Strategic Innovation Promotion Program / Automated Driving for Universal Services

# Prototyping and testing of Dynamic Map Platform for study and consideration of issues and resolutions of Automated Driving for Universal Services

# Report (Summary)

March 2018

Dynamic Map Service Platform Consortium

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# Project summary

- Following items were considered and studied to realize the dynamic map service platform.

| Step | Content |
|---|---|
| ①Consideration of data linked to dynamic map | Considering data which has needs, based on last years project(Study and consideration to construct the “Dynamic Map Service Platform” ) |
| ②Consideration of concrete use method of dynamic map information | Planning a service model which is able to be proposed to concrete user, in each of 6 fields, and revealing data flow of each service model. |
| ③Demonstration of service models | Making prototypes of service models which is planed in step ②, and demonstrating business and architecture of each service model with collecting actual information. |
| ④Demonstration of service platform | Putting each data which is used in step ③ into the prototype of the dynamic map service platform, and considering the value of the dynamic map service platform by visualizing and cataloging the data. |

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# Selection list of information that link to dynamic map

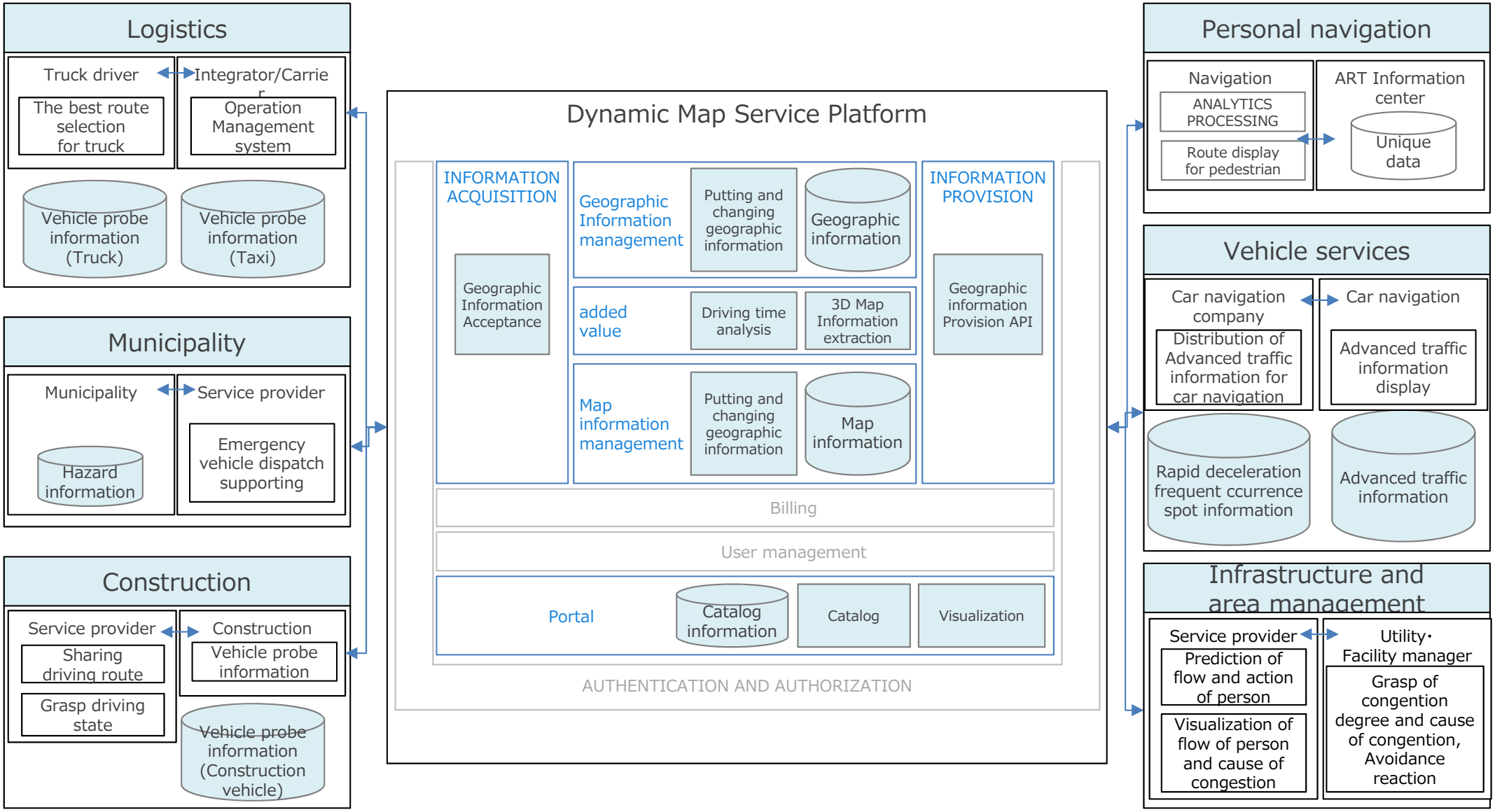
## ■ Following information was procured.

