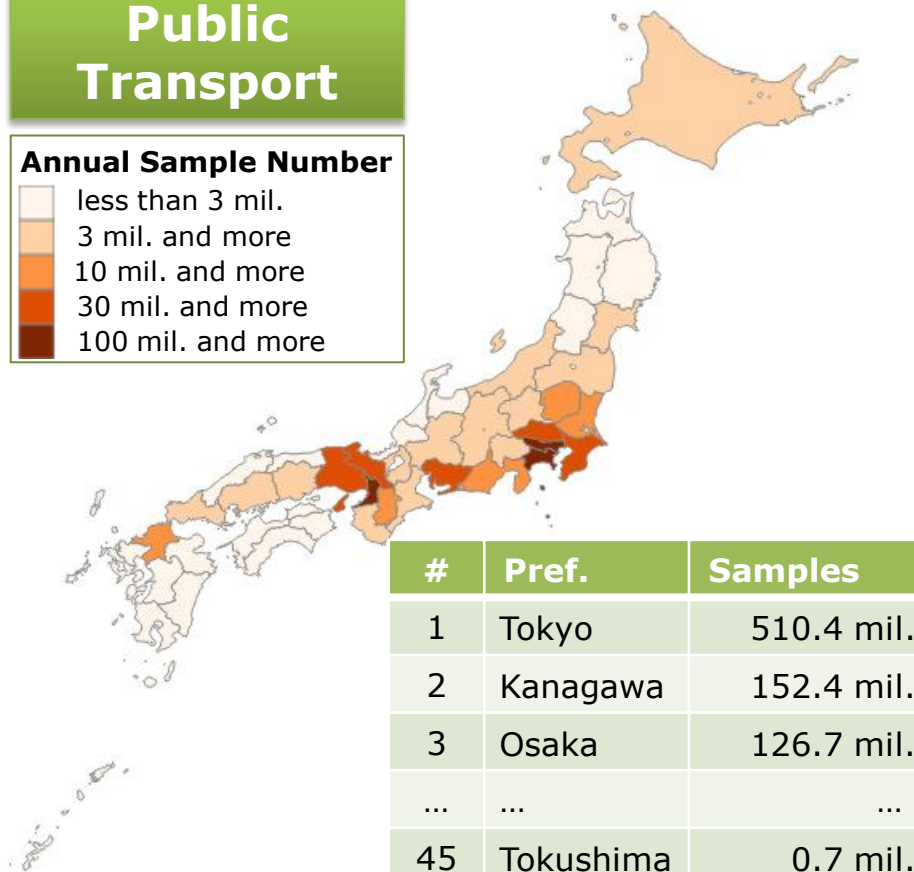
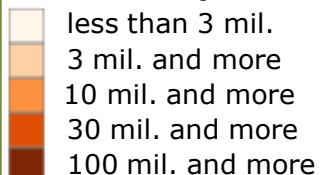


Reflect Future Traffic Demand

Data Volume (FY 2013)

Public Transport

Annual Sample Number

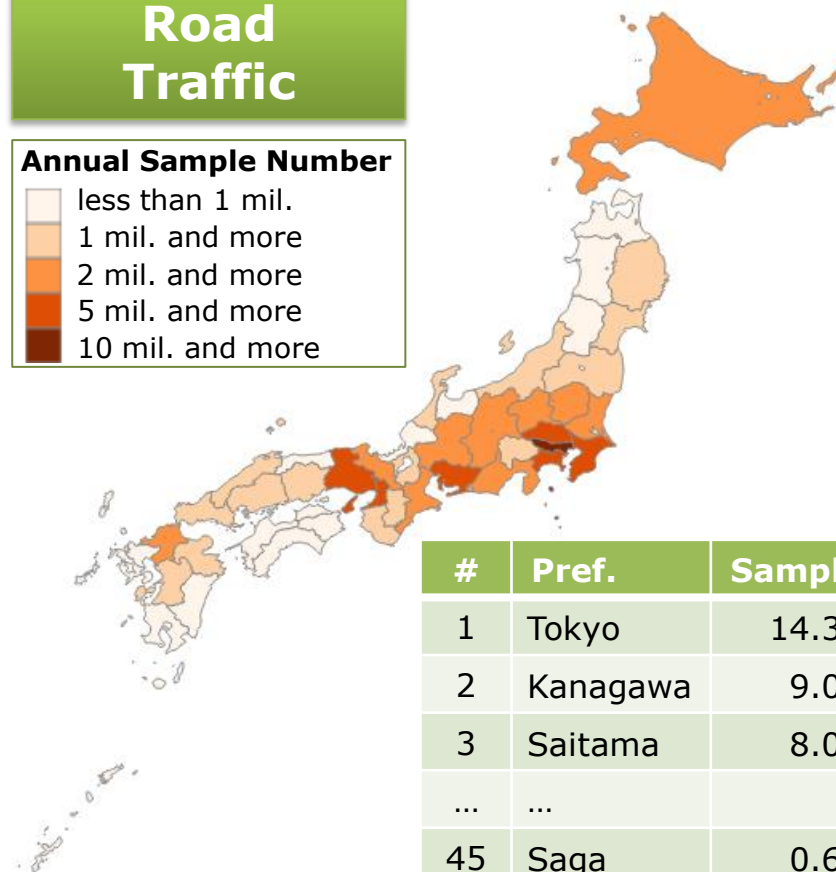
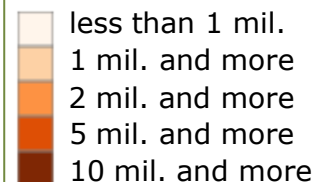


#	Pref.	Samples
1	Tokyo	510.4 mil.
2	Kanagawa	152.4 mil.
3	Osaka	126.7 mil.
...
45	Tokushima	0.7 mil.
46	Kochi	0.7 mil.
47	Okinawa	0.3 mil.

