

Comparative Positioning of Korean Network Companies Moving to Converging Cloud Services

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Abstract. As conversing technologies of network and smart mobile platform become more advanced, not only a lot of private but also public organizations are turning their attention to hot issue 'cloud.' This study includes comparative case studies on major network companies' cloud strategies that lead Korean cloud computing industry in two viewpoints. Firstly, in the internal private cloud perspective, differentiating characteristics of mobile cloud groupware as an information system resource toward smart work environment were investigated. Secondly, in the external, strategic public and mobile cloud services for B2C or B2B customer is investigated. In particular, this study focuses on business conceptual models and system architecture for 'mobile cloud' oriented on conversing (federation or hybrid) clouding. These case studies of Korean-style cloud business system may be adopted as a useful prior academic and practical research that suggests future trends of cloud market or as a strategic guidance in such framework.

Keywords: Private cloud, Public cloud, Mobile cloud computing (MCC), Network companies, Mobile office, Convergence

1 Introduction

In Korea, cloud computing is emerging as a next-generation information resource ("IR") for companies, internally to organizations and a keyword for core business strategies, externally to organizations. As in 'Smart work' environment, the practical value of mobile cloud computing ("MCC") is gaining by the day, cloud service market is watched by major network operator companies with keen interest. MCC is an agglomeration of 'mobile' and 'cloud computing.' Rather than being a 'creative' innovation technology, it is more of an evolutionary technology where the existing cloud computing advances toward future cloud computing (Ro et al., 2001).

MCC is garnering much attention for its role as public cloud, an important strategic system for n-screen conversing service or business model, as well as private cloud, an IR or mobile office that converges with internal groupware. Recently, centered on Korean network companies, the interest on industrial stakeholders for MCC market leadership is on the rise. In Korea for the moment, three major network

companies are driving cloud service industry based on smart device market and wire-wireless network infrastructure. Especially, as not only private sector organizations but also public sector counterparts realize the epochal importance of smart work, introduction of MCC is being expedited as new value proposition.

The purpose of this study is to investigate through case studies, MCC or cloud business modeling from the private cloud viewpoint that establishes cloud environment internal to an organization to the public cloud perspective that supports personal or enterprise customers. In other words, this research attempts to discover unique qualities for Korean companies in the context of mobile office MCC for private cloud and strategic MCC for public cloud business. At the same time, the authors seek to discuss differentiating attributes of converging hybrid cloud computing as well as MCC.

2 Theoretical Background

2.1 Cloud Taxonomy and Architecture

At least in academic context, definitions for cloud computing are diverse. The concept of cloud computing is said to have originated from the perspective IR management methods to efficiently use residual capacities of personal computing servers by the users (Bisciglia, 2006). Cloud computing means a large-scale distributed computing paradigm' that is virtual, dynamic and mobile expandable, and has the economies of scale where computing power, storage, platform, and service are provided through the Internet. In general, cloud computing can also be seen as virtual computing where information system and infrastructure are utilized as service through the internet.

Cloud computing, depending on how its components are understood and realized, can be classified into architecture, virtualization, core services, DB governance, and security management, among others. The core technology of cloud computing, in essence, is virtualization. Virtualization refers to partitioning information resources on a single server into multiple virtual machines, and as such, it is distinguished as servers, desktops, presentations, and application. Cloud service architecture comprises the following five 'layers': SaaS (cloud application); PaaS (cloud software environment); IaaS (computation resources), DaaS (storage), and CaaS (communication) on the cloud software infrastructure layer; hypervisor and virtual machine monitor on the software kernel layer; and the firmware/hardware layer. Cloud companies are mainly service providers for IaaS, PaaS, and SaaS, and may expand their services to include the aforementioned private cloud, public cloud, hybrid cloud, or community cloud.

2.2 Mobile Cloud Computing

Mobile cloud computing is an 'expanding and converging' cloud where the existing cloud computing is expanded to mobile terminals and platforms. In smart

environment, because a mobile device isn't merely a simplistic communication device but a powerful personal medium, business providers need to offer services specialized for each customer context. Recently, the services that combine content with high consumption rates and such MCC technologies are gaining in particular. In a converging clouding environment, companies or general users will be able to access several hundred or even thousand computers according to required tasks.

