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Requirements for Private User Offers of Cloud Computing Services

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Abstract

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With a growing number of personal computing devices operated by the average private individual or employee, an increasingly popular means to have personal files and frequently deployed software applications at hand, without the hassle of having to transfer them between or install them on various devices, are cloud computing (CC) services. To date, research on CC services has primarily focused on business customers. This paper provides an overview of differentiators relevant for private users of CC services. The proposed framework is introduced to guide the design of private user CC offers and to highlight potential directions for future research.

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1. Introduction

In Germany, while bandwidth and usage of both fixed line and mobile data networks have soared over the past few years, the revenues of telecommunications providers are stagnating: The number of landline broadband customers increased by 4.6% annually (22.8 m in 2008 versus 28.6 m in 2013) and average monthly data-volumes per access rose by 10.2% per year (9.4 GB per access/month in 2008 versus 15.3 GB per access/month in 2013). At the same time, providers are facing a slight annual decrease of 3.4% in revenue (35.3 bn Euro in 2008 versus 29.7 bn Euro in 2013). In a similar vein, mobile network operators are confronted with an even more drastic annual growth in data usage of 64.0% per year (22 MB per postpaid SIM card/month in 2008 versus 261 MB per postpaid SIM card/month in 2013), accompanied by slightly shrinking revenues (25.4 bn Euro in 2008 versus 25.1 bn Euro in 2013) (Dialog Consult, 2013).

Sales from various established non-voice telecommunications services such as text messaging or other value-added services (e.g., directory assistance) are lowered due to substitution of established offerings by Internet protocol (IP)-based services, which in turn create revenue for third-party suppliers of software applications (e.g., WhatsApp). In the near future, this trend is likely to be amplified by users moving from circuit-switched voice to (mobile) voice-over-IP telephony (Shin, 2012). This sales shift leads toward an increasing commoditization of established services accompanied by price erosion and thereby decreases profit margins for telecommunications providers (Carr, 2004). Hence, telecommunications providers are looking for new business models to extend their service portfolio beyond being a mere bitpipe (Rake-Revelant, Holschke, Offermann, & Bub, 2010).

One potential source of sustained revenue development for telecommunications firms lies in the growing market for cloud computing (CC) services. According to the US-American National Institute of Standards and Technology, CC can be classified as a service category "for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance, 2011, p. 2; also see Baun, Kunze, Nimis, & Tai, 2011; Venters & Whitley, 2012].

Similar to telecommunications service suppliers, CC providers achieve decreasing average operating costs as the scale of the underlying infrastructure increases (Durkee, 2010). Some researchers even argue that CC can be categorized as a (public) utility (Buyya, Yeo, Venugopal, Broberg, & Brandic, 2009; Strømmen-Bakhtia & Razavi, 2011). Furthermore, CC services are taken to be specialized offerings that can easily be incorporated in the existing infrastructure of telecommunications service providers (Rake-Revelant, Holschke, Offermann, & Bub, 2010; European Commission, 2013; Zeller, 2013). Thus, with positive network externalities and the same group of suppliers, CC and telecommunications services exhibit close similarities.

Previous scholarly work extensively discusses general technical categorizations of CC services (Armbrust, Fox, Griffith, Joseph, Katz, Konwinski, Lee, Patterson, Rabkin, Stoica, & Zaharia, 2010; Dillon, Wu, & Chang, 2010). In addition, it emphasizes trust, security, and legal aspects of CC (Marnau, Schirmer, Schlehahn, & Schunter, 2011; Zissis & Lekkas, 2012; Rath & Rothe, 2013). Some analyses scrutinize drivers of CC adoption (Benlian, Hess, & Buxmann, 2009; Lee, Chae, & Cho, 2013). Other studies examine potential software-related commercial differentiation features of CC offerings such as pricing (Koehler, Anandasivam, & Dan, 2010; Lehmann, Draisbach, Buxmann, & Dörsam, 2012; Brumec & Vrček, 2013), quality of service (Zhang, Cheng, & Boutaba, 2010; Hoßfeld, Schatz, Varela, & Timmerer, 2012), and/or versioning (Katzmarzik, 2011). The business informatics literature on CC overwhelmingly discusses risks, benefits, and current use cases for corporations. Business user needs are, however, very likely to differ significantly from private user needs. This is indicated by the aforementioned similarities of CC services to the telecommunications sector, for which previous work has drawn clear distinctions between the two user groups (e.g., Gerpott, 2004 and 2012). Yet there is a dearth of scholarly studies on private users of CC services.

This is surprising since a substantial share of CC service sales stems from the residential market. According to BITKOM (BITKOM, 2013), in 2012 overall CC service revenues in Germany amounted to 5.3 bn Euro, of which 2.3 bn Euro were generated by private users (business users: 3.0 bn Euro). Private user revenues in the CC market are forecasted to grow up to 6.4 bn Euro (business users: 13.7 bn Euro) by 2016 (BITKOM, 2013). Even though revenues in the private user segment are well below those in the business user segment, due to the substantial CC demand growth in the residential market, CC suppliers are well advised to not only foster business-to-business- but also their business-to-consumer-oriented services. Against this background, it is worthwhile to broaden CC research by investigations related to

demand characteristics in the private user segment.

Hence, the purpose of this paper is to carve out the requirements of private users of CC services and to provide practitioners with insights on how to target this market segment with differentiated future CC offers. The remainder of this article is organized as follows: Section 2 summarizes key features of CC services. Furthermore, it highlights the main levers for differentiating CC services. Section 3 provides a comprehensive overview of private user-specific service requirements derived from the academic telecommunications literature. The requirements identified are then transposed onto CC. Section 4 derives summarizing conclusions.