1.3 bn. Samples a Year

Road Traffic

Annual Sample Number



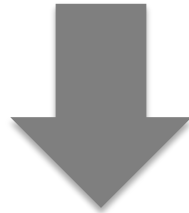
#	Pref.	Samples
1	Tokyo	14.3 mil.
2	Kanagawa	9.0 mil.
3	Saitama	8.0 mil.
...
45	Saga	0.6 mil.
46	Kochi	0.5 mil.
47	Tokushima	0.5 mil.

130 mil. Samples a Year

Large Amount of Samples Available

Route Search Request Logs

- **Large Amount of Samples Available**
 - esp. for rail service
- **Reflect Future Traffic Demand**



Purpose of our Study

To Detect Sudden Rises in Traffic Demand
by Using Route Search Request Logs

Heat Map

Visualizing the Concentration of Traffic Demand

April 13, 2013

**Seibu-
Kyūjō-mae
station**



描画条件：
1時間に600回以上
発着地に指定されている駅を描画。
多いほど赤い。

データ元：
NAVITIME, 乗換NAVITIME,
PC-NAVITIME

Heat Map

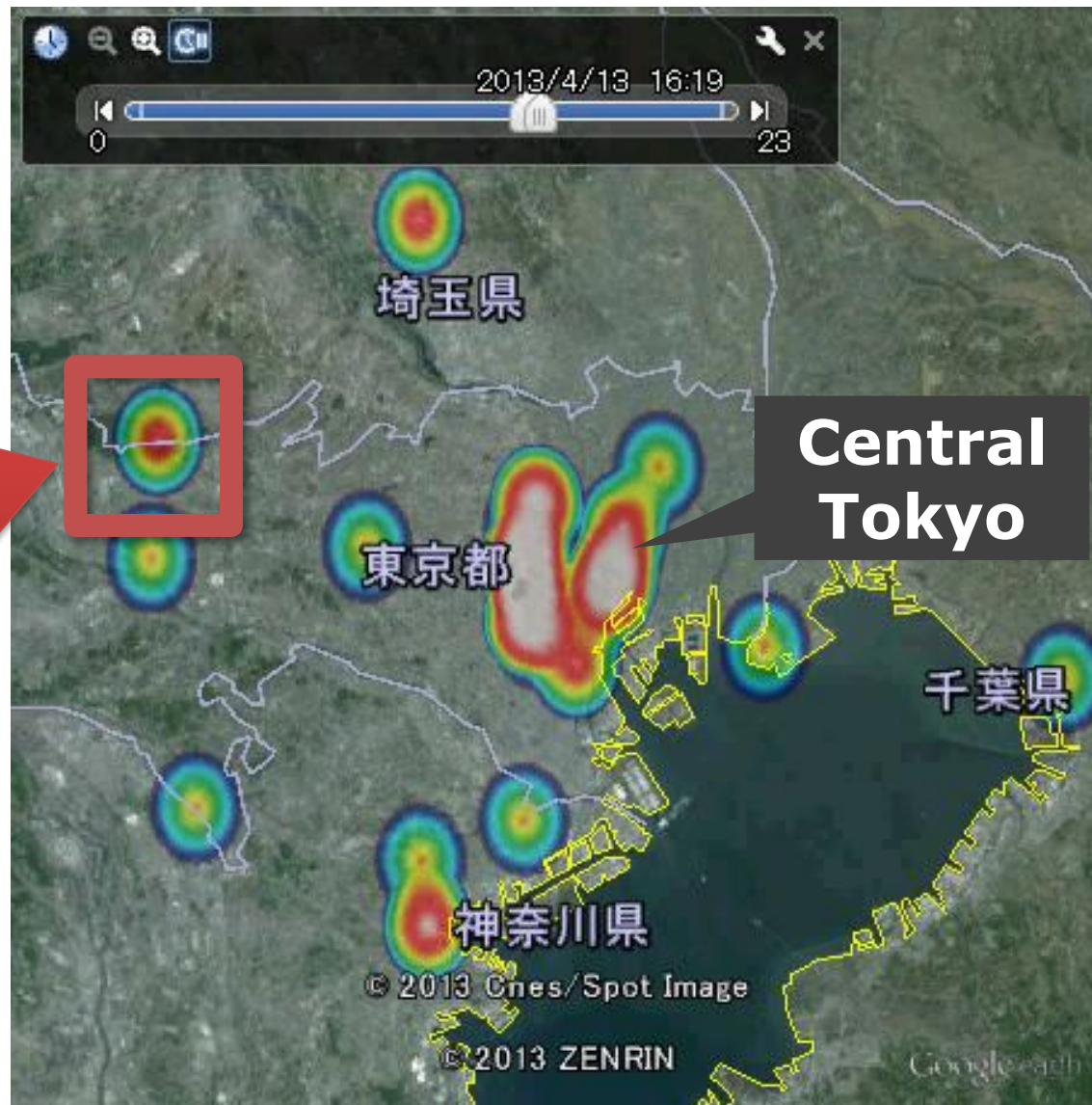
Visualizing the Concentration of Traffic Demand

Before the curtain time of **Momoiro Clover Z's** concert at Seibu Dome, April 13, 2013

Seibu-Kyūjō-mae was the 7th most requested station.