| Category | No. | Information | | Information Provider | Information Procurement Company |
|---|---|---|---|---|---|
| Quasi-dynamic information | 1 | Vehicle probe information（Truck） | | Carrier | FUJITSU |
| | 2 | Vehicle probe information（Taxi） | | Taxi company | FUJITSU |
| | 3 | Vehicle probe information（Bus） | | Bus company | NEC |
| | 4 | Vehicle probe information（Construction vehicle） | | Construction Company | OKI |
| | 5 | Tweet | | Twitter | NTT DATA |
| Quasi-static information | 6 | Advanced traffic information（Including road lane information） | | PIONEER | PIONEER |
| | 7 | Weather information（Halex Dream!） | | Halex | NTT data |
| | 8 | Mobile spatial statistics（Population distribution） | | DOCOMO InsightMarketing | NTT data |
| | 9 | Rapid deceleration frequent occurrence spot information | | PIONEER | OKI |
| Static Information | 10 | Facility Information (Public facility, Doorway, Designated evacuation shelter, etc) | | Ministry of Land, Infrastructure, Transport and Tourism | HITACHI |
| | 11 | Digital national land information (Waterlogged area, etc) | | | NEC |
| | 12 | Road information where there is a risk of flooding | | Local governments | FUJITSU |
| | 13 | 2D Map | | Zenrin | FUJITSU |
| | 14 | 2D Map（Including points information where accidents occur frequently） | | Increment P | PIONEER |
| | 15 | 3D Map | Road width information | SIP *1 | FUJITSU |
| | 16 | | Pedestrians crossing information | | FUJITSU |
| | 17 | | Road lane information | | PIONEER |
| | 18 | 3D Map | | | FUJITSU |

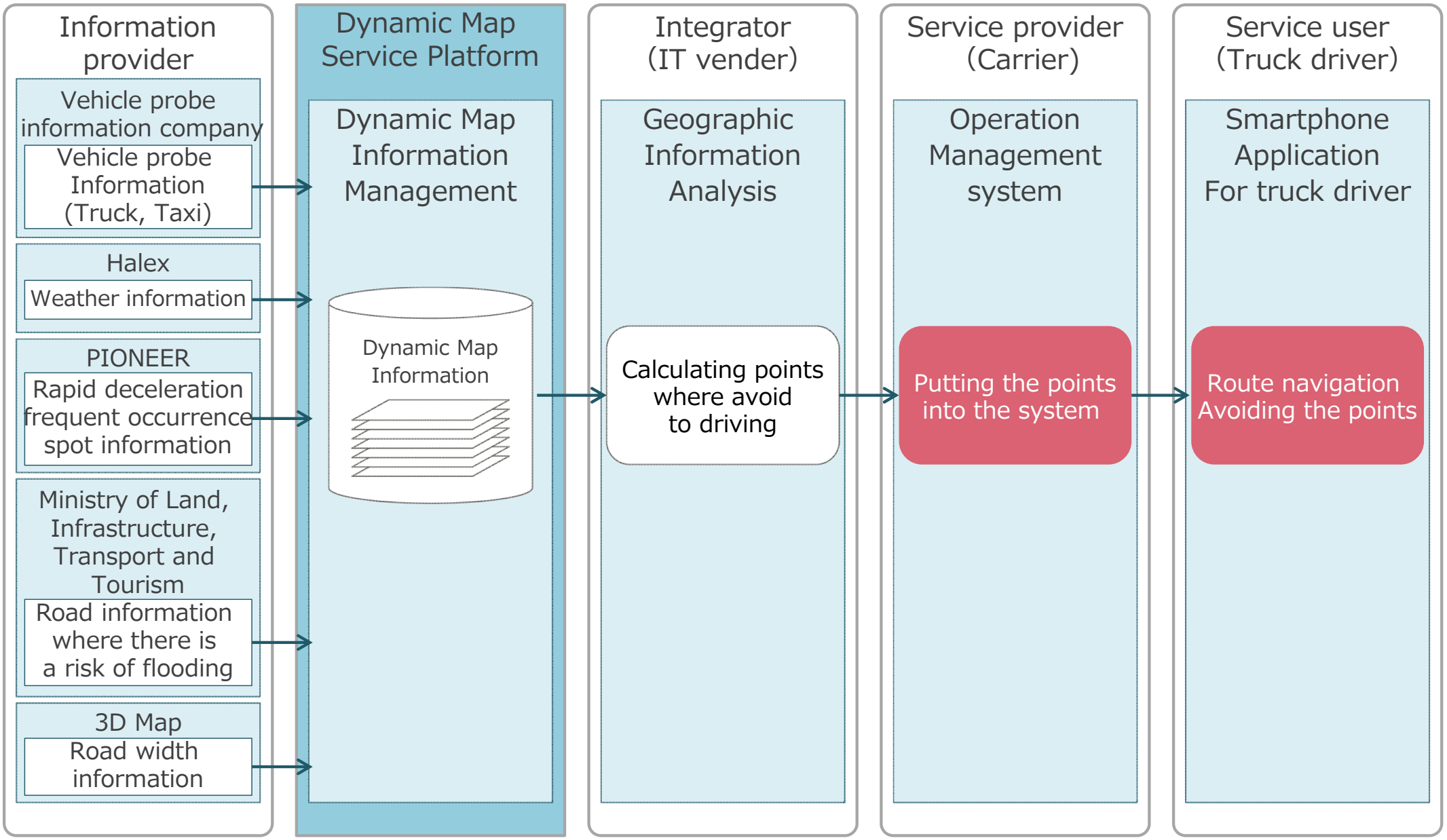
*1 : The data that the Dynamic Map Consortium made in FY2016 was used.

