

# How Evolving Network Access and Network Management Technologies are Redefining the Competitive Wireless Markets

*Fernando Beltrán, University of Auckland, New Zealand*

*Jairo A. Gutiérrez, Universidad Tecnológica de Bolívar, Colombia*

*José Luis Meliús, Universidad Politécnica de Cataluña, Spain*

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## ABSTRACT

*This paper examines some of the key problems users encounter when accessing current generation wireless networks. Using a case study of a hypothetical user, the authors explore the emerging services and the new broadband wireless network technologies necessary to carry them out. This paper analyses the issues associated with an observed trend in the industry that exposes potential changes to the long-term, rigid commercial relation between wireless providers and users: as a result of a range of evolved broadband wireless access standards and technologies, autonomic communications and policy-based management, and new pricing schemes, consumers will likely face new opportunities to enter short-term and spot contracts with the new wireless providers. This new landscape also allow multiple competing Access Providers (APs) to dynamically assign prices, and poses new and interesting challenges to the regulatory function. The paper also discusses a framework for the integration of heterogeneous technologies and management policies based on the network context that make up this emerging, hybrid wireless landscape, and describes the economic characteristics of new markets likely to arise.*

*Keywords: Autonomic Communications, Broadband Wireless Access Technologies, Cognitive Wireless Networks, Short and Long-Term Service Contracts, Two-Sided Markets, User-Centric Services*

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## INTRODUCTION

When Carlitos was confronted with the harsh conditions his cellular telephone company would apply to his desire for contract termination, he wondered: “*there has to be a more*

*rewarding way to deal with a telecommunications service provider*”. In fairness, Carlitos’ cellular provider did let him know by the time he signed up what would have happened had he decided not to continue his commercial relationship before a two-year period. What really attracted Carlitos to become its customer was the seemingly unlimited texting amount he

DOI: 10.4018/jbdcn.2011070104

could do. Texting had become “huge” according to the popular press and Internet reports; more people were texting every day, with teen-agers being the most fanatic in almost every country (Lenhart, 2010). The estimate that 2.5 trillion text messages were sent by consumer of texting services around the world in 2008 was another impressive piece that revealed the growing importance to the big cellular providers of services other than voice (Stross, 2008). Similarly it is becoming clear that mobile broadband devices are transforming the way users access the Web and access personal content at home. Even when someone like Carlitos is at home, he increasingly likes to use his connected devices and gadgets over WiFi and 3G networks for mobile entertainment (Sandvine, 2010).

One day, Carlitos came across yet another report on the state of wireless telecommunications around the world. As someone who really needs to communicate for business and leisure purposes, Carlitos would not really care much about the many facts regarding the cellular voice markets. After all, he reckoned, he was getting something really fantastic: the benefits of an invention turned into one of the most successful and profitable markets at the turn of the 21<sup>st</sup> century. The report highlighted the fact that it has taken the cellular industry only 26 years to reach almost 50% of the world’s population (Belic, 2007), that is, about 3.3 billion people. It also said the market has continued to show encouraging signs of expansion, in spite of the world turmoil brought in by the catastrophic financial crisis of 2008.

To his amazement Carlitos learned that 1 bit of information encoding his voice would cost the company about 0.000015 cents, whereas a bit encoding the text messages he likes sending so much would cost 0.018 cents, that is, roughly 1200 times the cost of one voice bit (Kang, 2008). Carlitos could hardly believe it. Honestly anyone would hardly believe it. Cellular companies have been able to expand the range of services they provide, which originally only consisted of voice, directory and other minor information services, to a large range of new Internet mobile services (real-time com-

munications, real-time entertainment, social networking, Web Browsing P2P file sharing, gaming, etc.) which are now supported by their third generation (3G) networks. However, it is not only the direct provision of services that provides them with huge revenues. Roaming charges seem unjustifiably large with companies relying on the inconveniences and difficulties associated with changing providers for a short period of time (say, while traveling abroad) to effectively lock customers in. On a report’s footnote Carlitos has just learned that, in fact, since March 1 2010, European mobile phone operators are obliged under European Union (EU) roaming rules to offer their customers (users) a cut-off limit facility to protect them from bill shocks while traveling in other EU countries (European Commission, 2010). In spite of such a lukewarm directive Carlitos can see that the big players seek not only to keep but also to strengthen the long-term commercial relationship with their customers. Their proprietary access technologies serve their business plans all too-well even if sometimes someone like him has to carry two different phones or two different access cards, to be able to use different services from different providers. Carlitos is going to have a hard time cancelling his cellular service before the contract termination date, so he wonders: “*is there another way?*”

## SETTING THE CONTEXT

Carlitos likes to try new electronic communications gadgets. As many other users, he is quite aware of the possibilities those new devices might offer. But in spite of their technological virtues, Carlitos has a hard time when it comes to finding who would allow his newly acquired communication devices access to information, communication and entertainment (ICE) services. The Internet is now the main source of ICE services, and telecommunications companies engage in competition for users who seek reliable access paths. Mobile communications devices can engage in active search for access to wireless networks operators who provide

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