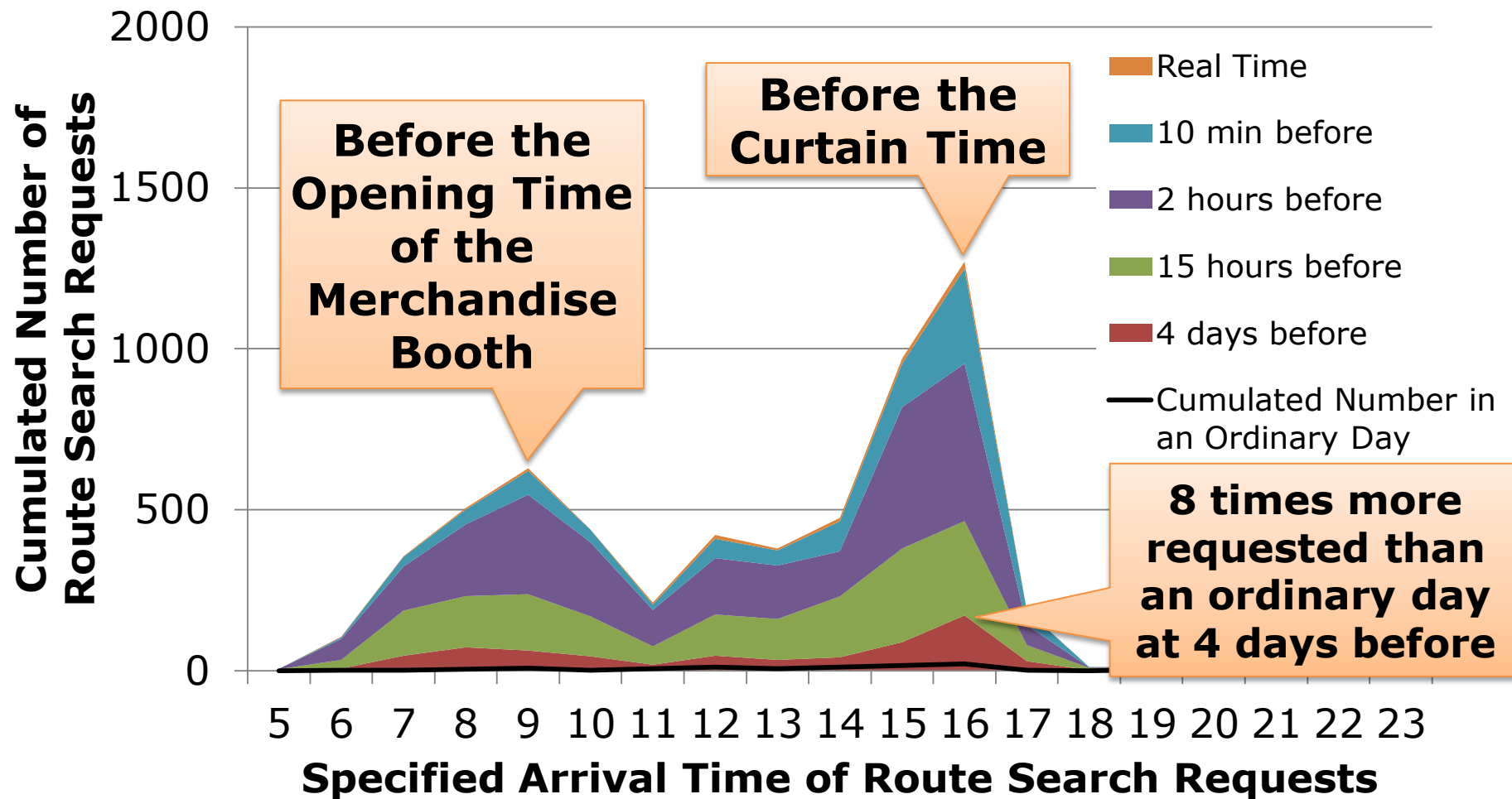
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PC-NAVITIME