Core functionalities of MCC service are as follows. First, the users are free to process a portion of mobile service tasks as clouding computer. Second, a variety of real-time streaming data can provide uninterrupted mobile services through cloud computing servers. Third, while the users store their own data on cloud storage, they may implement automatic data synchronization and offline-mode services at the same time. Through the Open API or mash-up platform provided by MCC, the data stored in cloud storage can be used simultaneously on various types of mobile platforms. Lastly, MCC is an infrastructure environment in and of itself that inspires n-screen converging businesses.

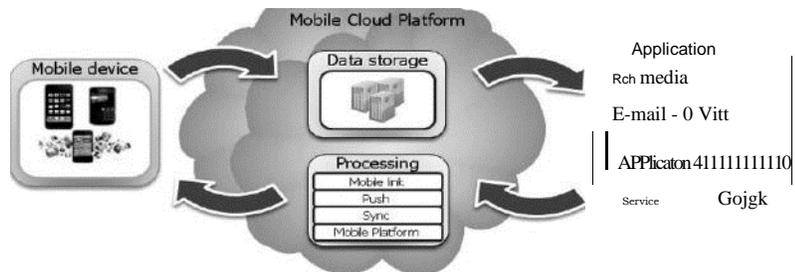


Fig. 1 A Mobile Cloud Platform

3 Strategic Perspectives

3.1 Private MCC

In smart work context, applied technologies of MCC are becoming diverse. As mentioned, mobile clouding is the core technology that shapes mobile office environment. As an example, cloud PC service can be described as a 'desktop cloud server virtualization' technology. It is indeed a paradigm shift where the form of computing is transformed such that each company employee does not 'own' individual IT or computing resources. Thus, it is a corporate mobile service (EMS) that enables real-time task completion anytime anywhere through mobile devices, mobile solutions, and convergence telecommunication networks.

The corporate mobile service currently enjoying high demand is SaaS-based mobile office service as it can be integrated as or expanded to become groupware such as ERP and CRM going forward. Examples abound in the forms of settlement systems, internal inventory system, intra-company address searching, smart device

web conferencing, and PaaS-based application service tools from Soonr, Samsung Mobile Cloud Center, Thinkfree, and Namusoft (Lee, 2010; Miller, 2009).

3.2 Public MCC

In order to construct a cloud computing capable of offering successful inter-device integrated services, standardization on device integration operation framework or data formats should take the priority. As discussed, mobile clouding is the realization of a computing environment that can overcome the limitations posed by mobile devices. Whereas the early cloud computing was a model that supported basic IT resources such as servers and storage, the recent cloud models focus on types of transmission for inter-device converging content and services, in creating values for n-screen.

Because cloud streaming service has its servers perform all required operations first and then transmits only the consequent results, high-quality service is provided regardless of each device's hardware performance capabilities. For the future, streaming service models are expected to advance continuously when it comes to MCC mobile cloud service. And should a mobile device itself enabled to perform operations commensurate to those done by high-end personal PCs, a totally different beyond cloud computing environment could ensue.

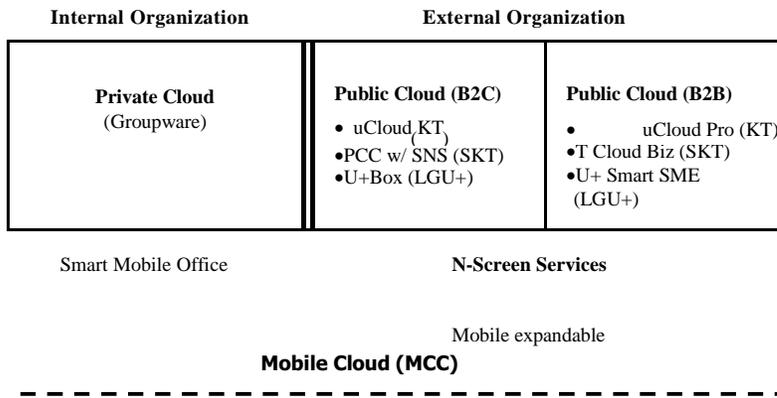


Fig. 2 Private and public cloud based on MCC

4 Case Studies

To explore private cloud MCC toward mobile office and public cloud MCC for B2C or B2B service or business, case studies on three major Korean network operator companies were conducted. The companies thus chosen were KT, SKT, and LGU+ that have high market shares in MCC service market in Korea. Today, KT, SKT, and LGU+, each have differentiated focus on their respective customer bases in carrying out their businesses. In analysing the case studies, in-depth interviews with team leaders with the relevant responsibilities in cloud computing for said companies were employed, along with secondary data for each firm.