# Association chart of Dynamic Map Service Platform Prototype

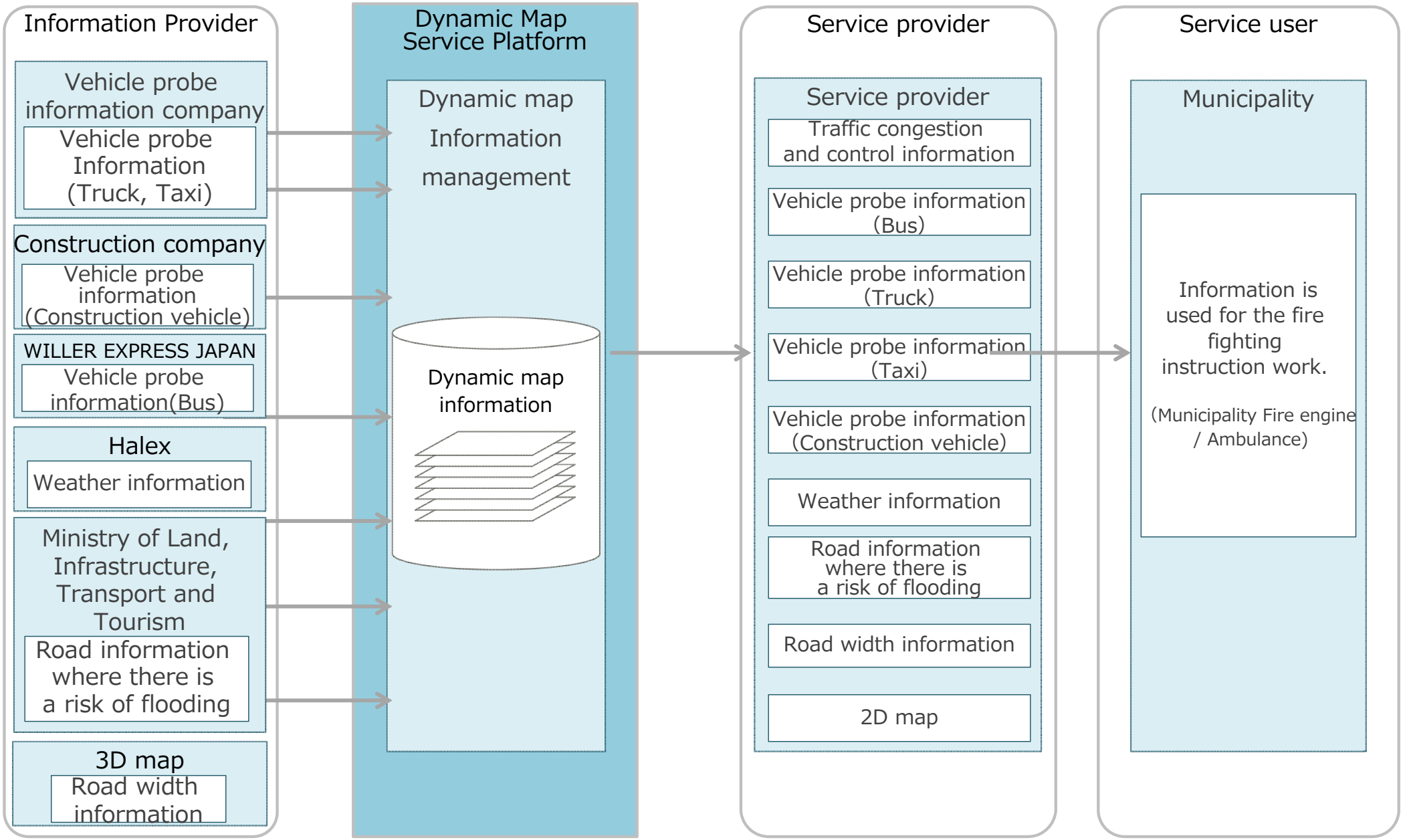
■ The prototype was made and proven as shown in the figure below.