The Number of Request Logs

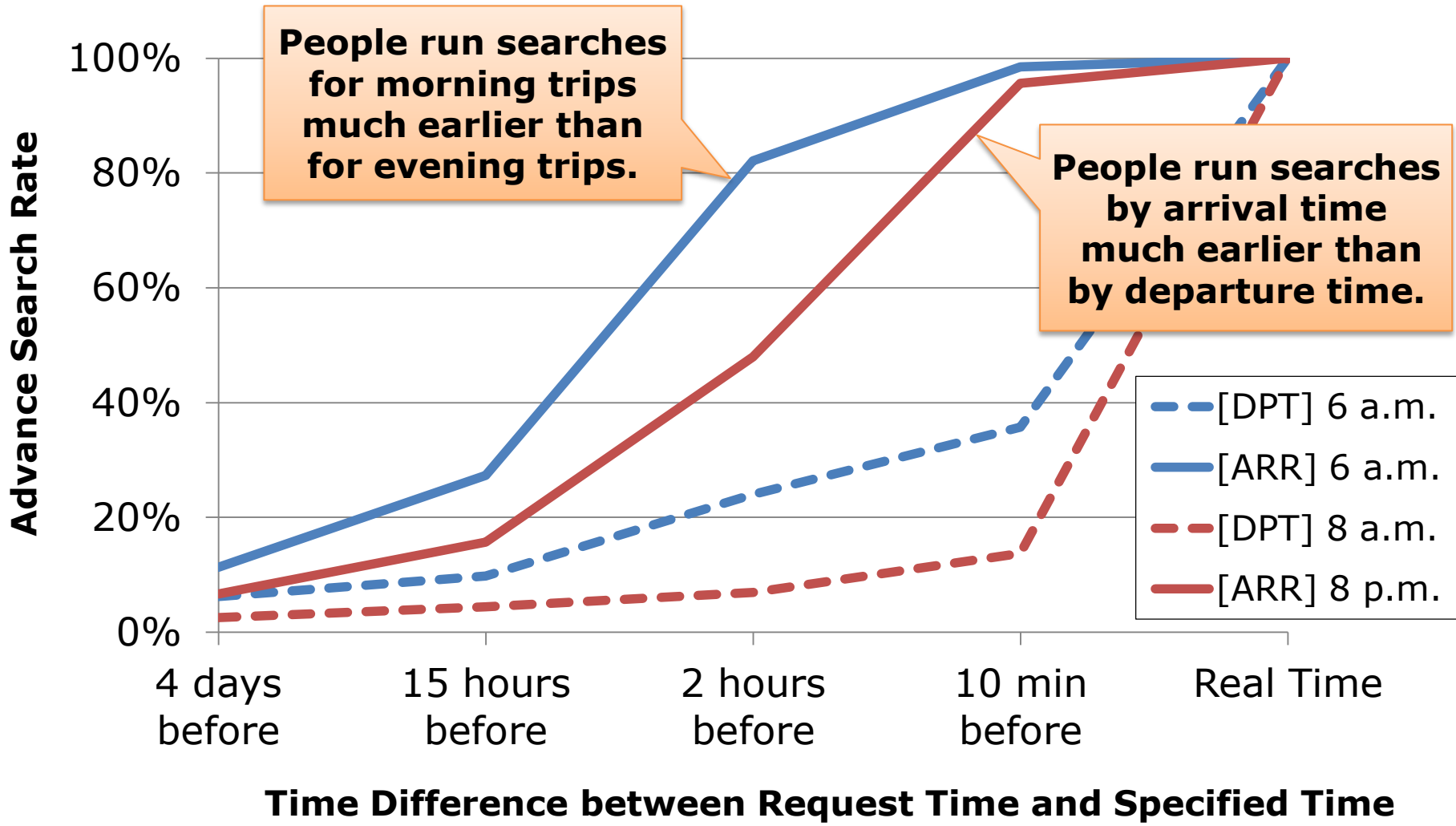
Seibu-Kyūjō-mae Sta. on April 13, 2013



Possible Use for the Capacity Adjustment & Retail Marketing

Increasing Trend in Advance Searches

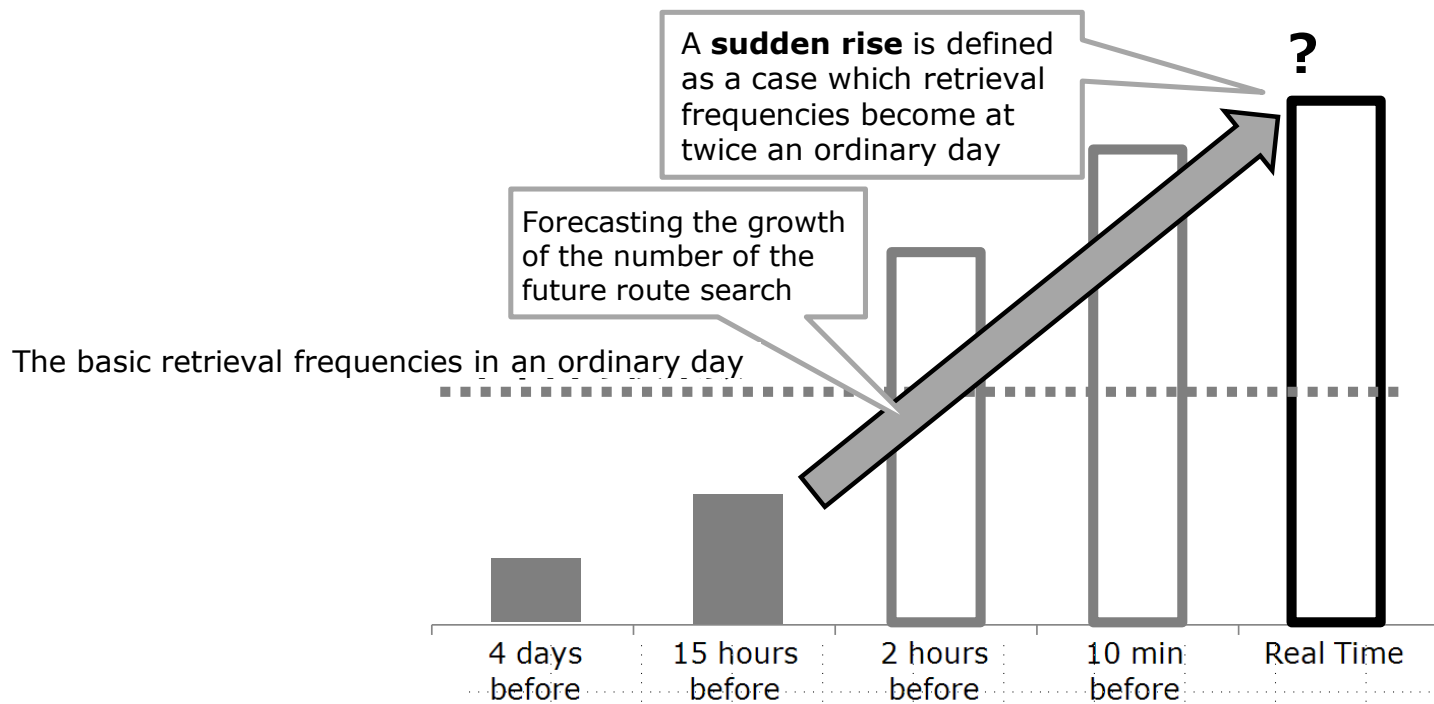
The Growth of Advance Search Gives the Key to the Prediction



People Run Searches in Advance for Morning Trips by Arrival Time

Detection Method

Learning Period : From February 1 To March 17, 2013 (6 Weeks)
Target Period for Prediction : From March 18 to April 14, 2013 (4 Weeks)
Target Units for Prediction : $1,762,880 = 1,574 \text{ Stations} * 28 \text{ Days} * 20 \text{ Time Zones} * 2(\text{Departure or Arrival})$



References

Ishimura R, Ota K & Tomii N (2013)
Detecting Sudden Rise in Demand of Transportation Needs in the Near Future Based on Immediate and Historic Data of Route Search Service (in Japanese).
The 47th Research Meeting on Civil Engineering Planning, 2013

Detection Result

Target Period: From March 18 To April 14, 2013 (4 weeks)

The Number of Sudden Rise in Traffic Demand:

Total 12,268 (2.2% were detected 4 days before)

