Open Protocols and Open Platforms & OTUs

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Abstract

Although the UK traffic industry has standards and specifications that allow interoperability of disparate items of traffic control and ITS equipment there is still a lack of open systems. This paper looks at a new platform that was originally developed for a local authority and is designed to allow user defined solutions to be implemented. It considers the processes, benefits and issues that go with such an approach to traffic tactics.

Introduction

This paper reviews the case for the implementation and deployment of an open platform for the development by the user community of custom solutions for site or area specific problems in managing their network.

What does this mean? The following sections will present some of the background to open systems in the traffic control and network management field, it will look at some instances where flexible solutions have or may be deployed and will also address some of the issues and relate these to other communities using open solutions.

Open Solutions In Traffic Control

Opening up traffic control and network management is not a new idea. One distinct whole purpose of HA specifications is to ensure interoperability between equipment components through openly accessible common specifications for performance and for interfacing. Although most of these specifications do not go deeply into the communications and data formats to be shared they do establish the precedent that interoperability leads to good value solutions. (The short comings of interoperability are discussed later).

In the 1990s the then DETR now DfT co-ordinated and funded the UTMC programme to achieve interoperability between what had previously been the ‘silo’ solutions of ITS, ensuring that data from the multiple sources on the network could be gathered together in one common database for the general benefit of all the systems and users that needed network data to inform or expedite traffic movement. The resulting UTMC specifications are well known in the UK and widely adopted by many equipment and solution suppliers, and equally widely used by many authorities. UTMC was a good move as for many suppliers it required relatively minor work to implement data conversion at their interface to the next system, and not major upheavals in products. Some new products were brought to the market fully in the ethos of UTMC, but sadly the UTMC ideal did not reach all parts on the traffic management and control legacy systems.

In particular the tendrils furthest from the common database which were, to some extend still covered by HA specs did not get included, hence the communication with vehicle and pedestrian

detection in traffic controllers remained outside of UTMC. Similarly the relatively well defined field of UTC only got picked up in the UTMC process rather later than other areas under the DfTs numbered project UG405, which subsequently became the label by which UTMC compliant UTC communications is now known.

Because UTMC only required that the boundaries between existing systems were modified the underlying business models for the products and services that these systems delivered did not change as much as might have been expected. The platforms and algorithms/solutions being offered were set to one side while the protocols were implemented and as a result we are now using very well proven but arguably slightly dated solutions joined together with modern glue.

Rather like the Ford Escort that saw a new drive line, a new engine and then a new body and butterfly-like became the Ford Focus, perhaps now it is time to look at the platforms and solutions.

Platforms & Potential Applications

As reported elsewhere within the Symposium, Southampton City Council under the guiding influence of Mr Martin Wylie have implemented bus priority and compensation using the RTEM single loop classifier and the local intelligence unit (LIU) from ITSPE at a number of key sites on arterial bus routes in the City to not only optimise bus movement but also to minimise the disruption to other traffic that results from this prioritisation. The compensation is implemented by calling of dummy phases configured into each stage to extend green times.

It is this LIU in particular that is being discussed here. Any item of equipment that has its own processing and data storage, can influence the controller and has external communications capability is a potential out station. The LIU is such a platform.

Following proving of the hardware in the Southampton trials a UG405 OTU solution has been developed for the LIU. telent are bringing this solution to the market as the Optima UG405 OTU.

Given the limits to LA funding then any deployment of equipment has to address at least one of the prevailing policy or market constraints and show a real benefit over life. With the withdrawal of BT's analogue circuits, users who operate UTC systems need to be considering their options. At the very least they will need to implement digital communications giving them IP connectivity to the controller. They will need to look at the version of UTC software they are using to ensure that it is compatible with digital communications (also giving thought to which other services could operate over the same communications structure, and they will also need to look at their OTU stock and address replacement of old analogue OTUs. Only if all these steps are taken will their UTC system survive the withdrawal of analogue communications. The Optima UG405 OTU addresses the last of these points. It has been tested on all three of the SCOOT providers' systems.

Looking beyond this immediate and pressing need, innate to this intelligent out station is the capability for the equipment to be used in other capacities.

The range of applications can be divided into:-

- Those running solely locally, e.g. the bus priority & compensation of SCC. Many of the successful Better Bus Area bids identify improved bus priority as an objective.
- Those that employ the local processing and communications:- UG405 OTU
- Those that use the local storage and processing, for example local data logging as used in Swindon to verify their speed responsive red signal system.
- And those employing the communications options, remote data logging.

The recent HA task 026 tender for a solution to replace MIDAS with something easier to deploy. To cover both sides of a motorway above ground detectors can be connected to an LIU which runs a congestion detection algorithm to meet the Agency's requirements and reports the onset and end of such congestion alerts over the LIU's communication link to a server/hosted solution which provides a feed into a control room system. What has the HA got to do with LA interests? The congestion monitor described does not just have to reside by the motorway. Every signal controlled junction or pedestrian crossing supports detection. The detection events can be directed to the platform and used to derive measured of network performance.

Another example is the provision of an LIU to Amey in Bedfordshire to provide data logging for their trials of the Radix magnetometer at their Great Barford site. In this case the LIU monitors the outputs of the magnetometers at the point that they connect to the controller and store daily logs of detection event on an event by event basis for subsequent analysis. However data logging goes beyond trials to providing support to the surveying process carried out, often manually, by local authorities. The platform can be used to supplement the existing network.

How To Implement these Solutions

In the same way that there are a number of skilled practitioners who can perform configuration of signalised sites, telent and, in the interests of open systems, others can provide the expertise to implement scripts or dedicated applications that will run on the platform.

Looking ahead, it is possible to foresee issues arising around running multiple scripts or applications, and in the same way that controllers support different modes in a priority table, the platform will allow users to allocate a priority to any application wanting to run. Similarly the use of IO will be managed during platform configuration to ensure no conflicting demands are placed on outputs in particular.

Benefits And Areas Of Concern

Taking areas of concern first, one that immediately arises is the allocation (or division) of responsibility – where different systems are brought together and the interface does not work as expected then the responsibility for fixing the problem may get smeared between the parties. However this is probably a small price to pay, and whereas, as a smaller user of a single suppliers products you may not get their undivided interest, in an open arena it is likely that your problem has already been addressed elsewhere, and in the face of open systems it is beholden on the suppliers to

show they are as open as the next supplier. In this case as in most cases interfaces specified by the HA remove many of these problems.

Other areas where processes will need to be deployed are in the configuration of the platform IO to ensure that outputs in particular are not being asked to do different tasks at the same time. A combination of intelligent configuration tools and prioritisation of applications will inform users where they are making disparate demands on outputs.

Much as they do now for controller configurations, users may either design and implement solutions themselves or use external expertise to deliver solutions. In either case, the application and configuration management processes are already in place. Users already record, store and track controller configs and only need to extend these to cover the solutions being run on the platform.

The benefits have already been alluded to and arise primarily from the availability of a flexible platform that can deliver diverse solutions to help address user's problems. Beyond this there is scope to develop a register of solutions and experience across a community of users and developers, and, for example, the recent Better Bus Area applications show how many Authorities want to optimise junction performance for bus movement.

Summary

An intelligent hardware platform originally developed for bus priority and compensation has had different applications written to run on it. Among these are the telent UG405 OTU function that has run on the main UTC in stations, a data logger used in equipment trials, a red runner monitor and a data gathering and reporting system. The platform has IP connectivity and standard interfaces for connection to traffic control and similar equipment.