Smart Cities

South Korea: Busan Green u-City

Smart City Builds on Cloud Services Delivered by Public-Private-Partnership

Executive Summary

Connected devices, distributed sensors and Internet technologies are enabling cities to capture valuable data, deploy new services and enhance existing services, ushering in the era of smart cities. These services can improve the effectiveness of city management, generate new growth opportunities for local businesses and raise the quality of citizens' lives.

An early example of a smart city, South Korea's Busan Green u-City is using a cloud-based infrastructure delivered by a successful collaboration between the local government, the global technology supplier, Cisco, and South Korea's largest telco, KT.

Building on a total investment of USD 320 million, Busan Green u-City is now moving forward and implementing its multi-staged development plan. This will result in the launch of community centres and numerous urban services for its citizens.

The benefits of these new services to citizens are varied and numerous, for example:

- Increase citizens' benefits by timely welfare services information distribution
- Improve information accessibility by delivering information through various media channels and devices
- Improve learning experiences by two-way video communication enabled mentoring
- Increase free education contents and its quality for low income community residents and students, and thus to deal with social divide issues
- Reduce overall / regular health care cost, especially for low income residents and solitude living aged people
- Improve access to care services for chronic diseases, reducing the need for patients to visit remote hospitals
- Create new markets for participatory urban regeneration projects applying u-City technologies
- Provide wider revenue creation opportunities by open innovation-based urban regeneration framework

In the first stage, the partnership set up the Busan Mobile Application Centre (BMAC) which has now generated new revenues of USD 2.2 million and online sales revenue of USD 42,000 through the launch of 13 new companies and the development of 70 new apps by small creative start-ups.

Busan's Green u-City is underpinned by several key innovations:

- A cost-effective cloud-based architecture that enables the easy provision of new urban services to a large numbers of users. The Green u-City's multi-service open platform can deliver both commercial services for the city, as well as free services for its citizens that can be expanded over time. Moreover, by opening municipal data to third party developers, the Busan government is encouraging innovation in the public service sector.
- The public-private-partnership set up between Busan Metropolitan City, Cisco and KT, shares both the costs and the risks of the project. Building on their successful collaboration in IFEZ(Incheon Free Economic Zone) and Busan, Cisco and KT have established a joint venture, KCSS, which is now providing a full range of ICT solutions to other cities in Asia.
- The role of the mobile operators in the Green u-City model goes beyond connectivity. KT, for example, has been instrumental in supporting and investing in u-City design and development, and manages the overall operation of Busan u-City. KT is also providing several crucial enablers of the new cloud-based model: its mobile broadband network contributes to deliver ubiquitous coverage and bandwidth for the Green u-City, while cloud-based applications are accessible via mobile and embedded devices.

Busan Green u-City: Introduction

Busan is the second largest city in South Korea, the largest city port in the country, and the world's fifth busiest seaport. It is located on the south-eastern tip of the Korean Peninsula.

Busan started its u-City (ubiquitous city) programme in 2005, retrofitting next-generation technology into the city's major infrastructure, encompassing the port, transportation, tourism and convention sectors.

To support its continued growth, in 2012, Busan started the second four-year phase of a development programme with four strategic goals: building a City with a Smart Economy, a City with a Smart Life, a City with a Smart Culture, and a Smart Green City. Busan also planned to develop and implement 31 ubiquitous urban services. The Green u-City project is designed to help Busan achieve these objectives.

Busan Green u-City is a public-private-partnership between the Busan Metropolitan Government, the Busan IT Industry Promotion Agency, Cisco and KT. Central and city governments, and private partners are investing approximately USD 452 million in the Green u-City project.

The partners are implementing the project in three stages. During stage 1, they focused on the design, and brought together city administration and developers in the Busan Mobile Application Centre, a new shared application development platform that uses open city data. In stage 2, new services for the city and its citizens were trialled and key platforms for content management were developed. Stage 3 will deploy commercial end-user services and build a more robust cloud platform for commercial and industrial applications.

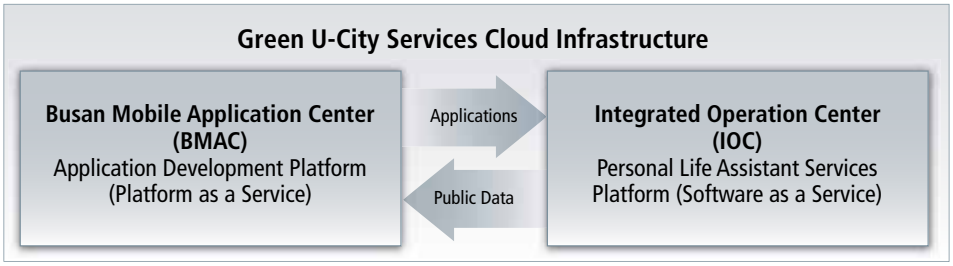
"Cities have an opportunity to use the network as the platform for visualizing and modelling urban infrastructure to provide innovative urban services and manage urban sustainability. Using the network as the critical infrastructure (in addition to electricity, water, and natural gas), cities can integrate multiple systems to deliver on-demand services over an Internet-enabled cloud infrastructure supported by open innovation."