Cause Event	Number Detected	Stations for Example
Concert	62	Seibu-Kyūjō-mae, Suidōbashi, Korakuen, Saitama-Shintoshin, Shin-Yokohama
Sporting Event	17	Ukimafunado, Hasune and Keisei-Sakura (for marathon), Urawa-misono
Other Event	12	Kokusai-tenjijō-seimon, Yokosuka-chūō (for U.S. Fleet Activities)
Holiday Resort	28	Kudanshita (for cherry-blossom viewing), Takaosanguchi, Tokyo DisneySea Station
Government & Business District	36	Nihon-ōdōri, Tochōmae, Kasumigaseki, Nishi-shinjuku
School Event	47	Kudanshita, Hiyoshi, Chuo-Daigaku・Meisei-Daigaku
Time Schedule Revision	15	Wakōshi, Shinjuku-sanchome, Kita-sando, Motomachi-Chūkagai
Airport	2	Haneda Airport, Haneda Airport Terminal 1
Unknown	48	
Total	267	

The World's Fastest? Demand Detection of NEW SHINKANSEN

Last Weekend



北陸新幹線

KAGAYAKI
HAKUTAKA
TURUGI
ASAMA



2015
3月14日
東京 ↔ 金沢・富山
開業

新幹線は北陸へ。

2015年3月14日、新幹線が富山/金沢まで開通します。近日開業予定の北陸新幹線をご紹介します。

北陸新幹線は、長野新幹線の長野駅から先に延伸する形になります。長野県から新潟県、富山県を経て石川県に達する、長野駅～金沢駅間の228.1kmが今回の開通区間です。東京～金沢間を最短で2時間28分、東京～富山間を最短で2時間8分で結びます。

飯山駅、上越妙高駅、糸魚川駅、黒部宇奈月温泉駅、富山駅、新高岡駅にも新幹線の駅が開設されます。このうち、黒部宇奈月温泉と新高岡は今回新しくできる駅、上越妙高は信越本線の脇野田駅を移設して名称を変更します。その他の駅は既存の駅に新幹線ホームが増設されます。今回の開通と同時に、東京駅～長野駅間の路線名称も長野新幹線から北陸新幹線に変更となります。



Station Congestion Alert

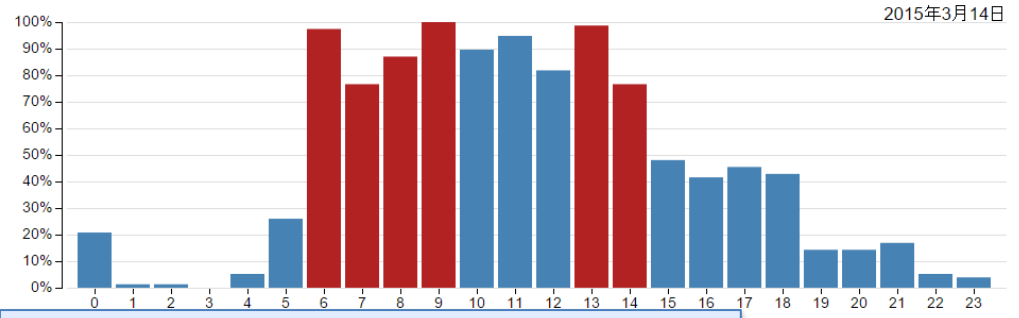
Station Congestion Prediction Calendar as of March 7
<http://www.navitime.co.jp/pcn/forecast/station> (Japanese)

土	日
3/7	3/8
平塚	ナゴヤドーム前矢田
3/14	3/15
新富士(北海道) 前橋 富山 金沢	前橋 みなとみらい 富山 金沢
近鉄長島 ドーム前千代崎 鳥栖 中津(大分県)	大正(大阪府) ドーム前 ドーム前千代崎 ユニバーサルシティ

Toyama Station

いいね! シェア 0 ツイート 0

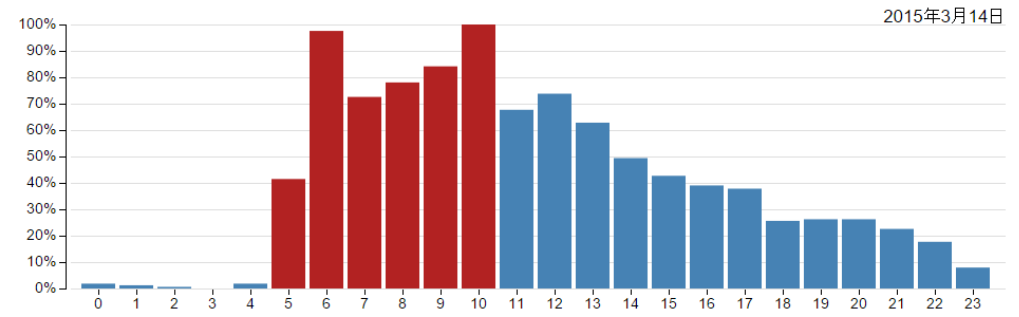
- 2015年3月14日 6時、7時、8時、9時、13時、14時
- 2015年3月15日 8時、9時
- 2015年3月16日 7時



