Case Study of Data-driven City Management in Cities Abroad

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Abstract

The concept of adopting corporate management techniques for city management is starting to gain momentum. To ensure better, more enriched lives for citizens, we must constantly invest in innovation to increase efficiency on a sustainable basis. Trials are underway to effectively utilize existing data to enhance city management. NEC is harnessing its technologies and solutions in initiatives to realize sustainable city management in several European cities. This paper provides a summary of NEC's Cloud City Operation Center (CCOC) as a solution to achieve the aforementioned objective, and presents use cases demonstrating how this solution is being adopted in cities abroad that are striving to become smart cities.

1. Introduction

As of 2018, more than 50% of the world's population are city dwellers, and this percentage is expected to exceed 75% within 20 years. Accordingly, the percentage accounting for GDP, energy consumption, greenhouse gas emissions, and other economic indicators is expected to increase further. In other words, cities play an important role in developing and promoting economic growth and prosperity of the entire country.

Cities, meanwhile, are motivated to make citizen's lives better on a completely different scale as nations. The reason for this is that once residents feel dissatisfied with living conditions, they can easily relocate to another city; it is infinitely easier to move to another city than to another country. This underlying competitive nature is the engine that creates and sustains innovation in cities.

2. Issues in City Management

Although each city has its own unique history, industries, and scale of activity, with specifically different issues and priorities, some issues that cities face are common to all. In this section, we explore the issues of sustainability and continuity which are common to all cities.

2.1 Sustainability

The multifaceted notion of sustainability is regarded as a major issue.

(1) Economic sustainability

Under the recent business downturn and swelling budget deficit, the national government cannot avoid fiscal austerity measures in view of concerns about the future of social security and welfare. This means that cities must construct new business models that do not depend on government subsidies in order to remain an attractive location as targets for business and investment.

(2) Social sustainability

Social stability in the form of quality of life (QOL), legal framework, and business opportunities are essential aspects in attracting talent and investments to cities.

(3) Environmental sustainability

Particularly in areas of rapid urbanization, lack of infrastructure is placing great strain on the environment. This calls for the need to implement growth strategies with minimal negative impact on the environment.

2.2 Continuity

It is essential to formulate and execute new plans for developing smart cities, while ensuring that existing public services continue to run smoothly.

(1) Data collection

Data plays a vital role in urban development because it provides us a window to accurately understand how the public services are offered and used to achieve the goal of transformation and reform, and how citizens feel about these services. However, many cities do not have a system in place to automatically collect data, and thus the resulting information is often inaccurate.

(2) Transformation program

A large number of municipal ministries and agencies act independently, making it difficult for local government leaders to oversee the entire city and ultimately draw a clear vision of the future. Transformation can be achieved only by overcoming a number of tiers of local governments, the siloing for each service, and the accompanying subdivisions of budget. Related departments must share long-term targets and short-term indicators and form a strategy that all departments are capable of supporting. To this end, it is essential to build a flexible and efficient data platform as a mediator between the data source and application.

3. NEC's Solution

3.1 Cloud City Operation Center (CCOC)

NEC's CCOC (**Fig. 1**) is a common platform system developed by NEC to provide status visualization, data analysis and simulation for industry-specific smart services. This system utilizes FIWARE, the infrastructure software developed and implemented by the Future Internet Public-Private Partnership Program (FI-PPP) of the European Union (EU), and has been adopted for use in the system to realize smart cities in countless cities and companies mainly in Europe. FIWARE is characterized by its open architecture that is geared toward existing IT systems and systems to be newly developed.

(1) Features

- Visualizes data and customizes dashboard functions
- Integrates Internet of Things (IoT) data
- Integrates existing IT system data
- Creates rules and workflow for automated services
- Creates reports
- Adds analysis algorithm for specified services

(2) Effects of implementation

- Helps organize and manage old and presently collected data
- Enables efficient development of IoT applications
- Visual data identifies strategic advantages
- Discloses data to citizens and entrepreneurs
- Forecast algorithm promotes efficiency of services
- Promotes collaboration between relevant ministries and agencies
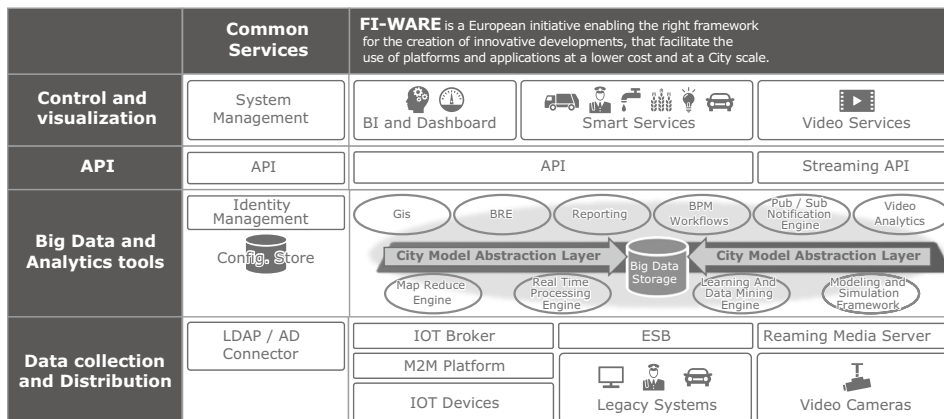- Derives profit from businesses based on the data

Fig. 1 NEC Cloud City Operation Center.

