Open MaaS Platform that Supports Multimodal MaaS

Yoshihide Sato, Shinya Ooi, and Kuniaki Suseki

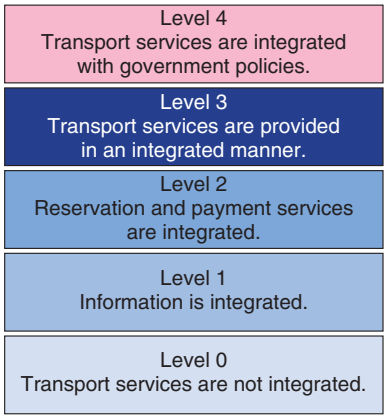
Abstract

The concept of integrating various transport systems is called mobility as a service (MaaS), and one early example started in Finland. This article describes a vision of a public transport-based MaaS platform and NTT's activities on the platform. Focusing on the mobility of people, the platform integrates several public transport systems and peripheral services to generate traffic flows that are locally and globally optimized end-to-end. The aim is to make a one-stop mobility service possible.

Keywords: MaaS platform, public transport, cloud-based certification

1. MaaS levels

There are four levels of mobility as a service (MaaS), as shown in **Fig. 1** [1]. At Level 0, there is no integration. At Level 1, information about transport systems is integrated so that users can access information across different transport services. Examples are train route search services that are widely used today. It is at Level 2 or above that booking and payment are integrated. At Level 2, users can book and pay for railway and bus services that are provided by different operators as if they were a single service. At Level 3, transport services provision (bundling/subscription, contracts, etc.) is integrated. It becomes possible to provide a service by which the user can select transport systems appropriate for the particular situation with the same ticket or a subscription service that allows the user to use different transport systems up to a certain amount per day or per month. Level 4 is the ultimate MaaS level at which transport services are integrated with the policies of municipalities and the national government to optimize mobility.



Source: Created based on a paper from Chalmers University of Technology

Fig. 1. Levels of MaaS.

2. World of MaaS in which public transport systems and various services are linked

As the level of MaaS goes up, mobility is made increasingly convenient for individuals. In achieving Level 4, it is important to look at mobility from a broader perspective and to pay attention to easing congestion and supporting movements of mobility-impaired people. For example, if the mobility demand in crowded urban areas can be leveled off temporally and spatially, congestion in transport systems and crowding at destinations can be reduced, leading to comfortable mobility experiences for individual travelers. For this purpose, it is important not only to integrate transport services but also to link mobility with various services that travelers will use at destinations.

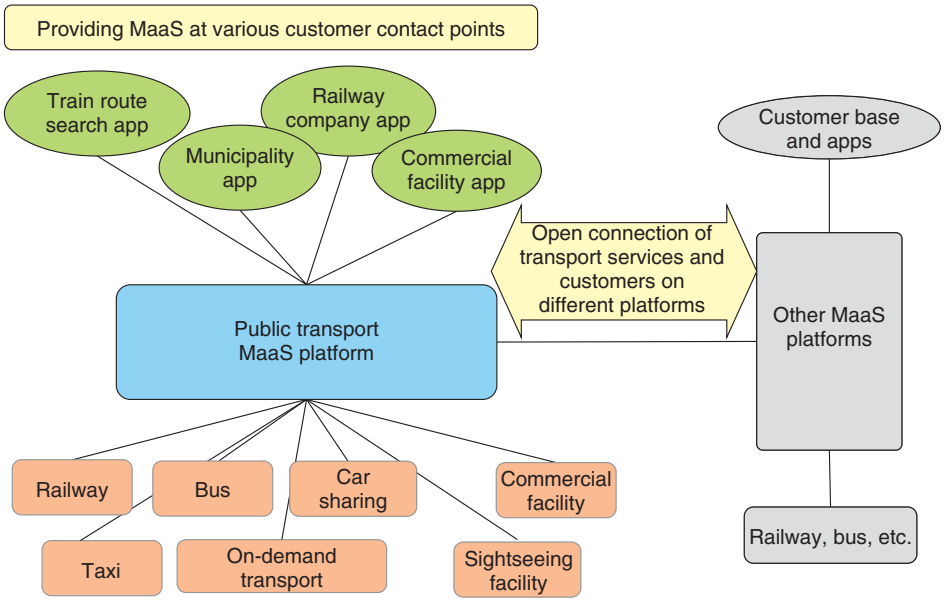


Fig. 2. World of MaaS in which transport and services are linked, and public transport MaaS platform.