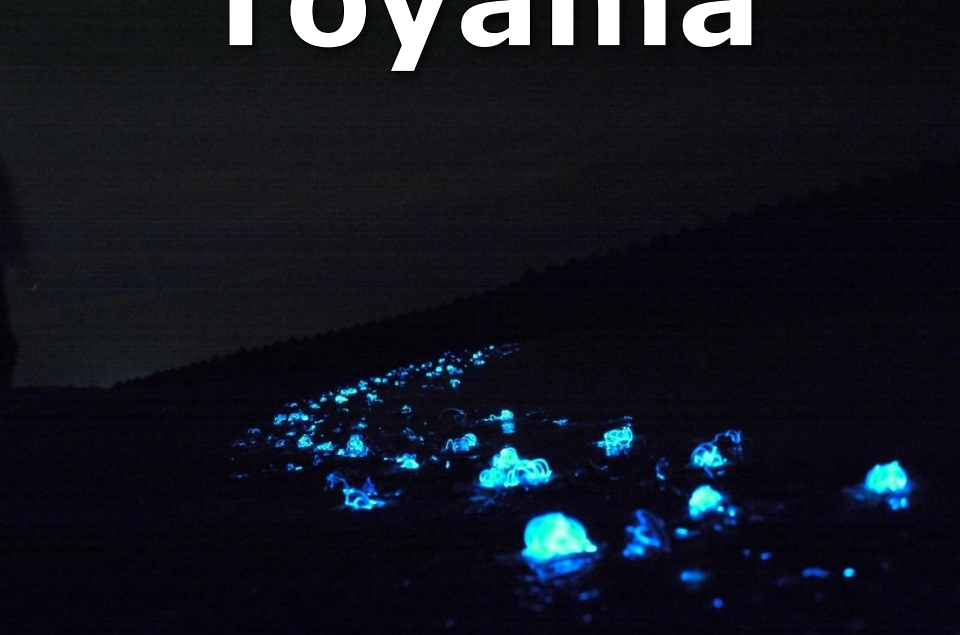
Kanazawa Station

いいね! シェア 0 ツイート 0

- 2015年3月14日 5時、6時、7時、8時、9時、10時
- 2015年3月15日 6時、7時、8時
- 2015年3月16日 7時
- 2015年3月23日 7時



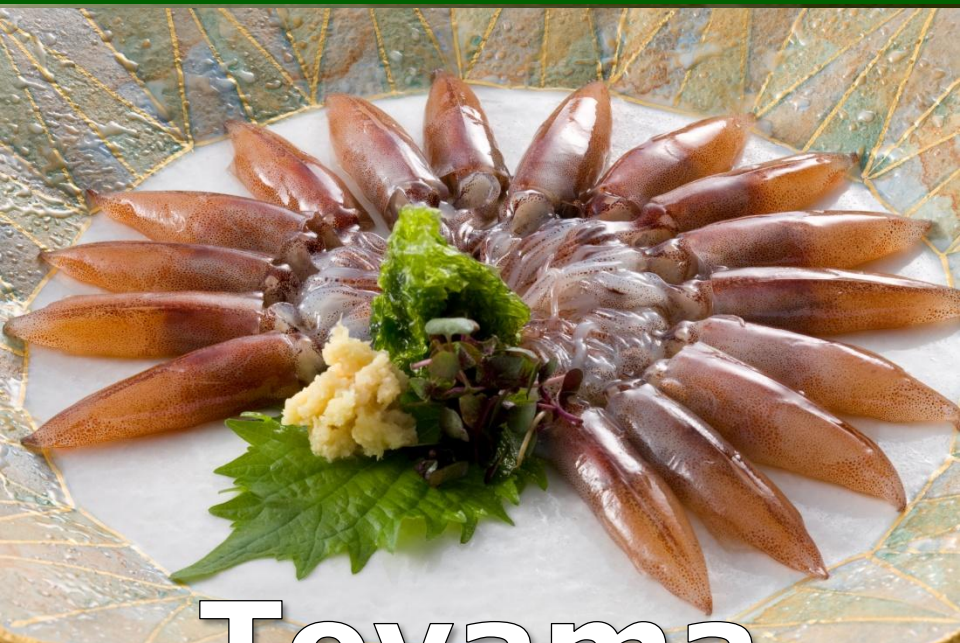
Kanazawa or Toyama?



Kanazawa

Toyama

Kanazawa or Toyama?



