New Era City Infrastructure: Fukuoka City Wi-Fi, Free Public Wi-Fi Service

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1. Introduction

According to the Japan Tourism Agency's "Consumption Trend Survey for Foreigners Visiting Japan" (January - March 2014 quarterly survey), foreign visitors regard the Internet (accessed via smartphones) as the most useful source of travel information while staying in Japan, but the most useful information during visits to Japan comes from free Wi-Fi. A robust Wi-Fi environment thus serves as a major attraction in extending hospitality to a city's visitors, for Wi-Fi not only makes an unfamiliar town much more accessible to the visitor but also provides a way to broadcast favorable information about the city to the far corners of the earth using Facebook and other social network services, which promises to bring in even more visitors in the future.

Fukuoka is now coming up on the fifth anniversary of the *Fukuoka City Wi-Fi Service*, a free public wireless LAN service that was initially rolled out in April 2012. Here we will provide a brief overview of the service and describe some of its unique features.

2. Deployment Background and Service Overview

Fukuoka is a compact port city favored by proximity to key cities on the continent, open sea lanes and air routes, an international airport, a Shinkansen depot and other large train stations, and a broad 2.5-km harbor. The economy is thriving with over 90% of Fukuoka residents employed in the tertiary wholesale,

retain, and service sectors.

Given these favorable circumstances, Fukuoka is well positioned to increase the number of tourists as a short-term growth strategy by attracting visitors and increasing consumption in the city. Fukuoka is also committed to free wireless LAN service as a way of attracting foreign tourists as well as Japanese visitors by providing more convenient access to general information and safety information in the event of a disaster, and providing more efficient dissemination of information.

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April 2012	Launch service
June 2012	Complete installation of service in all subway stations
November 2012	Set up Fukuoka tourist facilities to start offering services in private facilities at convenient access points
April - June 2013	Launch service at eight Fukuoka JR Kyushu train stations
October 2013	Launch service at Nishitetsu Bus Terminal, and start providing service in large-scale commercial facilities
December 2013	Rollout service at Nishitetsu Fukuoka (Tenjin) Station
April 2015	Rollout Wi-Fi via vending machines featuring disaster prevention station capabilities

(1) Bases

Fukuoka's Wi-Fi service was launched on April 27, 2012 with 16 base stations set up in subway stations, tourist information centers, and other locations throughout the city. Note that this was the first deployment of Wi-Fi in a subway by a municipal government in Japan. During the four years since it was rolled out, we have continued to upgrade and expand the service so that today, as of April 30, 2016, the service is supported by 97 base stations (440 access points) deployed throughout the city (see Figure 1).

(2) Deployment

The Fukuoka city government initially established a committee in April 2011 to figure out how best to deploy the public wireless LAN, and came up with a scheme in which the city would be responsible for deployment in municipal facilities and a Public-Private Cooperative Group that included private-sector business leaders would be responsible for deployment of the service in private facilities. The city took the lead in organizing the project, but soon brought the private sector along as full partners in the project.

■ **Figure 1: Fukuoka City Wi-Fi Base Map**
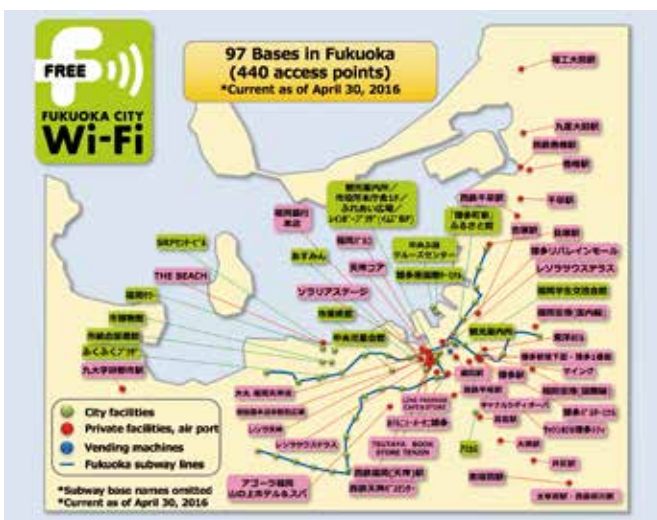
To hold down costs of deploying and maintaining the service, the new Fukuoka LAN service harnesses the Wi-Fi cloud environment and equipment of other legacy Wi-Fi services supported by the telco operators.

