China Mobile Streetlighting - Internet of Things Case Study

Introduction

LED streetlighting is transforming the urban environment and making maintenance and control of streetlights more straightforward. In the past, sodium lamps have been expensive to install and maintain, requiring manual inspection and manual controls. Across China, these traditional lighting methods are being replaced by intelligent LED lighting. LED lighting is easier to control and cheaper to operate, and by connecting the lamps to a control centre, dynamic control can be achieved, removing the need for manual inspections and interventions.

China Mobile has a 2G/GPRS powered smart street lighting service already available. This has been deployed in a number of cities including the city of Longnan, the city of Bahzou and the Wudang district of the city of Guizhou. The China Mobile solution can integrate various kinds of sensor into the connected street lamp, including environmental, traffic and security monitoring, making full use of the connectivity nodes.

NB-IoT Street Lighting Deployment

China Mobile have begun to research and deploy NB-IoT variants of their connected street light service to monitor the performance compared to GPRS and understand how network coverage, power consumption and network performance is compared to the existing 2G solution.

280 NB-IoT controlled intelligent streetlamps have been installed by China Telecom in a pre-commercial trial to monitor their performance. 50 streetlamps have been deployed in the Yongchuan district of Chongqing City, 120 in Xiajing Province, and 100 in Xiong.

China Mobile has signed a cooperation agreement with the Yangzhou Gaoyou government to partner with the local streetlamp manufacturing alliance situated in the Yangzhou hi-tech zone in order to develop the connected streetlights and NB-IoT module.

The China mobile system can connect either lamps individual or via a controller for loop control over several light poles. This connects each lamp to the cloud management platform, where all actions can be completed remotely. In the complex environment of the city, the NB-IoT network coverage is very good, meaning communications reliability will be high.

Benefits to the City

NB-IoT has delivered some significant benefits to the cities that are piloting the NB-IoT street lighting service from Chain Mobile.

Cost Reduction – A quicker, simpler way to manage the streetlights across the different pilot implementations has led to reduced management and maintenance costs. The ability to remotely monitor the status of streetlights, change the lighting up time or lighting intensity means that energy bills are lower and the cost of manual inspections is much reduced.

Sensor & Data Integration – The integration of sensors into the light pole to monitor environmental conditions or traffic is simple to achieve, as they are able to share the same connection and relay data to the same management platform. This means all the sensor and lighting data can be seen in the same place. In addition, via API access, this data is accessible to China Mobiles customers, so that they can integrate the data into their own platforms and provide their own unique services and analysis on their local environment.

Energy Saving – One of the core benefits of LED bulbs is low energy consumption. NB-IoT is also optimised for energy consumption, and together they make a good fit. By building a connected streetlight that has minimal energy needs, the costs of running lights across a city can be significantly reduced.

Outcomes and Lessons Learned

The initial deployment of NB-IoT powered streetlights has been a success, with all streetlights connected successfully to the NB-IoT network in the cities in which they were deployed.

The NB-IoT coverage needed to connect the streetlights was equivalent or better to the existing 2G service provided by China Mobile, and all lightpoles were able to be connected. NB-IoT is designed to offer improved coverage over existing networks, and so is able to cover larger areas of the city, including indoor locations.

Response times to incidents and issues has been greatly improved. In one instance, when lighting from a whole area was lost due to power supply issues, the lighting service was able to be restored far more quickly than in the past, when each light would have had to be visited and restored manually.

In addition to real-time lighting control, multiple sensors can also be supported on lightpoles through the NB-IoT connection, with the available bandwidth proving suitable for transmitting all data and commands to and from the various sensors that have been installed. This means that the city is in a position to expand their intelligent city services and begin getting a fuller picture of the status of various locations as needed.

The pilots deployed in various locations have taught China Mobile that NB-IoT is a clear contender to connect large numbers of streetlights and sensors in the future. The use of a standardised technology means that China Mobile are able to work with a range of partners from local industries in order to bring new products and services to the market.

Conclusion

NB-IoT has proven to be a very capable upgrade to the existing 2G connectivity provided by China Mobile for their streetlighting service. It is more energy efficient, offers better coverage and is straightforward to install and manage. In the future, NB-IoT will become much more widespread for powering streetlights and other sensors throughout the city. In the future, China Mobile will be able to rollout large scale volumes of connections throughout the city, offering a better customer experience and enabling a new range of services for the intelligent city.

The GSMA Internet of Things programme is an initiative to help operators add value and accelerate the delivery of new connected devices and services in the IoT. This is to be achieved by industry collaboration, appropriate regulation, optimising networks as well as developing key enablers to support the growth of the IoT in the longer term. Our vision is to enable the IoT, a world in which consumers and businesses enjoy rich new services, connected by an intelligent and secure mobile network

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