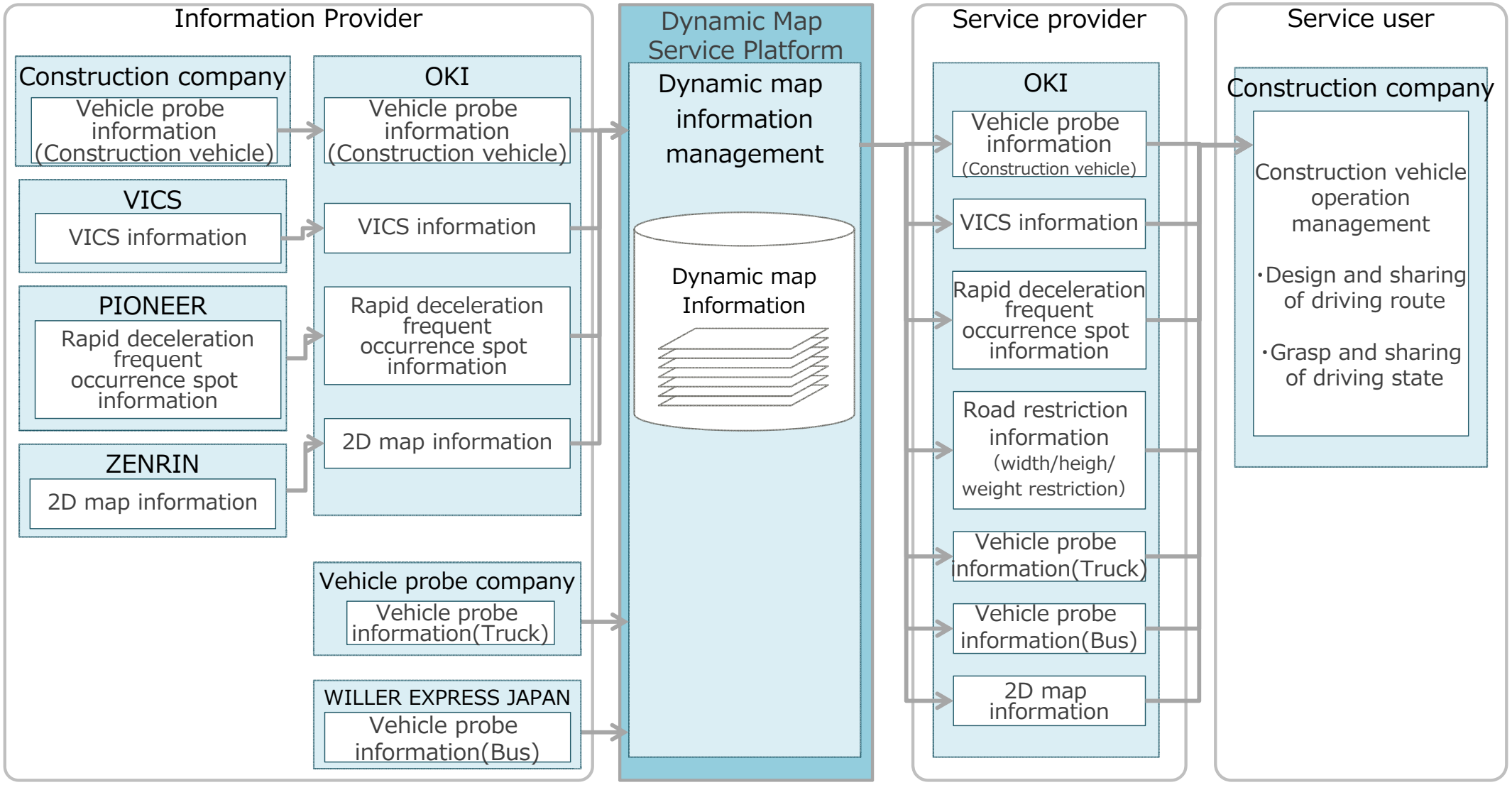
# Diagram of demonstration environment of service model (logistics)