(3) Multilingual Capability

The service can be accessed in five languages: Japanese, Korean, two varieties of Chinese (simplified and traditional characters), and English.

(4) Automatic Authentication on Base Stations

As of August 2014, the service was implemented in such a way that users could remain automatically connected to the service for up to six months on a particular base station once users are registered on the service. Intuitive user-friendliness of the service was also markedly enhanced by enabling seamless migration from one base station to another.

(5) Security

Security measures are implemented in a way that maintains accessibility and convenience of the service without compromising a user's registration data or filtering parameters.

3. Functions Built Into the Service

(1) Portal Functions (Figure 2)

Users can access a wide range of information from the top page of the service including the Fukuoka City Wi-Fi homepage, disaster and crisis management information, and even a brief survey where users can provide feedback. After connecting to the Internet, the first page allows users to access the Fukuoka tourist site *YOKA NAVI* that opens doors to unlimited useful information (left). In the event of a disaster, warning or emergency information is delivered to users via the Pop-In Banner feature. And in the

unlikely event of an extreme disaster, user connections may be interrupted as the service cuts over to emergency response mode, or the service may switch back and forth between normal mode and emergency response mode (right).

(2) Stamp Rally Function (Figure 3)

We came up with the Stamp Rally function to increase awareness of the Wi-Fi service, to promote use of the service, and to attract more people into the city. Essentially, the Wi-Fi Stamp Rally is a scheme enabling regular users to enjoy collecting unique stamps associated with each base station by logging onto the different Wi-Fi bases throughout the city.

(3) Pop-In Banner Function (Figure 4)

In December 2014, we added a Pop-In Banner capability that displays a banner above the Internet browser. By exploiting the banner feature, various messages can be displayed in rotation: information about seasonal events, security-related warning, and so on.

(4) Open Data

The service provides access to Fukuoka's Open Data Site for the number of authentications on each base and each date. See the Open Data Site here: http://www.open-governmentdata.org/ (Japanese site only)