Nicola Villa, Managing Director, Global Public Sector, Cisco Internet Business Solutions Group

Smart City: Cloud Vision Services

Cities need to develop, run and expand a large ecosystem of services efficiently and securely, while controlling spending. To do this, they need to collaborate and share information across public and private communities. Cloud-based city services and opening up access to public data can help cities achieve this objective.

Cloud architectures need to be built on robust networks, fault-tolerant datacentres and ubiquitous network reach to support fast deployment of new smart city services. In Busan, the blueprint and business architecture of the Green u-City was developed by Busan Metropolitan government and Cisco. This architecture is founded on a ubiquitous IP network that combines next generation broadband technologies. This network supports a cloud infrastructure made up of an intelligent city management system – an Integrated Operation Centre (IOC) - and an application development platform.



Source: Cisco

As an incubator, BMAC provides a physical space, virtual tools, testing and consultation services for small- and medium-size businesses developing citizen-centric mobile applications and services. The selection process to enter into BMAC is competitive and mainly based on the submitted business plan. Once businesses complete their start-up mission, or start generating revenue, they prepare to move their base from BMAC to other locations, such as smart work centres. This cloud infrastructure is already enabling a first set of green-growth initiatives covering the five vertical sectors as outlined below.

An incubator of smart city services, BMAC's multi-service platform is used to develop a combination of free public services and value-added commercial urban services (sometimes referred to as a Freemium model) that aim to improve all aspects of a Busan resident's daily life. These Freemium services will be provided through smart community centres; three such centres will be launched between September 2012 and March 2013.

Busan Green U-City Blueprint

Smart Community (Smart Work/ Learning/ Healthcare)	Smart Green Urban Mobility	Smart Energy/ Resource Recycling	Smart Safety and Security	Smart Green Logistics
Smart work Mobile App Dev Center Video contact center Smart learning Smart health-care	Busan PTA Smart travel stations Smart parking Mobile augmented reality tour Busan eco-pass (smart pricing)	Green urban services center Smart energy management center Smart buildings Eco-mileage (eco-card)	Integrated safety and security with CCTV build-to-lease IOC Emergency response and disaster prevention	Real-time logistics infrastructure Green logistics operation system Green u-logistics information utility service

Source: Cisco

" This isn't a one-off release or consulting partnership, but a way of developing a long-term cooperative business model, which is by far the more meaningful. Through this project, KT's core aim is not just the commercialization of smart space solutions, but the accumulation of business experience and the fostering of talented human resources and many other goals in other business fields also that can be accomplished through the strengthening of our global competencies."

Suk-Chae Lee, Chairman and CEO, Korea Telecom

Smart City Operating Model: Public-Private-Partnerships

Public-private-partnerships are a way to finance smart city projects, combine different sources of expertise, and market new services to end-users.

In Busan's Green u-City project, two private partners – Cisco and KT – provide the technical and operational expertise required to set up collaborative cloud-based infrastructure and manage the city operations. Cisco has led the project since November 2009. KT, which was a partner for Busan City in the first phase of its u-City project, joined Green u-City as a prime contractor in 2011.

The Busan Metropolitan Government, which provides financing for Busan Green u-City, plans to recover its costs both from operational savings and new revenue streams. BMAC also gives a share of its revenue back to the Busan IT Industry Promotion Agency, which provides training and education for the participating small and medium-size application developer companies.

The initial results of the Green u-City project and BMAC performance show that it is becoming a new source of revenue for the government, and a driver of new jobs in local companies:

- **First year revenue in excess of USD 2.2 million:** After the first year of operation, the applications and services developed by BMAC have generated external project revenues of USD2.2 million and online sales revenue of USD42,000 for Busan City.
- **Helping Busan City to become more cost efficient:** Through the use of extensive public data, the Green u-City operating centre (IOC) is helping the Busan city management to improve the use of resources, city logistics and waste management, thus reducing the operating costs for the city.
- **Creation of new businesses and jobs**: During the first year of the operation of BMAC, 13 companies were established and 70 applications developed by small creative start-ups. The city's goal is to employ 3,500 app developers and 300 sole traders by 2014.
- **Plans to become a greener city:** Busan aims to reduce its carbon emissions by 2,981 metric tons by 2020, 67.8% lower than in other newly-developed Korean cities that do not possess Green u-City services. This level of CO2 reduction will be driven by citizens now able to monitor and control their consumption of electricity with the help of new applications and services.