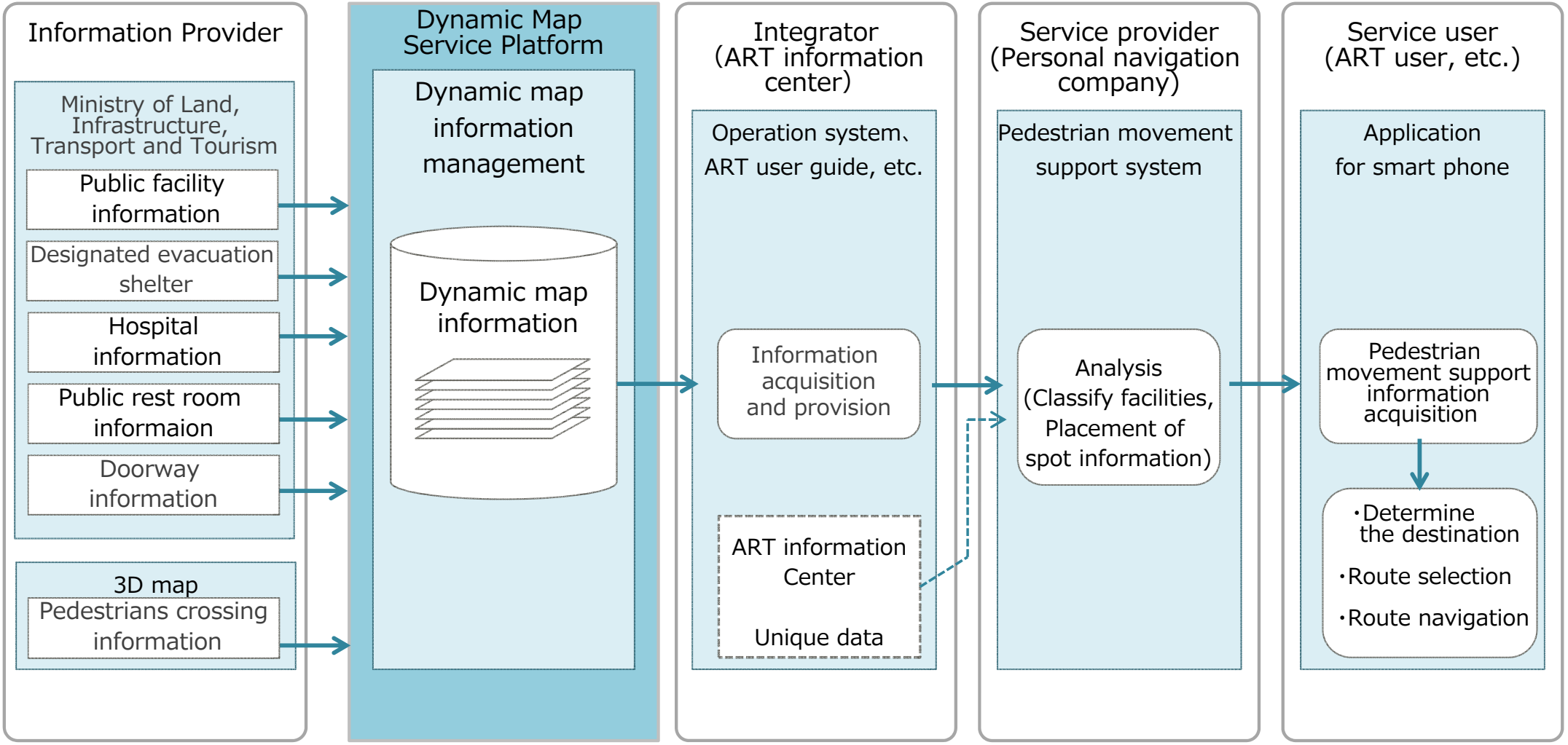
# Diagram of demonstration environment of service model (Municipality)



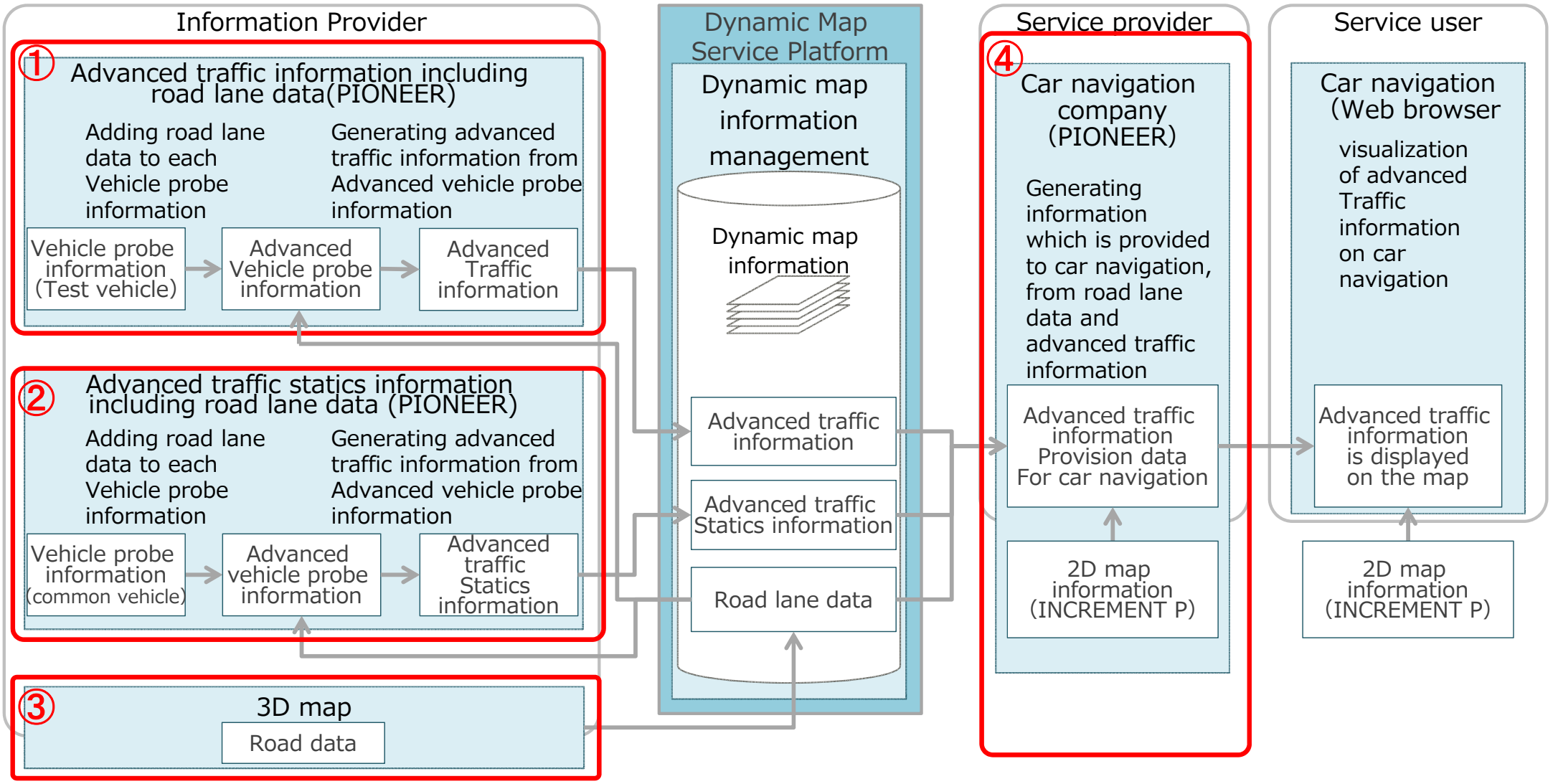
# Diagram of demonstration environment of service model (Construction)