(5) Promotion to Encourage Use by Foreign Visitors

In August 2014 a new multilingual website supporting five languages was set up so that visitors can use Fukuoka City Wi-Fi service and local base stations even before they actually arrive in Japan. Currently, as of April 2016, the Fukuoka City Wi-Fi service has received approximately 2.77 million page views from countries all over the world. In addition, Fukuoka produced
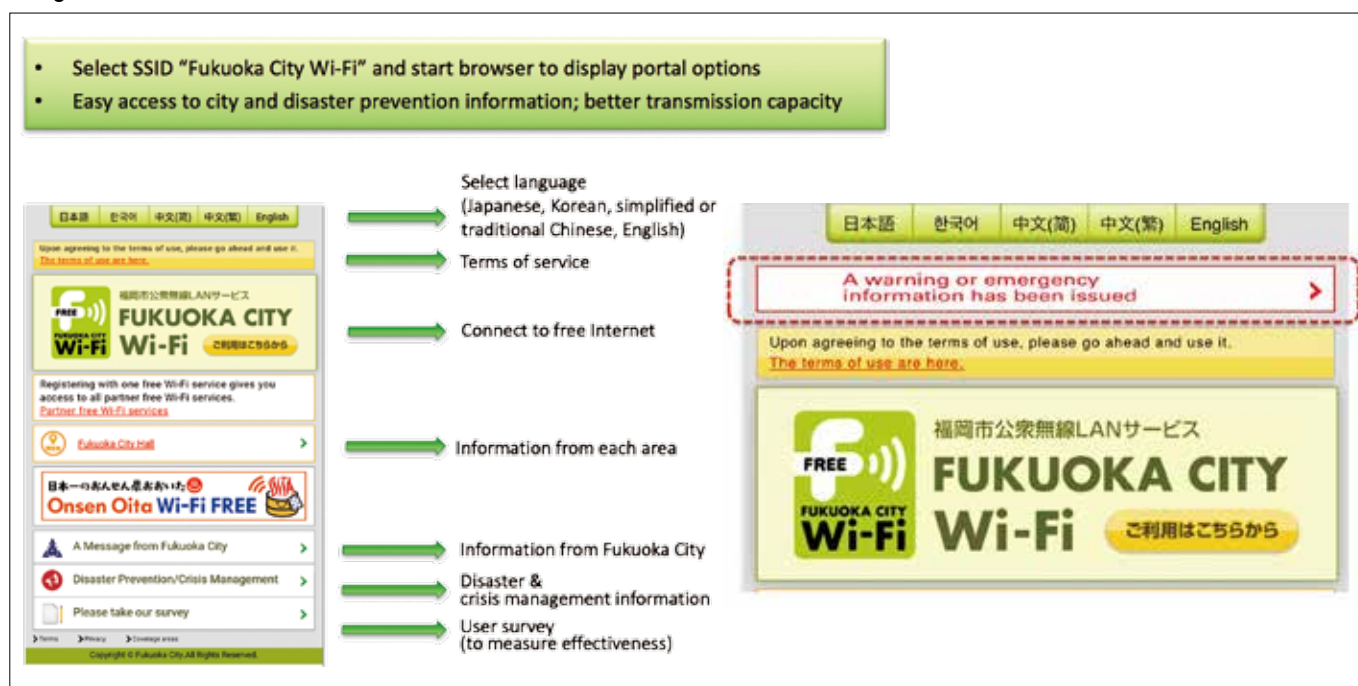
■ **Figure 2: Portal Functions**
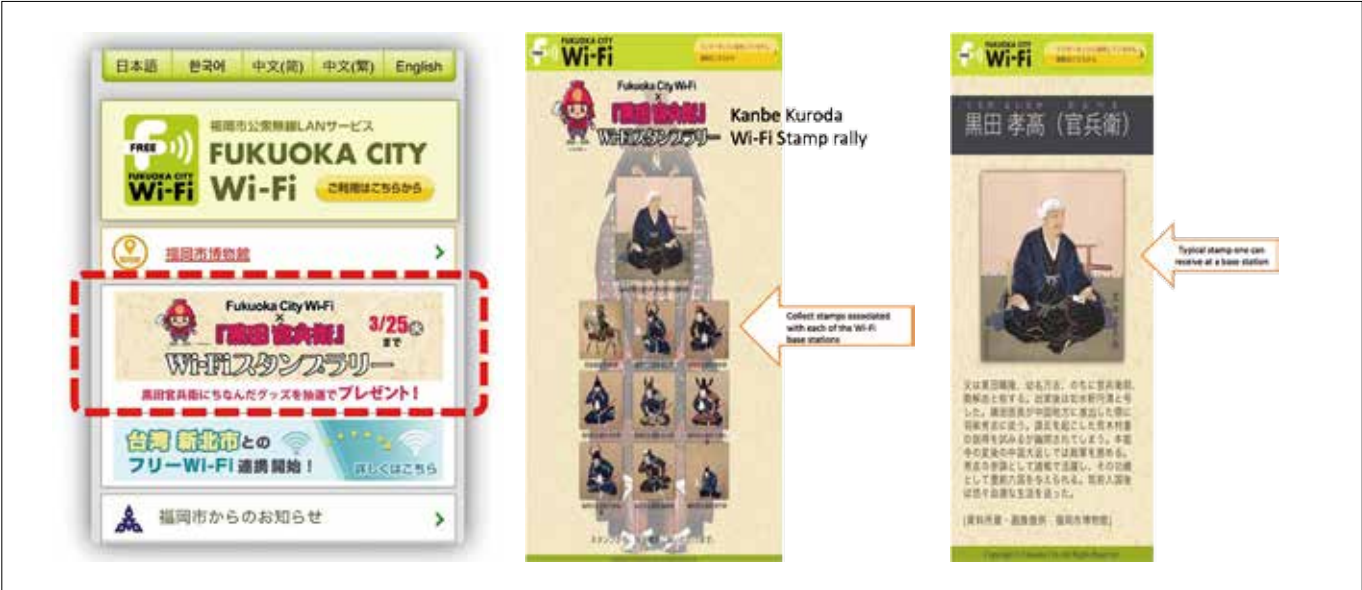
■ **Figure 3: Stamp rally**

■ **Figure 4: Pop-up banner function sends security alerts and promotes ICT literacy**

a series of public relations videos in five different languages in March 2015. More recently, the videos were upgraded to YouTube, and digital signage was installed at international terminals at the airport and Port of Hakata and on main streets.