3.2 Screen components

The CCOC Platform provides a wide assortment of components to facilitate the flexible and rapid visualization of data (**Fig. 2**).
- Map, Table, Graph, Gauge, Event details, Predictions, Alarms, Actuation, Multivariate analysis, Create new event, Camera, Filter, and Embedded web

3.3 Integrated application

The CCOC Platform allows subsequent NEC security applications to be implemented at any time.
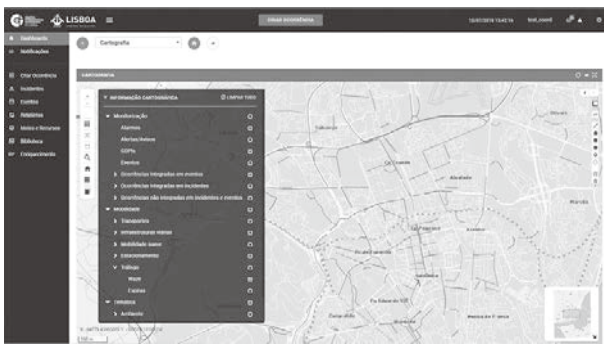

Fig. 2 Screen Image of CCOC Platform.

Fig. 3 Image of IAPRO-based monitoring.

Fig. 4 Image of NeoFace Watch.

(1) IAPRO: Advanced image analysis and behavior detection system
Enables high accuracy behavior detection by monitoring moving objects in real time, and automatically recognizes and tracks people, vehicles, and other objects (**Fig. 3**).

(2) NeoFace series
The NEC NeoFace series offers face recognition products[1] harnessing the benefits of NEC's face recognition technology which is considered the best in the world in speed and accuracy. This technology is used in a wide range of global applications (**Fig. 4**) including computer-access authentication, and entrance and exit management in the industrial sector; face authentication entrance in the entertainment sector; and immigration control, national ID system, and other applications in the government sector.

4. Case Examples

As people in European countries generally have a high environmental awareness, the European Union (EU), and governments in its member countries and their local governments have been driving smart city policies forward focused on promoting the pervasive use of renewable energy. At the time of the year 2018, the EU countries are working toward the goal of achieving comprehensive smart cities based on the utilization of data.

Here, we introduce smart city initiatives deployed in Bristol and Lisbon.

4.1 Bristol City

Bristol is a regional hub city with the eighth largest population in the UK. The city aims to create innovative new smart services under one of UK's advanced flagship smart city projects. Bristol City and the University of Bristol established a joint venture called Bristol Is Open (BIO) to propel the smart city project forward. NEC has entered into a partnership with BIO.

As a first step, a facility called the City Operation Center (COC) was set up as a platform to promote the sharing and usage of data between concerned ministries and agencies (**Photo**).

The British government operates a cooperative purchase program geared for the central and local governments, and NEC has received approval to provide CCOC cloud hosting services to support the program. This framework has also been used to provide the CCOC to Bristol city.

The screen components installed in NEC's CCOC will be used to firstly enable the visualization of in-home

ment system for data collection.

Under this system, the CCOC will integrate and manage data from 10 internal systems in Lisbon city, and will achieve the linkage of data from 30 external systems (airport, railway, traffic, environment, energy, police, and other systems). NEC's IAPRO has also been deployed as a community monitoring system (**Fig. 5**).

NEC will leverage its AI and IoT technologies for real-time collection and analysis of various kinds of community-acquired data (weather, geography, tourism, air pollution, traffic congestion, etc.), thereby contributing to the swift provision of municipal services in response to the detection of illegally parked vehicles, suspicious objects, and more.
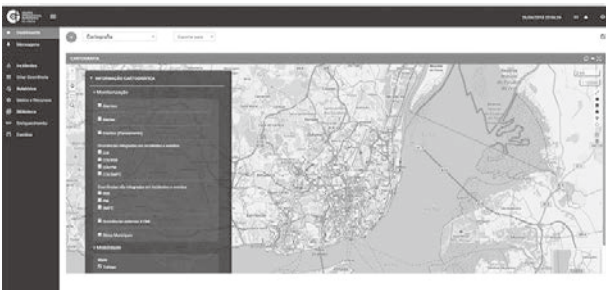

Photo City Operation Center.

Fig. 5 Image of community monitoring system.

nursing care, community monitoring, and traffic monitoring operations. Furthermore, the event management component will be used to promote work flow standardization (Situation management). Going forward, plans are underway to deliver a wide spectrum of services in such fields as energy supply management, waste management, and entertainment.

4.2 Lisbon City

Lisbon is the capital of Portugal with a population of about 540,000 people within the city's administrative limits. In the urban area extending beyond these limits, the population exceeds 3 million people, making it the 11th most populous urban area in the EU. Popular as a tourist destination, Lisbon is striving to strengthen security and better the quality of life (QOL). To accelerate the digital transformation of the city as a whole, it is considering the cross-integration of urban environmental data collected through IoT devices, data from external agencies, and data from multiple departments of the city.

To achieve this endeavor, the city established a facility called the Integrated Operation Center (COI). NEC's CCOC, as a system to be installed within the COI, was selected among other global and Portuguese vendors in a competitive bidding to provide the integrated manage-

5. Conclusion

There are still many issues to contend with in order to realize smart cities. To solve these issues, cities are starting to examine ways to manage cities like companies with focus on sustainability. In this paper, we presented some use cases of NEC's solutions and the management of cities abroad based on the data utilization.

Reference

1) NEC Press Release: NEC's Video Face Recognition Technology Ranks First in NIST Testing, March 2017 https://www.nec.com/en/press/201703/global_20170316_01.html

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The details about this paper can be seen at the following.

Related URL:

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https://www.nec.com/en/global/solutions/safety/face_recognition/index.html
GOV.UK Digital Marketplace
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