



INTERNET OF THINGS CASE STUDY



TRANSFORMATIVE IoT BEYOND CONNECTIVITY

TM ONE Transforms The Way Cities Move

END-TO-END SMART TRAFFIC SOLUTION FROM TM ONE GAINS TRACTION WITH MUNICIPALITIES

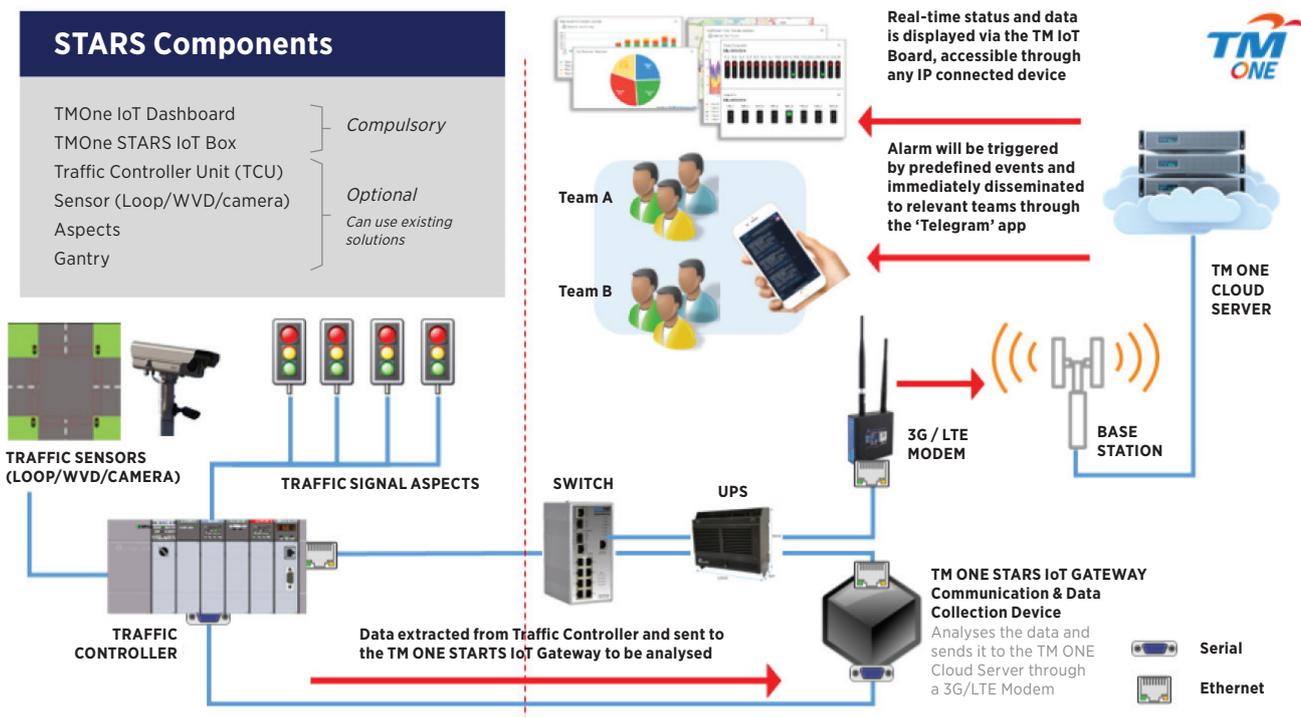
TM ONE, the business solution arm of Telekom Malaysia Berhad, is seeing strong demand for its Smart Traffic Analytics & Recognition System (STARS), which can programme traffic lights to respond to real-time data collected by connected cameras and sensors. The traffic light solution offers cities with improved traffic flow and reduces idle time at red lights.

Employing a combination of cloud and edge-based computing and analytics, the end-to-end managed IoT system uses analytic algorithms to automatically adjust traffic lights to optimise the traffic flow through a junction. Alternatively, engineers can view real-time information via the STARS IoT Dashboard on a laptop or mobile device and alter the sequence of the traffic lights accordingly from anywhere. The solution uses Telekom Malaysia's mobile network to relay data from the traffic controller unit to the IoT platform.

The information collected by the system can also be analysed to identify any faults in the traffic signals, enabling field engineers to be deployed quickly to minimise traffic

disruption. The municipality can predefine various events that will prompt STARS to trigger an alarm that can be immediately disseminated to the relevant teams through the Telegram mobile application. This system enables any issues to be identified and resolved quickly and efficiently (see graphic on next page).





SPEEDING UP JOURNEYS, REDUCING CONGESTION AND COSTS

By providing much more than connectivity, TM ONE says STARS and other solutions are opening up new opportunities and revenue streams in the IoT market. First launched in 2016, STARS is now monitoring more than 130 junctions across four municipalities in Cyberjaya (Cyberview), Kelantan (Jabatan Kerja Raya Kelantan), Pengerang (Johor Corporation) and Penang (Majlis Perbandaran Seberang Perai). TM ONE believes it could ultimately be deployed to approximately 1,800 junctions nationwide across Malaysia.