See the multilingual tourist site here: http://wifi.city.fukuoka.lg.jp/en/

4. Effects

(1) Usage Status

From the date the service was first launched until today (March 2016), the total number of authentications on the service has been 28.18 million and the total number of foreign language views has been 45.32 million, and usage of the service has continued to increase year after year. Usage status of the service as of March 2016 reveals the following picture:
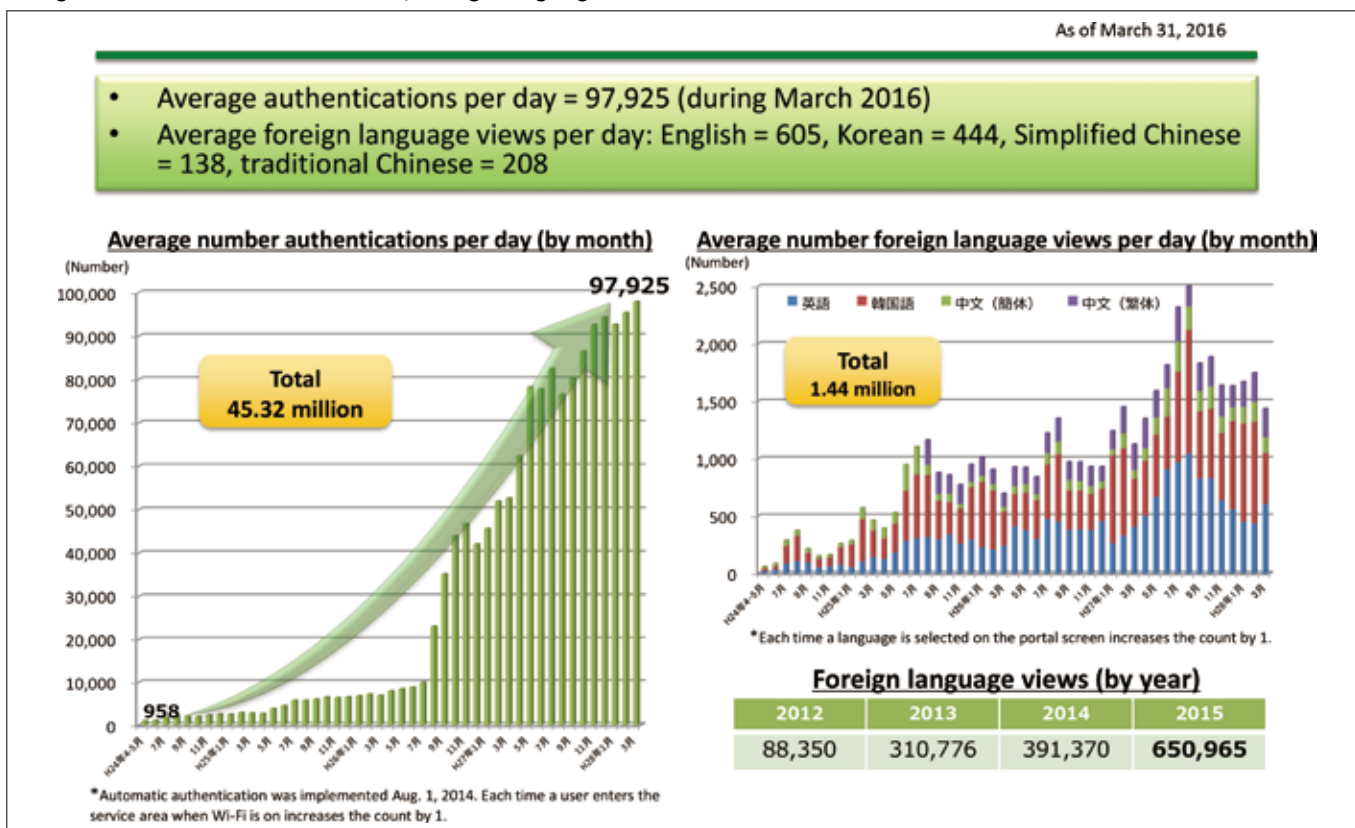
Average number of authentications	97,925 per day
Average number of users	22,410 per day
Number of foreign views	1,395 per day