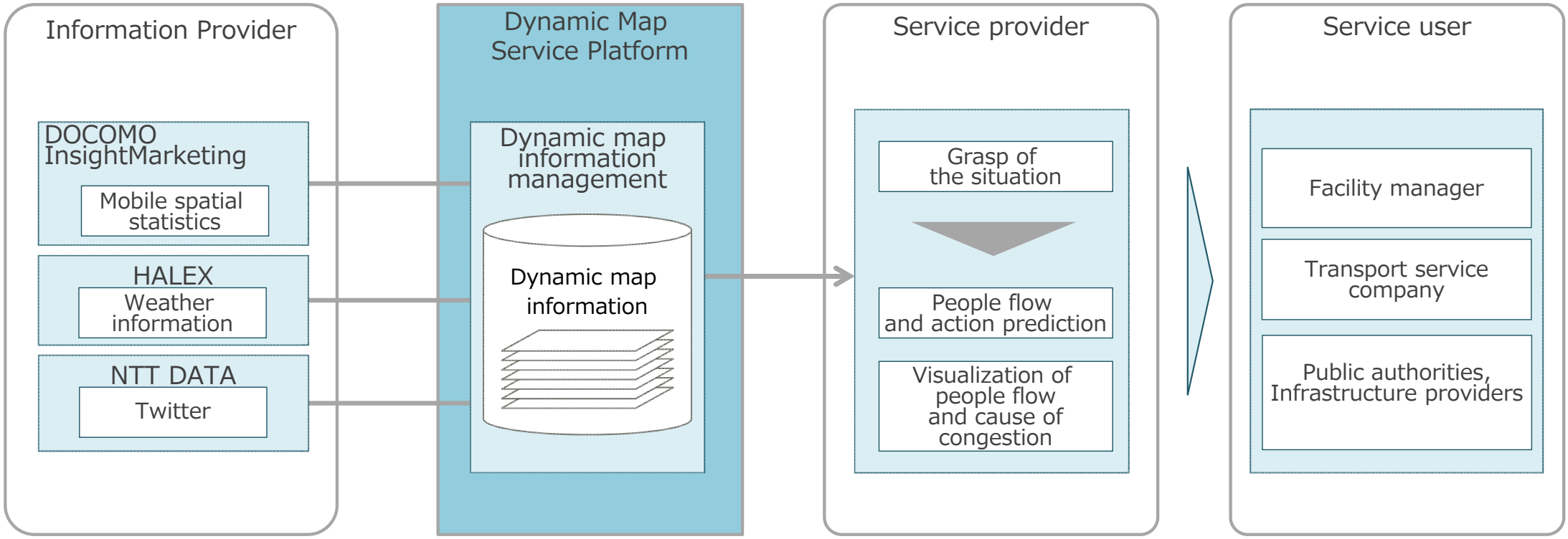
# Diagram of demonstration environment of service model (Personal navigation)



