

# **SYSTEM ARCHITECTURE**

## **FOR TRAFFIC MANAGEMENT IN JAPAN**

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### **SUMMARY**

We at the Universal Traffic Management Society of Japan (UTMS Japan) are constructing a system architecture for traffic management in Japan, an outline of which was reported in the 6th World Congress on ITS last year(1). This paper is a continuation to the said report in which we defined "services" associated with traffic management in Japan. Based on the defined services, we are contemplating the construction of both logical and physical architectures. We believe that the services we defined will become an important aid in having a common understanding among those who are related to traffic management as well as in executing traffic management. For this end, we would like to introduce our concept of "services" to people far and wide in the world.

### **INTRODUCTION**

Over the past three decades and odd years, traffic management systems (TMS) in Japan had been constructed in conformance with nationally unified policies and standards under the leadership of the National Police Agency (NPA), the general manager of traffic administrators in Japan. However, along with the progress of Intelligent Transport Systems (ITS), services to be provided by TMS had increased on an enormously large scale and thus a need had arisen in Japan as well to clarify the architecture of TMS as a whole. So, the Universal Traffic Management Society of Japan (UTMS Japan) responsible for the research and development of Universal

Traffic Management Systems or UTMS for short, which are, in essence, ITS being promoted by the NPA, decided on the construction of the UTMS system architecture(1) to describe the structure of the UTMS systematically so that it can serve as a guide to the future development of UTMS in Japan. We detailed the contents of the UTMS system architecture by adding items related to traffic management, while ensuring conformity with the system architecture for ITS in Japan(2)(3). As reported in our paper(1) in the 6th World Congress on ITS, our TMS are systems corresponding to "human beings." Therefore, we are also looking into the UTMS system architecture having an eye to human beings (such as drivers, pedestrians, traffic administrators, etc.).

### **DEFINITION OF SERVICES**

Before setting our hands to the construction of the UTMS system architecture, we listed services related to traffic management in Japan as many as we could think of and categorized them into intended fields. As a result, we came up with 14 major classifications called Objective Fields, 36 intermediate classifications called Services, and 187 minor classifications called Subservices. The 14 objective fields and a list of 36 services (hereafter referred to as the Services List) are as introduced in Table 1 below.

*Table 1 Objective fields and services list*

Objective Field	Service	No. of subservices
1. Providing traveler information		-
	1. Providing traffic information to drivers while traveling	11
	2. Providing traffic information to travelers before their start of traveling	7
	3. Providing general travel information to travelers	8
2. Providing route guidance		-
	4. Route guidance	5

*Table 1 Objective fields and services list (contd)*

Objective Field	Service	No. of subservices
3. Managing traffic flow		-
	5. Optimizing traffic flow by traffic control	4
	6. Effecting traffic control at intersections and crossings	8
	7. Effecting traffic control specific to lanes	7
	8. Effecting traffic control suitable for specific areas/zones	2
	9. Effecting traffic control for special-purpose vehicles	5
	10. Monitoring traffic status	3
4. Assisting safe driving		-
	11. Providing information on driving and road conditions at hazardous locations	9
	12. Providing information on driving and road conditions on ordinary roads	5
	13. Providing information on lateral driving and road conditions on ordinary roads	3
	14. Providing traveling information in high-speed traveling environment	3
	15. Assisting drivers	1
5. Assisting pedestrians		-
	16. Providing walking environment information to pedestrians	6
	17. Effecting traffic control specific to pedestrians	3
6. Taking actions specific to public mass-transit vehicles		-
	18. Initiating priority control for public mass-transit vehicles	2
	19. Providing information to the managers and patrons of mass-transit vehicles	7
	20. Providing public transportation information to travelers	4
7. Preserving environment		-
	21. Environmental preservation	4
8. Taking actions specific to commercial vehicle operations		-
	22. Assisting commercial vehicle operations	6
9. Managing traffic demands		-
	23. (This service is under study.)	1

