

The evolution of a smart city

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Making cities work is essential for the future, and means making the transport infrastructure work. Most journeys begin and end in cities. In many urban areas, however, increasing demand for urban mobility has created a situation that is not sustainable: severe congestion, traffic accidents, poor air quality, noise emissions and high levels of CO₂ emissions. Urban problems put at risk political goals for a safe, efficient and sustainable transport system.

Fixing the problems of urban growth has become a political and tactical imperative around the world, and significant research has gone into this area the last few years. Smart cities now focus on Urban Intelligent Transport Systems (ITS), which is how ITS can help alleviate current problems, and show the path towards a safe, efficient and sustainable future for our cities.

The Urban ITS smart city concept works by integrating transport systems and data from all sources to increase transport related safety, reduce pollution, decrease congestion, and improve overall quality of life. While smart city initiatives have started to spring up across the globe, many urban areas are uncertain of where to begin their smart city experience. They might try looking at their existing ITS and Advanced Traffic Management Systems (ATMS) for inspiration.

In the past several decades, transport sectors such as parking, tolling, inter-urban/urban traffic management and public transport have been segregated into divisions, with minimal interaction. In addition, political jurisdictions have typically procured transport systems in isolation with little regard for interoperability or the value of an integrated approach to transport monitoring and control. The result has been an expansion of

dissimilar transport systems that provide little in the way of common operational and informational environments.

With the shared goal of managing traffic flow to reduce congestion, the tolling/congestion charging, parking guidance and traffic management sectors are now merging functionalities into one platform to utilise their wide variety of data which is more timely, accurate, and detailed. Public transport in its various forms is yet another major area that is now starting to integrate with other sectors. The significant data-processing capability—big data in some form or another—is a prerequisite for the emerging urban ITS concept.

In recent years, these sectors and jurisdictions have finally begun to move toward a more seamless operational environment and information exchanges. These once self-governing and self-interested transport market sectors are now finding they have a common shared goal of efficiently

managing traffic flow and reducing traffic congestion, while minimising costs and maximising revenues.

Breaking down the walls between transport sectors is essential to realising a significantly higher level of service and quality of life for city inhabitants. The development and adherence to industry standards will play a central role in this effort and will require the full participation of many industry leaders.

Q-Free has been playing a leading role in standardisation of architectures, communication, and urban ITS, on the global level for over 20 years. These standards will save time, investment and operational costs for the public sector authorities by providing benefits such as open and fully defined data access for all modes under one portal, reducing vendor lock-in, improved transport logistics and access to accurate and timely data on a full city/regional level.

As developments in consumer electronics have put smartphones



In Northern Virginia, Fairfax, the Virginia Department of Transportation operations centre is a US\$125 million facility, manned by dispatchers with VDOT, the state police, Fairfax fire and rescue, and the Fairfax police



Q-Free has recently been awarded a contract to implement and maintain a new Statewide Advanced Transportation Management System for the Virginia Department of Transportation (VDOT) in the US

into the hands of virtually everyone, information exchanges will increasingly involve not only automobiles and trains, but cyclists and pedestrians as well. Large information exchanges based on MAC addresses from Bluetooth- and WiFi-enabled smartphones are now common at major events such as the Olympics. As more day-to-day mobility applications (like mobility as a service or mobility on demand) become widespread, individuals can share their travel plans more clearly and help network operators to predict and manage demand across the different transport modes.

The importance of mobility within the smart city cannot be understated. It is estimated that logistics-related exchanges will account for up to a third of the Internet of Things, and the ITS sector already utilises a diverse range of sensor technologies, some of which have application outside 'traditional' traffic management. Q-Free, for example, has within its portfolio several sensors

that measure the number of cyclists, pedestrians; presence, weight, direction and speed of vehicles, weather, and air quality etc. Although developed in the first instance for specific ITS services, these sensors have clear application in providing information for the smart city.

Modern ITS/ATMS are designed to bring efficiencies to the transport networks by reducing congestion and pollution while increasing travel time reliability and safety. ITS/ATMS systems bring well-developed communication networks as well as frameworks for multi-jurisdictional data sharing and dissemination. Leveraging these assets as a starter kit for a smart city environment could be a first step toward improving the overall quality of life in the city. ITS/ATMS systems such as Q-Free's OpenTMS, already provide the essential functional element of a smart city.

Coupling a modern ATMS with a robust and open data fusion portal could be a next step in the evolution of

the smart city system. This combination provides cities with a powerful and flexible environment with which to create the nucleus of a smart city. This allows cities to plug-in any number of transport data sources or interface with third party systems in a flexible standards based environment such as:

- Data fusion
- Information dissemination
- Multi-agency/jurisdiction support
- Incident/event management
- Decision support
- Data analytics
- Reports and dashboards

Whatever the approach chosen, the time has never been better for city and regional managers to start realising the improved efficiency and quality of life benefits of a smart city platform. ■

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