For drivers, STARS reduces the time spent waiting at junctions, speeding up their journeys. For local councils, it can reduce traffic congestion and related CO2 emissions, operational costs and support future traffic optimisation and town planning. For example, STARS has reduced traffic waiting time along Persiaran Multimedia (a main road in Cyberjaya) by more than 65 percent. At peak hours, it would take approximately 32 minutes to drive from one end of Persiaran Multimedia to the other, but it now takes between eight and 11 minutes.

Due to stringent procurement policies, local authorities typically need to engage with multiple traffic light operators

to provide and manage the traffic lights. TM ONE says STARS can be used with multiple monitoring and management systems, enabling the local authority to view and analyse data from all its traffic lights through a single platform.

DIFFERENT SUBSCRIPTION PACKAGES

In addition to the front-end STARS Dashboard, the TM ONE IoT Gateway (an edge computer), the mobile connectivity and the cloud-based back-end software, TM ONE can also provide municipalities with traffic light controllers and loop sensors, wireless vehicle detectors and cameras. In each case, TM ONE says it maintains all of the equipment it provides. As a cloud-based platform, STARS can be implemented quickly and can be upgraded over the air. Regardless of which package they opt for, municipalities pay for STARS as an ongoing managed service (see table on next page).



STARS Packages

<p>STARS Basic Monitoring & Visualisation Package</p> <p>Monthly recurring charges per Traffic Controller Unit</p> <p>Minimum contract duration 1 year</p> <p>Includes:</p> <ol style="list-style-type: none"> 1. Connectivity for STARS System 2. STARS System 	<p>Upgrade & Maintenance Package (Loop Sensor) <i>applicable to standard 8-group junction</i></p> <p>Opex Business model chargeable per annum with minimum contract of 5 years</p> <p>Includes:</p> <ol style="list-style-type: none"> 1. Traffic controller unit upgrade 2. TM STARS IoT Box 3. Connectivity for IoT Box 4. STARS System 5. Installation of loop sensors for each lane at each junction 6. 5 year full warranty for controllers, including maintenance 	<p>Upgrade & Maintenance Package (Wireless Vehicle Detector (“WVD”)) <i>applicable to standard 8-group junction</i></p> <p>Opex Business model chargeable per annum with minimum contract of 5 years</p> <p>Includes:</p> <ol style="list-style-type: none"> 1. Traffic controller unit upgrade 2. TM STARS IoT Box 3. Connectivity for IoT Box 4. STARS System 5. Installation of WVD for each lane at each junction 6. 5 years full warranty for controllers, including maintenance
<p>STARS TM IoT Box</p> <p>One time charge per Traffic Controller Unit</p> <p>Includes:</p> <ol style="list-style-type: none"> 1. TM STARS IoT Box 2. 1 year full warranty 		

TM ONE says it developed the business model for STARS after running a series of workshops to understand municipalities’ budgeting cycles. These workshops identified that local councils prefer to procure such systems through their operating budgets, with a short contract period, as the maintenance of traffic lights generally involves multiple contractors.

MOVING TOWARDS PREDICTIVE ANALYSIS

TM ONE is now developing TM ONE STARS 2.0, which will be able to analyse traffic data over six months or more and enable traffic lights to be programmed based on a range of external factors, such as weather, events and holidays, as well as real-time traffic data.

With the rollout of 5G connectivity in Malaysia, TM ONE is also planning to stream real-time video from road-side cameras to artificial intelligence systems that can estimate waiting times for each vehicle, count the number of vehicles, classify them according to type and recognise vehicle registration plates. Capable of detecting emergency vehicles, this system will be able to automatically adjust the traffic lights to get these vehicles through a junction safely.



About the GSMA

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at www.gsma.com or the GSMA Internet of Things programme at www.gsma.com/IoT.

Follow the GSMA on Twitter: [@GSMA](https://twitter.com/GSMA).

About TM ONE

With connectivity and security at its core, TM ONE is positioned as the only enabler of a Hyperconnected Ecosystem for all your business's digital journey. As the enterprise and public sector business solutions arm of Telekom Malaysia Berhad (TM) Group, our seamless and complete digital solutions are #madepossible by our people, processes and state-of-the-art technology.

As you venture on this journey of digitally transforming your business with us, you will also be supporting our mission of fully transforming Malaysia into a digital nation. This is all in line with TM's philosophy of "Life Made Easier", for a better Malaysia.

www.tmone.com.my

About Beyond Connectivity

Delivering seamless IoT connectivity has been a crucial element in helping operators to launch new services such as low power wide area (LPWA) networks, using NB-IoT and LTE-M technologies and create added value and sustainable growth. Now leading IoT operators are building on this and their reputation as trusted industry partners by delivering value added services beyond connectivity.

These transformative solutions include services across big data, machine learning, analytics, edge computing and enablement platforms. They are delivering substantial benefits to customers such as increased productivity, reduced costs and automated business processes as well as driving innovative new products and services, new lines of business and new business models. Services beyond connectivity are transforming businesses and industries.

www.gsma.com/BeyondConnectivity