USpace Smart Parking Internet of Things Case Study

Introduction

Parking in Taipei is at a premium, with strict parking controls that are enforced by the city with heavy fines for illegal parking. In this environment, it is common for residents to rent out their personal parking spaces to commuters and visitors through apps from a number of different providers. To ensure that only authorised vehicles park in these spaces, Chungwha Telecom has developed an NB-IoT powered smart lock that can be used to prevent unauthorised parking. The lock is bolted to the floor and can be raised or lowered remotely.

Chunghwa Telecom is aiming to create a new market with the smart lock, as limited parking resources across Taipei can be utilised more effectively to meet growing demands for parking with the use of this technology.

NB-IoT Deployment

Chunghwa Telecom is working in partnership with USPACE, a shared parking space provider, to supply the smart locks. Lock users can rent out their parking space, and allow immediate access to the space via the app. Drivers wishing to park can see the location and availability of all parking spaces using the system, and when a space is selected and paid for, the lock is lowered via its NB-IoT connection. USPACE provides the lock and app to its customers, and Chunghwa Telecom provides the NB-IoT network to connect the locks. Bluetooth Low Energy is also installed in the locks to enable short range communications.

In addition to the NB-IoT network, Chunghwa Telecom provides the IoT management platform for the service and big data analysis to further improve the service.

Benefits to USPACE

NB-IoT has delivered some significant benefits to USPACE and their customers in launching this new service.

Simplicity – The NB-IoT connected smart lock is simple to use and does not require training by either the parking space owner or user to understand. All actions are intuitive and quick to respond. NB-IoT offers a low latency for message delivery, meaning that the smart locks can be raised and lowered as needed – if a driver arrives at a space that they have reserved and paid for, the lock can be quickly lowered to prevent congestion and frustration.

Cost Reductions – As the smart parking locks are distributed across a wide area, NB-IoT offers considerable cost reductions over other communications mechanisms. NB-IoT uses the existing mobile network and allows for fully centralised device management across distributed parking areas, meaning that the process of managing the locks is simple and low cost. The status of each lock can be monitored and controlled remotely, which removes the need for manual maintenance and control.

Data Analysis – Advanced data analysis can be conducted using both real-time data from the NB-IoT network and historic data to spot trends in behaviour. NB-IoT allows an overview of the status of all locks connected to the network. User behaviour such as location of spaces and time they are available can provide additional insight such as when spaces are likely to be available, and where the most popular locations are in order to adjust parking rates.

FIGURE 1: USPACE Smart Lock

Enhanced Battery Life – NB-IoT is designed to be power efficient, and can run from battery power for up to 10 years, dependent on usage profile. The smart parking service is able to collect battery status from each lock to monitor power consumption and create an alert when a battery needs to be replaced to ensure a continuous service, which additionally minimises maintenance costs by directing crews to replace batteries before they fail.

Outcomes & Lessons Learned

NB-IoT has proven that it is well suited to connecting the USPACE smart locks across a wide area of Taipei, in a range of locations such as parking garages and off-street parking bays. All smart locks deployed across the city have been able to successfully connect with the NB-IoT network, and communicate in real-time the status of the smart locks to the control centre. The data that has been successfully transmitted via NB-IoT includes lock open; lock closed; availability status; battery level; time and date; anomaly alert.

The smart locks can be controlled directly from the USPACE app, meaning that operation of the locks by the user is as straightforward as possible, with NB-IoT enabling a simple process that allows the parking space owner or driver to lock and unlock spaces that they have previously reserved and paid for.
NB-IoT is designed to support a battery life of up to 10 years, depending on usage profile. The battery performance of the smart locks has resulted in reduced maintenance costs and better visibility of any issues with the smart locks that may require maintenance.

The smart lock has been proven in live operation by Chungwha Telecom and USPACE, and now forms a part of their ongoing strategy, with the lock for sale to the public. The aim is to extend the parking service across the city and free up as many off-street parking spaces as possible through their monetisation.

Conclusion

The Chunghwa Telecom and USPACE smart parking service is an advanced demonstration of the suitability of NB-IoT for smart city solutions. USPACE can offer a unique proposition into the Taiwanese market that has been enabled by NB-IoT, and the devices that have been deployed offer a long lifespan, minimal maintenance, and a high quality of service.

NB-IoT coverage in place today across Taipei means that Chunghwa Telecom and USPACE are able to expand their smart parking service quickly and open up many new parking spaces to commuters and visitors to the city. The reliability and high quality of NB-IoT communications allows partners to focus on their service, and not on maintaining and resolving communications network issues.

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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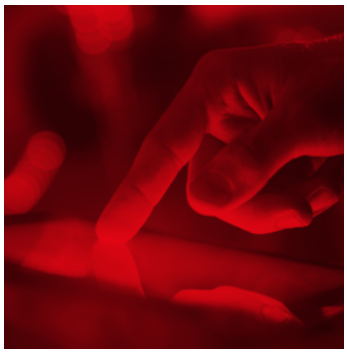

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