For example, travelers may be encouraged to stay at their destinations longer for shopping or entertainment to level off transport demand.

The overall picture of the envisioned MaaS is shown in **Fig. 2**. By providing, at various customer contact points, public transport systems and services on the public transport MaaS platform, it is possible to increase opportunities to sell mobility and other services. If multiple MaaS platforms exist, they can be connected so that the user will not have to install several MaaS apps for different transport systems.

3. Cloud-based authentication using transport-service IC cards

An important function of a public transport MaaS platform is authentication of users. Assigning the authentication function to the platform makes it easy to integrate authentication services for existing public transport systems and services and enables flexible service design. NTT DATA is conducting a demonstration experiment of cloud-based authentication using transport-service integrated circuit (IC) cards (i.e. smart cards) in collaboration with East Japan Railway Company (JR East) and JR East Mechatronics.

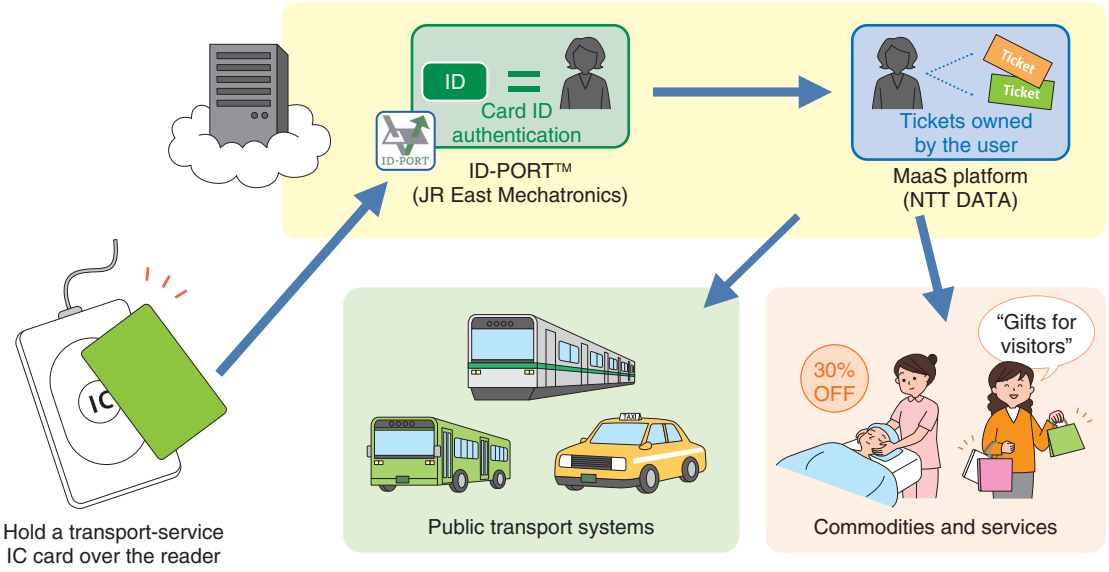
How cloud-based authentication using transport-service IC cards works is shown in **Fig. 3**. When the user holds a transport-service IC card, such as Suica®*, on a dedicated card reader, the user identifier (ID) is authenticated by the cloud. By referring to the user's ticket information that is linked to the user ID on the platform, it is possible to determine whether this user can use a particular public transport system or whether the user can receive a particular item, service, or discount.

To examine what value can be created with MaaS, we at Mobility Innovation Consortium [2] hosted by JR East conducted the following demonstration experiments using cloud-based authentications of transport-service IC cards in collaboration with transport system operators.

(1) Demonstration experiment of congestion reduction and excursion promotion in Yokohama City, Kanagawa Prefecture (November 2019)

To reduce congestion in the surrounding area after a sports event has finished, information that forecasts congestion on the routes from the event site to nearby transport systems was transmitted to participants. Temporal dispersion of transport system usage and spatial dispersion of passengers on transport systems and at stations were examined. Using flow-of-people data assimilation technology developed by NTT Service Evolution Laboratories, the system reproduced the flow of people on a simulator based on real-time local people-count data, historical data, and external

* Suica is a registered trademark of East Japan Railway Company.



* ID-PORT is a trademark for which JR East Mechatronics has lodged an application for registration.

