

# Reducing Information Asymmetry in Cloud Marketplaces

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## ABSTRACT

*Cloud Computing is emerging as a predominant paradigm for obtaining and providing computing functionality in the enterprise. Organizations that are planning to use cloud computing offerings struggle with the question "How do I choose the right offering?" Cloud offerings exhibit a variety of pricing models and different levels of service and functionality. In this article the authors define first Cloud Computing in the context of IT Governance. Then they set criteria to compare different offerings at the level of Software-as-a-Service (SaaS). This is an important precondition for the reduction of the verifiable information asymmetry and uncertainty in the cloud market. Besides deficiencies on the supply side, regarding configuration, display and communication of service bundles, the limited knowledge of potential buyers is main reason for the modest adoption. The authors apply strategies derived from information economics to reduce this asymmetry by integrating information substitutes in the service marketplace description, thereby transforming experience and credence qualities into search qualities.*

*Keywords:* Cloud Computing, Cloud Marketplaces, Information Asymmetry, Information Technology Governance, Software-as-a-Service (SaaS)

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## INTRODUCTION

The impact of information technology in organizations is ever growing, leading to a growing demand on IT management (Gama, Nunes da Silva, & Mira da Silva, 2011). In this scenario, Cloud Computing is changing the established paradigms of information management and the provision of web information systems and other business applications. Thus, the computing world is rapidly transforming towards the development of software for mil-

lions to consume as a service, rather than to run on their individual computers (Buyya et al., 2009). Furthermore, this paradigm shift makes the selection and governance of information technology (IT) providers more complex and challenging. Taking into account that both aspects have been pointed out as crucial for IT management (Casado-Lumbreras et al., 2011; Colomo-Palacios et al., 2011; García-Crespo et al., 2010), CIOs have to learn how to assess Cloud Computing offerings regarding both business and technical aspects in an optimized way. Simultaneously, they need to continuously

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assess and manage risks in the relationship with Cloud Computing providers.

The relatively high complexity of IT services in general makes the comparison of offerings cumbersome and expensive. The transaction costs associated with provider selection and supplier changes are high and often hinder transitions to more optimized service bundles. These insights arose at the beginning of the century with the emergence of web services and application service providing (Günther, Tamm, Hansen, & Meseg, 2001) and are generally applicable to any emerging new technology. They are even more pronounced in the case of Cloud Computing where the hype about its diffusion in society has been substantially more distinct.

One main property of such immature markets has been the information asymmetry between the different market actors – it prevents a meaningful comparability between offerings and thus is prohibitive for the establishment of fluid markets. In this work we propose the extension of approaches originating from web services and application service providing to marketplaces for Cloud Computing and demonstrate their application within an existing Cloud Computing marketplace.

The rest of this work is structured as follows: first, we provide some needed definitions in the context of IT governance. Then we define the term information asymmetry and its role in market interactions and then outline our concept for reducing such asymmetries in Cloud Computing marketplaces. Afterwards, we describe the application of our concepts in an existing Cloud Computing marketplace. Finally, we assess our work so far and present some future research directions.

## CLOUD COMPUTING, IT GOVERNANCE, AND USER EXPECTATIONS

While various definitions for the term “Cloud Computing” are existing, the US National Institute of Standards and Technology (NIST) provides one of the most comprehensive definitions:

*Cloud computing is a model for enabling 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. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models (Mell & Grance, 2009).*

Depending on the type of service, a distinction is made between

- **Infrastructure-as-a-Service (IaaS):** Rent processing, storage, network capacity, and other fundamental computing resources, e.g., rent space on the Internet,
- **Platform-as-a-Service (PaaS):** Deploy customer-created applications to a cloud, e.g., provision of developer tools on the Internet, and
- **Software-as-a-Service (SaaS):** Use provider’s applications over a network, e.g., use of an application via the Internet (Petrucci, Stantchev, & Tamm, 2011).

Based on operational, ownership and organizational aspects, private clouds (enterprise owned or leased, for a closed user group) are distinguished from community clouds (shared infrastructure for specific community) and public clouds (sold to the public, mega-scale infrastructure for a large number of different users). The cloud offers several benefits like fast deployment, pay-for-use, lower costs, scalability, rapid provisioning, rapid elasticity, ubiquitous network access, greater resiliency, hypervisor protection against network attacks, low-cost disaster recovery and data storage solutions, on-demand security controls, real time detection of system tampering and rapid re-constitution of services (Subashini & Kavitha, 2011).

Existing works in the context of assessing Cloud Computing offerings from the point of view of a user organization focus on Return on

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