4.1 Study 1: Competitiveness of Software and Application Technology

KT's business strategy based on MCC technologies calls for reducing its reliance on overseas companies and bolstering its own capabilities for survival. Leveraging its own telecommunications infrastructure and subscriber base, KT is supporting R&D efforts to make cloud-related software 'Korean' and proactively pushing for open partnerships to create a cloud world. KT newly created a headquarters called 'uCloud' dedicated to cloud, nurturing its cloud business as a strategic effort. In January 2010, this company is going expanding cloud business boundaries in full-fledged 'linkage' to its mobile telecommunications business. For instance, it is focusing investments in R&D for smartphone middleware, big data, and cloud storage.

The first service model launched by the aforementioned cloud headquarters was 'uCloud' backup service, providing free storage to individual users to safely store their computer data on cloud servers. B2B 'uCloud Pro' launched in 2010 is a service program that allows employees of corporate customers to manage backup and sharing of data of their data stored in PCs or devices such as smart devices. By simply connecting to cluster clouding servers or applications, these employees are able to use desired computing resources anywhere anytime.

4.2 Study 2: Sui Generis Cloud Business Ecosystem

SKT's key strategy is in establishing technological foundation for cloud computing. It has earmarked around KRW 3 trillion (USD 3 billion) starting in 2009, investing actively in cloud computing business as part of its 'Five Growth Technology Tasks' ("5nGINE"). The company established 'T Performance', a MCC-based testing service. To strengthen its R&D prowess, it worked in concert with Consortium of Cloud Computing Research to launch a PCC (personal cloud computing) complemented with schedule management, contacts, and social-networking service (SNS).

PCC's main services are file storage, contacts, and SNS. Moreover, as SKT runs an IDC (cloud data) dedicated for B2B cloud services, it provides IaaS, management solutions, and security services. It is also offering a wide-range of services, including SME location-based marketing analysis, M2M solutions, company management, IT resource management, 'Office Pack' service by 'T bizpoint' and integrated cloud services for SMEs called 'T could biz.' To construct a PaaS cloud computing, SKT is in partnership with IBM Korea, concurrently implementing strategic alliances.

4.3 Study 3: Multilateral Strategic Partnerships

LGU+ proclaimed a mobile 'web-hard' service for SMEs by launching corporate 'IJ+ Box.' At the moment, it is being expanded as a personal multimedia B2C cloud model, as an effort to advancing it as multimedia cloud business. General users can upload video clips to 'II+ Box' and play them in real-time on their own devices of various types. For example, there are n-screen service (video upload and real-time multi playback) and 'Imory' service (uploaded image developing).

In order to establish a smart work environment, B2B cloud-based SaaS platform and services are used to construct 'U+ Smart SME' that offers customized corporate support solutions combining wire-wireless telecommunication networks and services. For SaaS service customized for SMEs, LGU+ has, from the onset, formed joint implementation and strategic alliance with Microsoft.

6 Conclusion and Discussions

In terms of mobile applications, to process offloading of parts of services, cloud computing can be employed in its place, minimizing power consumption by mobile device processes. As the role MCC plays in mobile office that maximizes the potential of telecoms' converging cloud business and their core capabilities grows in importance, the market competition among them is becoming active. Especially, the telecoms that have at their disposal telecommunications network infrastructure partnerships with providers of devices, mobile platforms, and applications, performing the crucial role in the growth of the relevant ecosystem.

It is our opinion that for converging cloud service platforms based on MCC to grow as a successful business model moving forward, voluntary collaboration, as well as competition, among market participants is called for, along with proliferated strategic alliances. To assume a preferential competitive position among multinational corporations and emerging markets in the context of global market for the future, strategic measures by the major market players and coordination from the government are also deemed necessary to navigate some of the identified obstacles.

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