(2) Economic Effects (Ministry of Internal Affairs and Communications trial assessment)

MIC *Study Group on Telework Leveraging Regional Potential and Wi-Fi Usage* [1] conducted a study from 2014 to 2015 to assess the impact of the Fukuoka City Wi-Fi Service on the city's economy. The study concluded that the amount of revenues expended by foreign visitors to Fukuoka over the three-year period from 2012 to 2014 increased by close to ¥124 million, for a cost-benefit ratio of around 1.4.

※1 Study Group on Telework Leveraging Regional Potential and Wi-Fi Usage (Ministry of Internal Affairs and Communications), third handout,
    http://www.soumu.go.jp/main_content/000354251.pdf

■ **Figure 5: Number authentications, foreign language views**

As of March 31, 2016

- Average authentications per day = 97,925 (during March 2016)
- Average foreign language views per day: English = 605, Korean = 444, Simplified Chinese = 138, traditional Chinese = 208

Average number authentications per day (by month)

Total 45.32 million

97,925

958

*Automatic authentication was implemented Aug. 1, 2014. Each time a user enters the service area when Wi-Fi is on increases the count by 1.

Average number foreign language views per day (by month)

英語 韓国語 中文（簡体） 中文（繁体）

Total 1.44 million

*Each time a language is selected on the portal screen increases the count by 1.

Foreign language views (by year)

2012	2013	2014	2015
88,350	310,776	391,370	650,965

(3) Fukuoka Tourist Statistics

In 2014 the number of visitors to Fukuoka revealed a year-on-year increase of 4.1%, with record breaking increases in the number of tourists for three years in a row.

For the first time ever, the number of foreign visitors arriving in Japan via the Port of Hakata and Fukuoka Airport topped 1 million in 2014, and reached a record-setting high of 2.08 million in 2015.

Moreover, the number of MICE [2] events held in Fukuoka has increased so that Fukuoka has only been second to Tokyo for the past six years running, and more cruise ships call at the Port of Hakata than at any other port in Japan.

2014	Number of visitors	18,550,000
2015	Number of foreigners entering Japan through Fukuoka Airport and the Port of Hakata	2,080,000
2014	Number of MICE events held in Fukuoka	336
2014	Number of cruise ships docking in Fukuoka	99

(4) Survey

To assess the effectiveness of the service, we included a user survey in the Wi-Fi service to evaluate and review the service while seeking to improve user satisfaction. The survey revealed that user satisfaction is around 82% (proportion of respondents stating that they were "satisfied" or "somewhat satisfied" with the service).

5 Future Development

Since the service was developed and deployed by the city of Fukuoka, the city is in a unique leadership position to undertake a range of proactive initiatives. Looking ahead, we will seek to establish a "more sustainable operating model" for the service, while leveraging the Stamp Rally and Pop-In Banner capabilities as advertising that would help ensure a steady revenue stream from the service. And in terms of leveraging ICT, new information transmission challenges lie ahead that involve incorporation of ICT technologies—digital signage, beacons, applications, and so on—with Wi-Fi, while making good use of city measures and building new business models by the private sector through analysis of Wi-Fi access data and other forms of big data.

We are also pursuing *integrated authentication* with Wi-Fi services provided by other telecom operators. Discussions are ongoing at the national level on how to simplify and unify usage activation procedures, but at the same time Fukuoka is pursuing discussions with other local governments and organizations while trying to achieve more convenient usability by implementing integrated authentication on the browser.

Fukuoka Website URL: http://www.city.fukuoka.lg.jp/wi-fi/index.html (Japanese site only)

※2 The term MICE is an acronym for Meeting, Incentive Travel, Convention, and Event/Exhibition events.