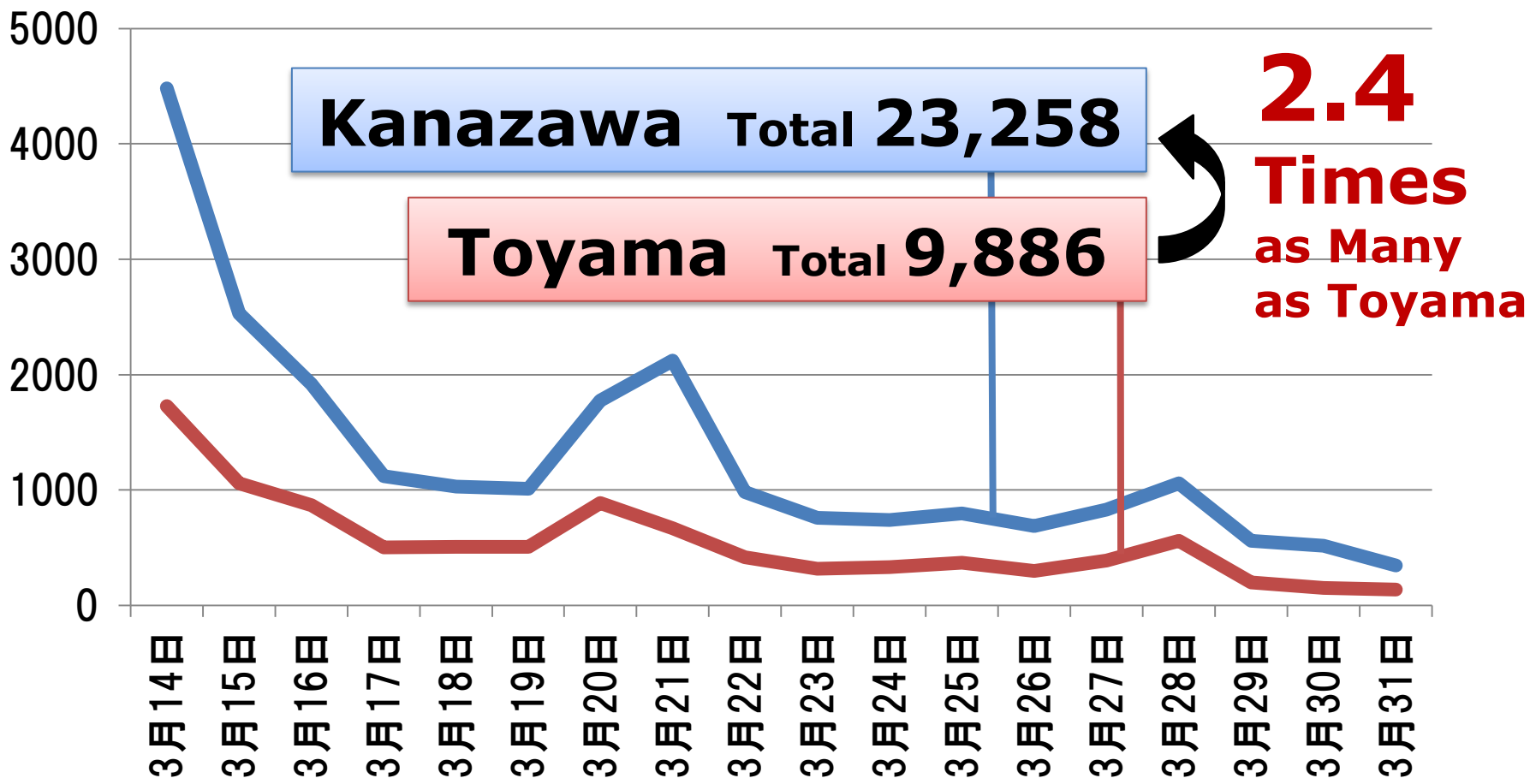
Kanazawa

Toyama



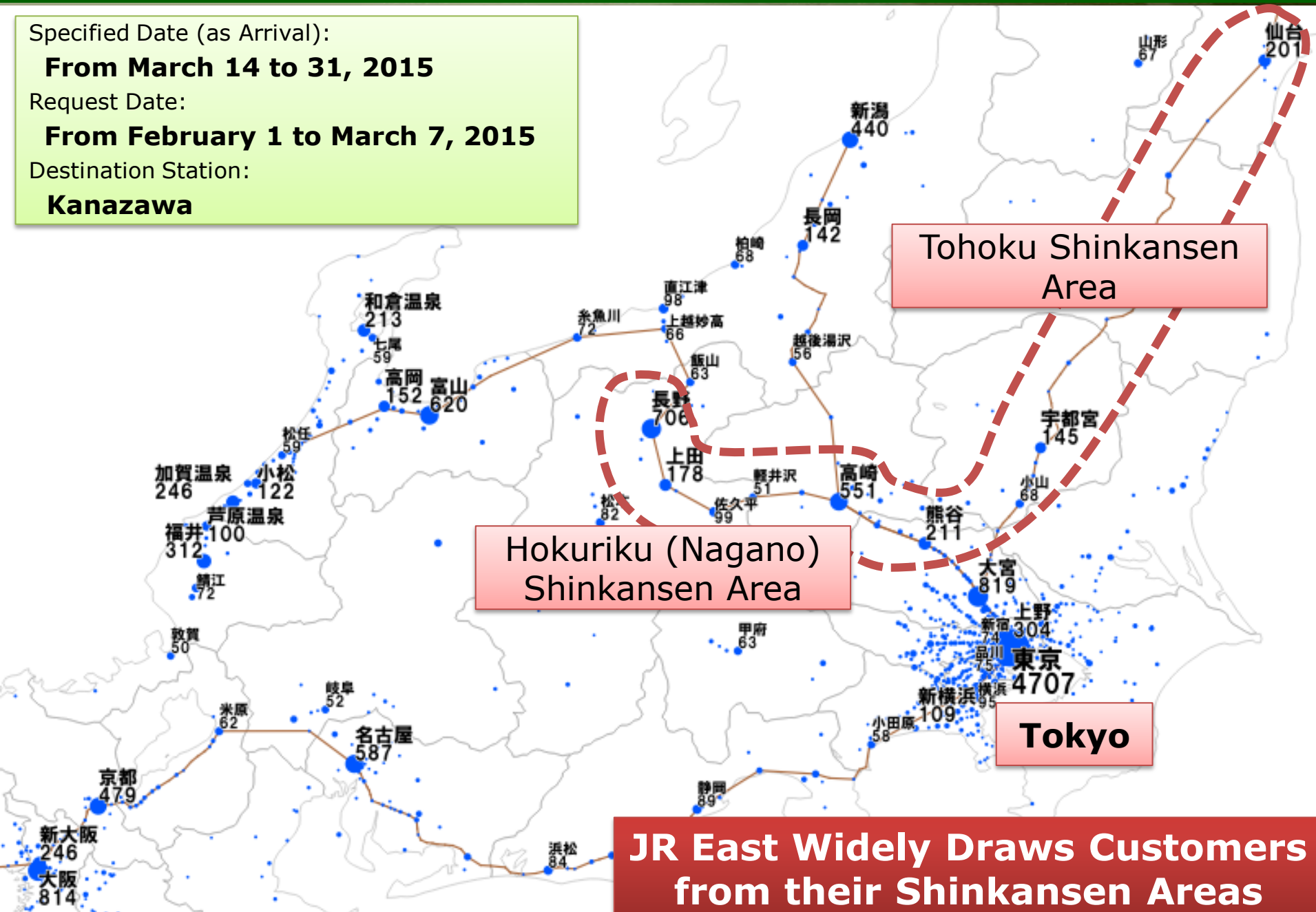
The Number of Request Logs

Specified Date (as Arrival) : **From March 14 to 31, 2015**
Request Date : **From February 1 to March 7, 2015**
Destination Station : **Kanazawa, Toyama**



Origin Distribution to Kanazawa

Specified Date (as Arrival):
From March 14 to 31, 2015
Request Date:
From February 1 to March 7, 2015
Destination Station:
Kanazawa