The success of collaboration between Cisco and KT led them to establish a joint venture - KC Smart Service. KCSS will use ubiquitous sensor networks, broadband convergence networks, and machine-to-machine technology to design, implement and operate new services that address all aspects of city life from parks to buildings. Initially, KCSS will focus on providing a full range of ICT solutions to smart cities in Asia.

Role of Mobile for Smart Cities – Beyond Network Connectivity

Mobile networks are crucial for ubiquitous connectivity within cities and supporting cloud-based urban services for both city administrations and citizens. In Busan, the next generation broadband infrastructure, the Busan Information Highway, combines fixed and 3G/4G mobile broadband networks.

But the role of mobile operators in smart cities can go beyond connectivity, encompassing other parts of urban ICT solutions. Network operators can help cities design their smart city strategy and provide ongoing operational management of smart city services. KT, for example, has undertaken 13 strategic planning projects nine detailed design projects and 20 implementation projects.

In Busan, KT's U-City Practice is involved in the development and delivery of three layers of services:

- Services for the city: KT manages the overall operation of Busan u-City using its operational know-how developed in other u-City projects in South Korea.
- Smart space services to create smart streets, smart buildings, and smart parks. These services use connected devices, combined sensor and broadband networks, machine-to-machine, WLAN, NFC and RFID technologies to provide services for both citizens and governments. Examples of smart space services include digital signage and smart bus shelters, NFC-based payments, posters, ads and access control, as well as energy management services for commercial and residential business, among many others.
- Services for citizens, delivered anywhere, at any time, on mobile and embedded devices. The reach of KT's networks and its existing relationships with end-users enables the delivery of applications that span a wide range of public sectors, from healthcare to transport energy and safety.

Busan Green U-City: Conclusion & Learnings

Successes

Busan Green u-City is a pioneering example of how collaboration between the local government and private sector partners can build a cloud-based smart city infrastructure with an open municipal data platform that can be accessed by third party application and service developers.

After only one year of operation, the enabling infrastructure of the smart city is starting to prove the feasibility of involving small businesses and citizens with public service provision and information-sharing processes.

Challenges

As Busan Green u-City enters its final phase, the city acknowledges that some challenges are yet to be overcome. Busan will need to continue developing innovative business models to ensure that new city services are profitable. Its initial focus on the business sector also needs to be broadened in order to stimulate sufficient public support and ensure that new cloud-based services are adopted by the entire community.

Busan Green u-City: Partner Background

KT

KT Corporation is a leading telecommunication operator in Korea providing wireless, fixed line, broadband and IP TV. It holds 86% of the national fixed-line market, 32% of the wireless market and 45% of the broadband market (19.3 million, 16.3 million, and 7.6 million subscribers respectively). KT proposed the U-City concept to the Korean government as a new model of city development through government-private collaboration, and applied it in the first u-City project in Dongtan in 2006. Since then, KT has been involved in 48 u-City projects in South Korea, taking part in strategic planning, design, implementation or operation of u-Cities. Additional information about KT can be found at **www.KT.com.**

Cisco

Cisco (NASDAQ: CSCO) is a global provider of intelligent networking technologies and solutions that transform how people connect, communicate and collaborate. Its Smart+Connected Communities (S+CC) initiatives enable cities to become "smart+connected" through using intelligent networking capabilities to weave together people, services, community assets, and information towards pervasive urban infrastructure solutions for homes, offices, transportation, healthcare, education, retail, government services, energy, and real estate. Information about Cisco's Smart+Connected Communities solutions can be found at: **www.cisco.com/go/smartconnectedcommunities.**

KC Smart Services (KCSS)

In 2011, KT and Cisco launched a joint venture, KC Smart Services (KCSS), to address the demand for smart cities and smart building construction in Asia. KT is the main stakeholder of this new strategic partnership based in Korea, holding about USD 30 million in enterprise value. The focus of KCSS is mainly on 14 global markets including Korea, Japan, China and New Zealand.

Further Information

Cisco® Internet Business Solutions Group (IBSG):
www.cisco.com/go/urban_innovation

Cisco IBSG Point of View paper on Busan's cloud based services:
www.cisco.com/web/about/ac79/docs/ps/Busan-Green-u-City_IBSG.pdf

Busan u-City Project:
http://english.busan.go.kr/02government/04_08_01.jsp

GSMA Connected Living Programme

The GSMA's Connected Living programme is a three-year market development initiative whose mission is to help mobile operators accelerate the delivery of new connected devices and services. Our target is to assist in the creation of 700 million new mobile connections, whilst stimulating a number of service trials and launches in the Automotive, Education and Healthcare sectors. The Connected Living programme is also working with the city of Barcelona, the Mobile World Capital, to develop and showcase smart city services. Our work focuses on the adoption of mobile-based solutions and services to ensure that the cities of the future are safe and healthy places to live and work.

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Connected Living

www.gsma.com
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