Fig. 3. Cloud-based authentication using a transport-service IC card.

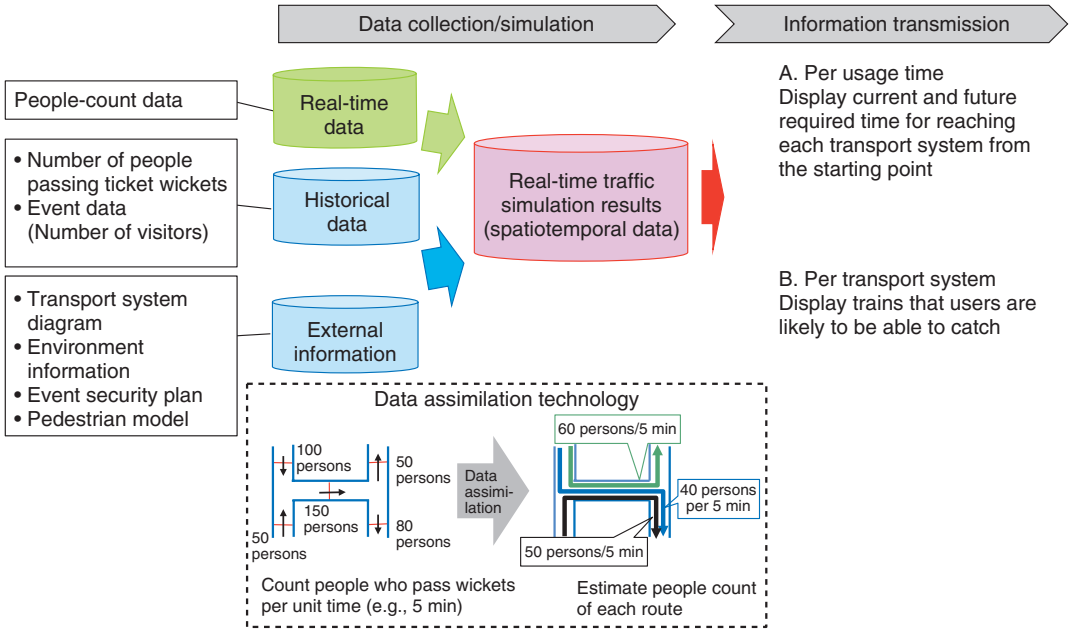


Fig. 4. Demonstration experiment of congestion reduction in Yokohama City.

information. The system generated information about the time required for people to reach transport systems at present and in the future and transmitted this congestion forecast information to participants (**Fig. 4**).

The transmitted information also included an attractive message inviting the participants to receive an incentive item and the privilege to ride on NTT DOCOMO's AI Bus [3] by choosing to take a train at the designated station using a dedicated transport-service IC card and to take a 10-minute ride to the

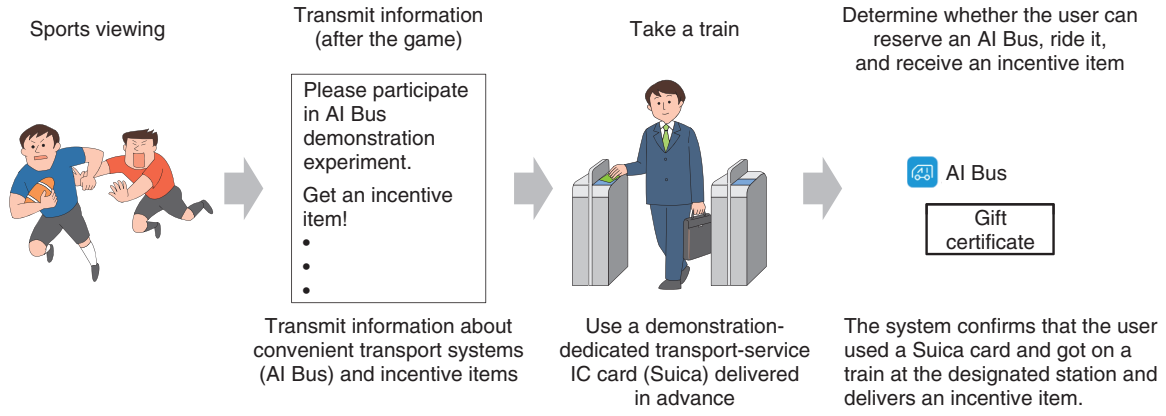


Fig. 5. Demonstration experiment of excursion promotion in Yokohama City.