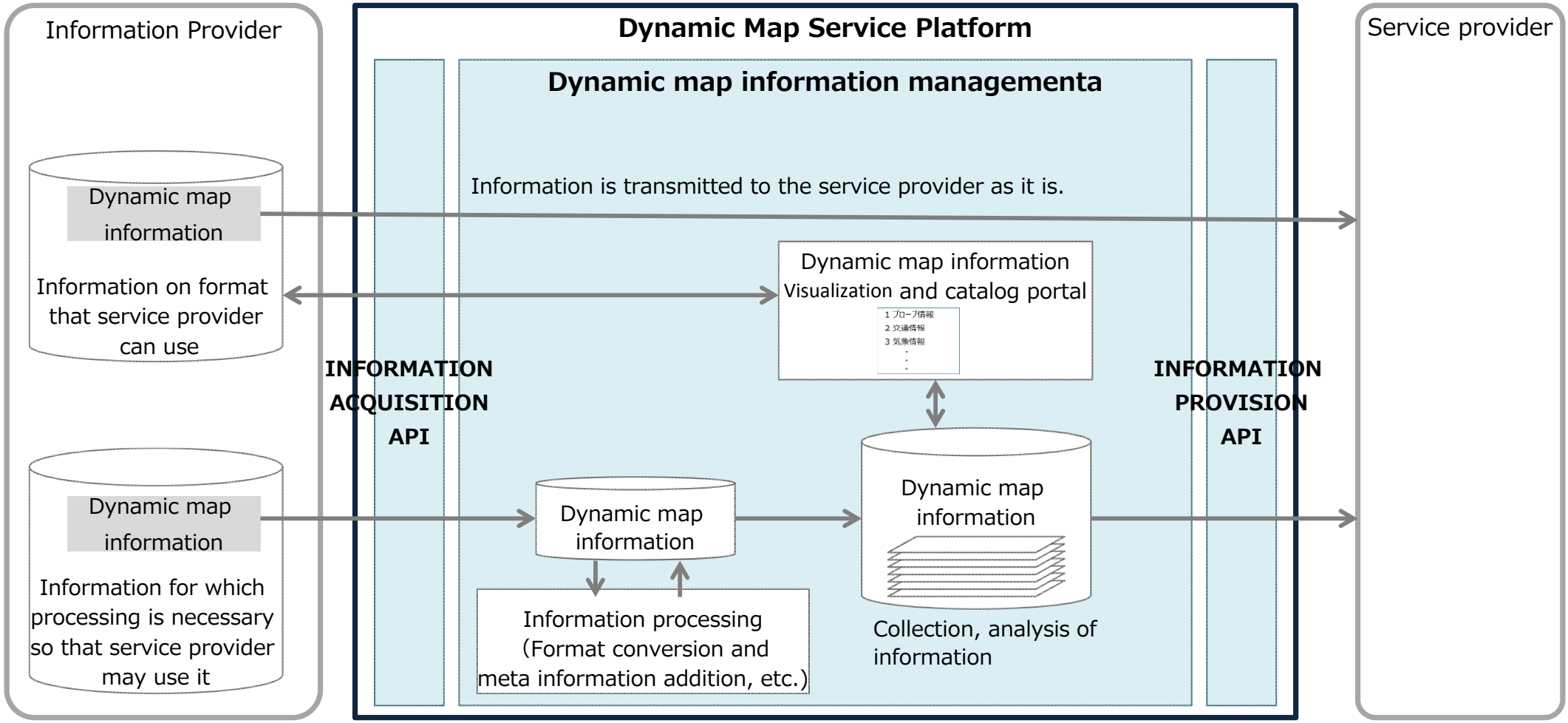
# Diagram of demonstration environment of service model (Vehicle)