*Table 1 Objective fields and services list (contd)*

Objective Field	Service	No. of subservices
10. Taking actions specific to emergency situations		-
	24. Prompting actions specific to incidents	5
	25. Initiating priority control for emergency vehicles	2
	26. Assisting first-aid and relief activities	7
11. Taking actions specific to crossings		-
	27. Providing information related to railroad crossings	2
	28. Effecting crossing signal control	2
12. Assisting police activities		-
	29. Maintaining traffic order	6
	30. Educating drivers on traffic rules and regulations	2
	31. Assisting police activities	5
13. Assisting traffic management planning and operations		-
	32. Planning efficient traffic management	10
	33. Providing or exchanging traffic information to or with other agencies	3
14. Providing services associated with traffic management		-
	34. Effecting settlement of accounts electronically for toll payment	3
	35. Assisting hotel reservations and check-in control	3
	36. Others	1

### **UTILIZATION OF SERVICES LIST**

Needless to say, constructing the system architecture is important, but we think the services list itself is an important item. For this reason, we have been spending much time in defining each service. We believe that the services list will become a great aid to traffic administrators (i.e., prefectural police HQ) throughout Japan in their common understanding of traffic management. Not only it provides important hints or suggestions to them in their execution of traffic management, but also it is of use to the general public in their understanding of traffic management. Furthermore, the list may even be helpful as a reference to traffic administrators in countries other than

Japan, although it contains many portions dependent on situations unique to Japan. For this end, we intend to explain this services list to all the traffic administrators in Japan, as well as to introduce it to people far and wide by means such as the Internet[4] (Figure 1). If there is any service not available in the existing UTMS, we intend to start the research and development of the service.

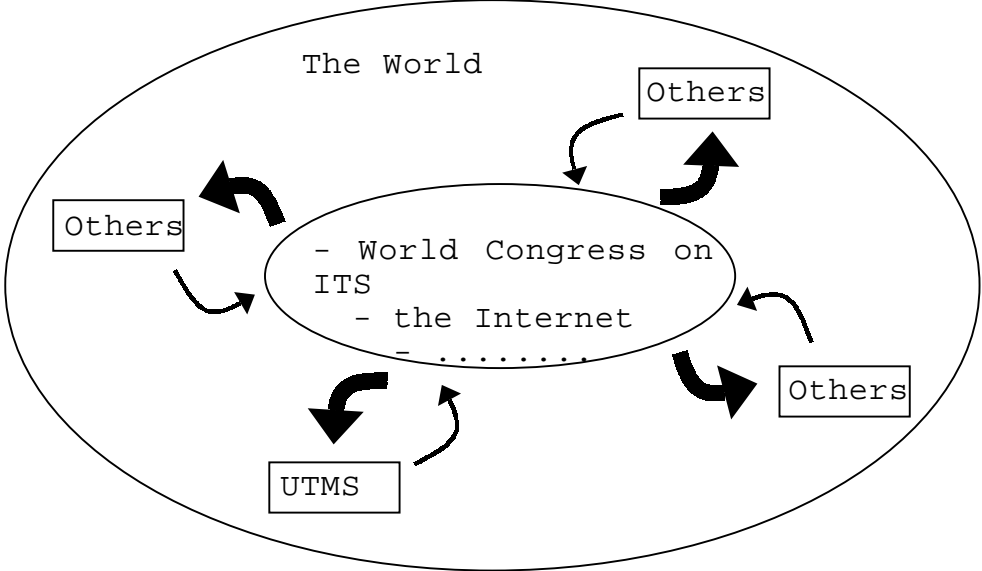


Figure 1 Reuse of Knowledge

**OUR FUTURE PLAN**

Within one year ahead, we intend to complete the construction of the logical architecture for the UTMS. Subsequently, we will look into the physical architecture. Also, we will continuously review both the services list and the UTMS system architecture.

**CONCLUSION**

The UTMS system architecture is a system architecture for traffic management in Japan. It explains the structure of the UTMS systematically and provides a guide to our research and development of UTMS. It is likely that the system architecture can become an aid to traffic administrators not only in Japan but also in other countries. We look forward to that it can be of use even a little in improving traffic management throughout the world.

## REFERENCES

- (1) Mizuo Mochizuki, et.al.: "UTMS System Architecture," 6th World Congress on ITS, 1999.
- (2) VERTIS: "System Architecture for ITS in Japan," <http://www.ijnet.or.jp/VERTIS/>, 1999.
- (3) Koutaro Kato, et. al.: "SYSTEM ARCHITECTURE DEVELOPMENT METHOD," 6th World Congress on ITS, 1999.
- (4) UTMS Japan Web Site: "<http://www.utms.or.jp/>"