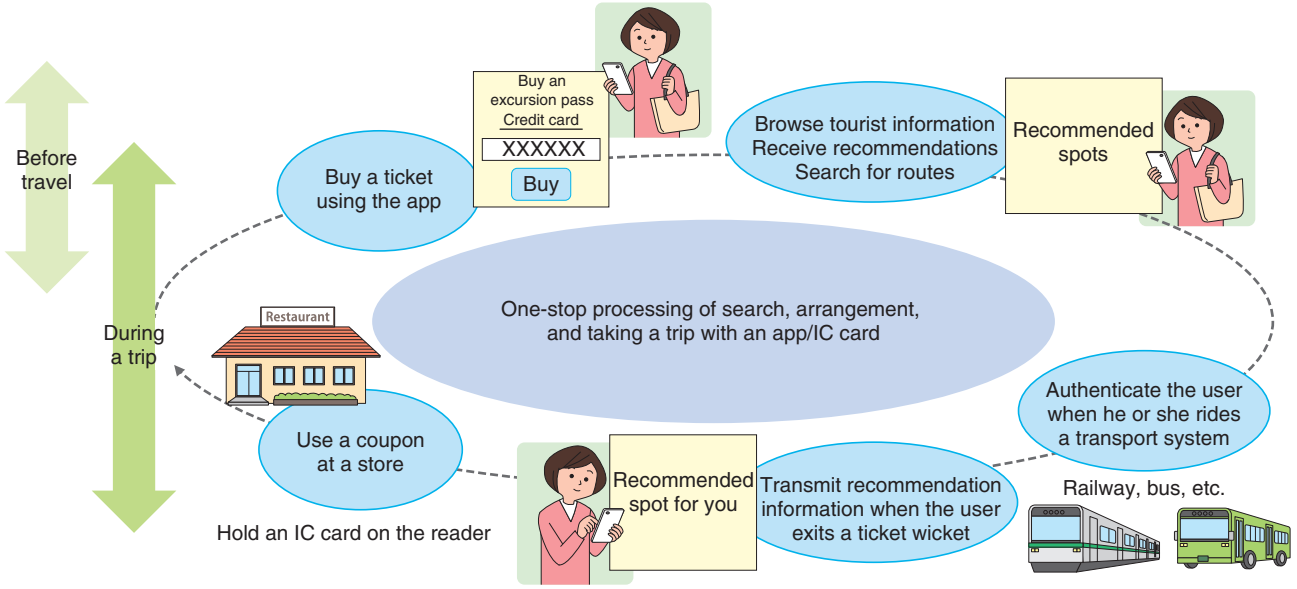


Fig. 6. Demonstration experiment of a multimodal sightseeing MaaS in Maebashi City.

Yokohama Rinkai area. This was an attempt to examine how providing incentive information can prompt participants to travel over a wider area or to different destinations (**Fig. 5**).

(2) Demonstration experiment of a multimodal sightseeing MaaS in Maebashi City, Gunma Prefecture (January 2020)

In this experiment, participants experienced the following service. A smartphone app was linked to the user's transport-service IC card in advance. With the app, a user can buy an integrated ticket that enables him or her to ride multiple public transport systems and receive discounts at stores. When a participant exited a ticket wicket, he or she received information about stores near the station and discount information, which were suggested by NTT COMWARE's LIKEUP™ [4] based on the user's attributes, location, and time. Therefore, seamless integration of mobility and consumption was examined (**Fig. 6**).

4. Future prospects of activities for non-urban areas

With a view to making a public transport MaaS

platform accessible throughout Japan, we are also directing our efforts towards solving traffic problems in non-urban areas. We established the Kasama City Smart City Consortium [5] in Kasama City, Ibaraki Prefecture to make it a smart city by resolving its traffic problems. Looking forward, we are seeking to link various provincial transport systems, such as on-demand transport systems and excursion buses, on a public transport MaaS platform so that transport systems that are convenient to both residents and tourists can be maintained and reinforced.

References

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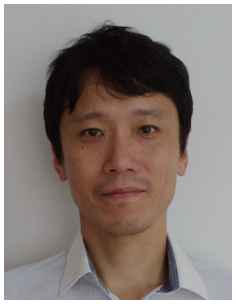

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