# Diagram of demonstration environment of service model (Infrastructure and area management)

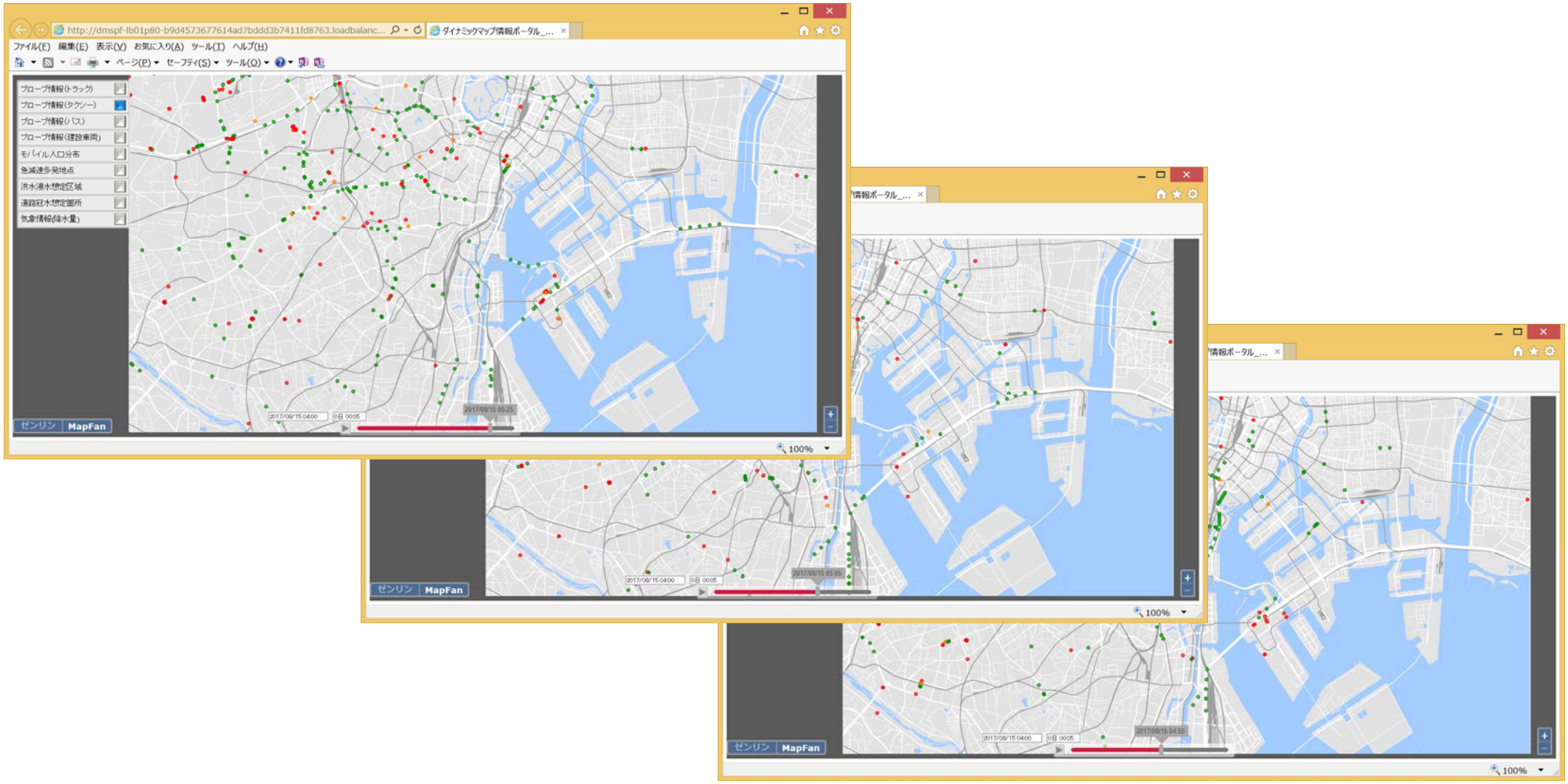


# Diagram of demonstration environment of service model (Dynamic map information portal site)



# Dynamic map data visualization portal site

- Visualization of information change over time as shown below




Visualization of time passage of Vehicle probe information (taxi)

# Effectiveness of Dynamic map service platform

| | |
|---|---|
| Effectiveness of dynamic map information | It was confirmed to be able to use dynamic map information which was collected in various fields and combined across various fields.<br>Especially, it was revealed that vehicle probe information was effective as follows.<br>・As the amount of vehicle probe information increases, the accuracy of the traffic density estimation improves.<br>・Multiple large vehicle probe information is useful to judge whether or not a road can be passed. |
| Effectiveness of common interface | It was clarified that developing a common interface was able to reduce development man-hours more than the interface was individually developed.<br>(6 interfaces of 3 service models were reduced) |
| Effectiveness of 3D map | The effectiveness of the information of road lane, road width and pedestrians crossing extracted from the 3D map was able to be confirmed.<br>• Road width information has needs from multiple fields. When the maintenance of the map of a general road advances, it becomes more effective.<br>• It was confirmed that the geographic information such as road lane, pedestrians crossing, signal for pedestrians, pavement and difference is effective if it was extracted from 3D map as easy for use. |
| Effectiveness of prototype function | • It was confirmed that meta data which is listed in the catalog portal can combine seeds and needs of dynamic map information.<br>• Visualizing dynamic map information was useful for the intuitive understanding of granularity, provision area, update frequency of dynamic map information.<br>• It was confirmed that dynamic map information could be used on multiple 2D map. |

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# Project result

- We made prototype of 6 service models and dynamic map service platform, and hold hearing with companies which was assumed as user of the 6 service models.
- We substantiated the effectiveness of the 6 service models and the effectiveness of the service platform through the above approaches.

**【Project result】**

It was confirmed to be able to use dynamic map information which was collected in various fields and combined across various fields.
Especially, Vehicle probe information is indispensable to achievement of services.
The information which combines multiple kinds of vehicle probe information and real time traffic flow information based on vehicle probe information is needed for many services.
And it was also confirmed that the field where 3D map was used extends by taking out the feature from 3D map and offering it to service provider.

In this program, we made prototypes of 6 services and demonstrated to confirm whether the 6 services could offer assumed value to service users.
As a result, it was confirmed that each service model had marketability.
And after the we could deepen our knowledge of how to use dynamic map information and needs of dynamic map information as a result of hearing with companies.

It was proven to be able to support understanding the followings to provide catalog and visualization function.
- What each dynamic map information is
- What value is generated by combining dynamic map information

And it was also proven to connect to each service model system with making prototypes of information acquisition and provision function and geographic information management function which were needed to distribute dynamic map information.
It was confirmed to handle different dynamic map information with common interface, and requests about additional function of interface was extracted to from service providers.
Result of that, it was deepen to study of the interface.

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# Tasks for the future

- Following considerations are needed.

| | |
|---|---|
| Providing real time information | System to provide dynamic map information in real time |
| Utilization of social information | System to get municipality public information |
| Providing of added value | Architecture to get and provide added value information such as images which are useful to visually grasp the traffic flow. |