Tohoku Shinkansen Area

Hokuriku (Nagano) Shinkansen Area

Tokyo

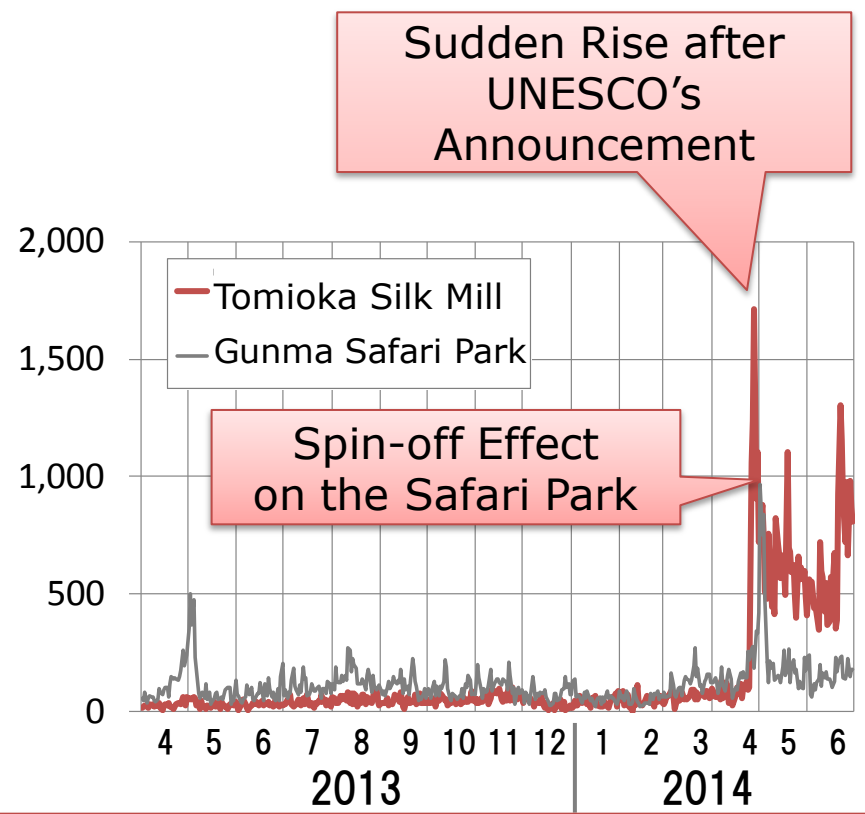
JR East Widely Draws Customers from their Shinkansen Areas

Development Potential

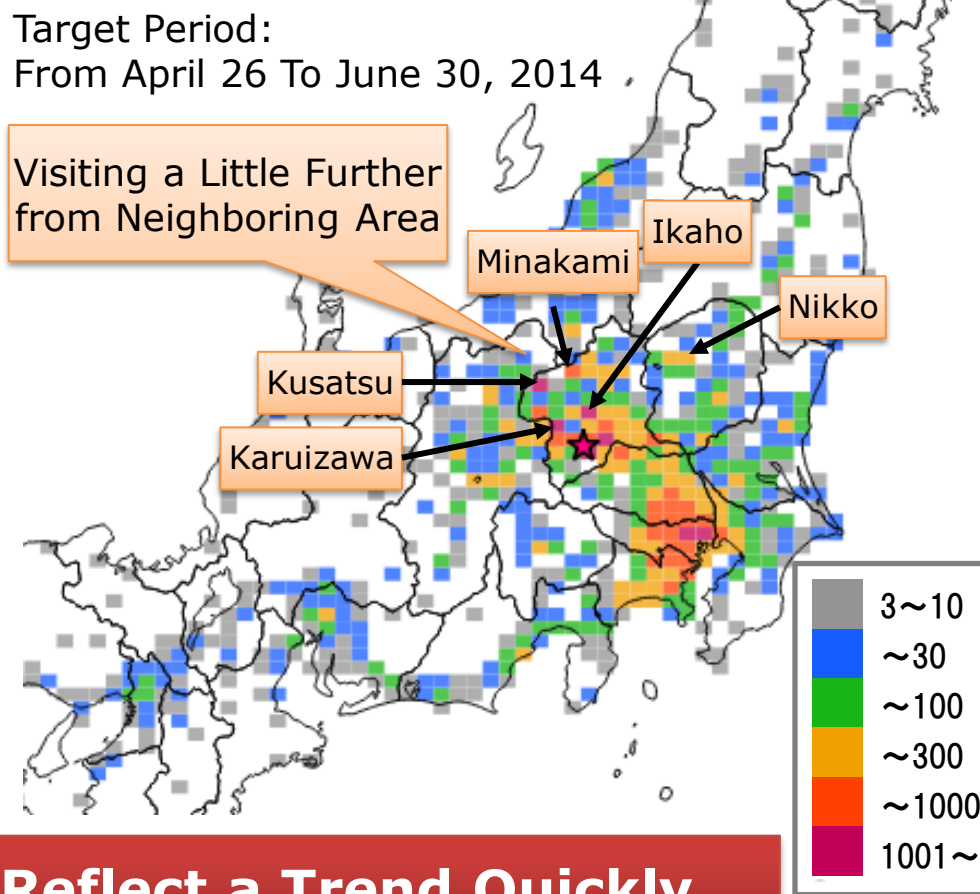
The impact to be inscribed on the UNESCO World Heritage List

The Tomioka Silk Mill

The Daily Number of Searches



Origin Distribution (Public Transport)



Route Search Request Logs Reflect a Trend Quickly

Conclusion

Sudden Rises in Traffic Demand

- Have been Difficult to be Detected
- Can be Detected by
 - **Route Search Request Logs**



Detecting Sudden Rises in Traffic Demand

- Will Improve
 - **Public Transportation Services**
 - **Retail Marketing Approaches**
- Would Contribute to success
 - **2020 Tokyo Olympics & Paralympics**