

Doctoral Dissertation Abstract

Features of a model for integrating current applications with the ones existing in the cloud

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DOCTORAL DISSERTATION ABSTRACT

The paper entitled “*Features of a model for integrating current applications with the ones existing in the cloud*” addresses the paramount issues to be taken into consideration when deciding to uptake the cloud computing technology and proposes a model for locally integrating current applications with a cloud computing solution. The first section of the paper is mostly theoretical, as it features the first main objective of this dissertation, namely the laying down of the conceptual groundwork for the cloud computing paradigm and the scrutiny of its evolution and constituents, in relation to other technologies employed in modern information systems. This research begins with a series of preliminary considerations concerning grid computing, which is regarded as the precursor of cloud computing services. In a subsequent stage of our investigation, we have presented, both theoretically and practically, the defining elements of the cloud computing model, the means of selecting such a solution, the detailed stages of development of the migration process, along with many other scenarios regarding the cloud computing service integration process and its respective implications for the client organization.

Construable as a practical guide for locally implementing and integrating this technology with various other applications, this research is divided into five chapters. *The first chapter* zeros in on grid computing, which we envision as a precursor stage for the development of cloud computing services. Starting from a historical overview of this technology, we have enlarged upon the most relevant characteristics and definitions we have been able to find in the literature, also focusing on its usage and the typology of grid computing-based systems. The closing section of this chapter considers, on the one hand, the utility of this technology within academia and scientific research and focuses, on the other hand, on the transition towards cloud computing solutions.

The second chapter encompasses an overall presentation of the cloud computing paradigm. Therefore, in order to fortify the theoretical grounds of the “cloud computing” notion, our research comprises the most noteworthy definitions of the concept and a synthesis of the particularities of this technology. With regard to the typology of cloud computing solutions, we have chosen to describe the types of services and the deployment models showcased in both the specialized literature and its applicative approaches.

Given the fact that the inaugural section of this doctoral dissertation is dedicated to the theoretical delineation of the cloud computing technology, starting from the *third chapter*, we

have submitted these solutions to a minute practical and economic analysis. In this respect, we have investigated upon the implications companies may encounter when adopting this technology, taking into account their ever-growing orientation towards new solutions for optimizing their activities and reducing their costs. In our attempt to highlight the opportunity or the necessity of switching to the cloud computing environment, we have dedicated the first section of this chapter to the main implications of the transition, based on the three dimensions of the issue: the organizational, the economic and the technical impact of the switch. Then, we have proceeded to examining the most significant benefits of employing the cloud computing technology. Although the most widely known advantage associated to the cloud is cost reduction, the true worth of this technology for the business environment emerges from streamlining the activity, increasing corporate awareness and responsiveness to the market demands.

On the other hand, we have also displayed the most often mentioned risks which prevent companies from adopting cloud computing solutions. Our investigation addresses various important matters, such as data and application security, system performance or blocking a certain supplier's data. However, we should mention that, in most cases, these risks are only perceived by users and do not necessarily reflect a critical flaw of such services. Along with the development and the process of perfecting this technology, most of its vulnerabilities have already been eliminated by the service suppliers and can be avoided altogether through the implementation of a preliminary minute analysis and through negotiating certain contractual conditions, in order to render them fully transparent to both parties.

Another focal point we can notice throughout the entirety of this chapter reflects the extent to which companies adopt cloud computing solutions. According to current studies and a series of special reports we have cited in our paper, we can notice an ever-growing trend in this respect, as more and more companies acquiesce to the utility of migrating toward the cloud computing environment.

The closing section of this chapter is concerned with the prospects of this paradigm and its potential to operate alongside other contemporary technologies. Through their association to mobile technologies, big data and social media, cloud computing services can ensure significant advantages. In fact, we could estimate that the cloud computing environment constitutes an indispensable part of the current business environment. For this reason, we have approached the most relevant connections between these complimentary technologies and we have introduced certain concepts like: consumerism of technology, BYOD (bringyourowndevice), internet of things and digital business.

The *fourth chapter* of the dissertation focuses on the decision to adopt cloud computing solutions. A primary aspect we have included in our research addresses the legislative and standardization organizations, as well as the current global legal framework for implementing and utilizing this technology. Other crucial matters to be taken into consideration for a successful migration are the governance policies, the contractual conditions, which should be clearly outlined beforehand, and a continuous monitoring of the service. Another issue worth mentioning is that the basic factors for the optimal functioning of cloud computing solutions are the possibility to monitor the performance and the quality of the service, as well as its ability to solve various incidents. In order to reinforce the theoretical content of our dissertation with concrete examples of using the service, we have displayed a report model which comprises the types of errors that may ensue after adopting a cloud computing service. Such reports are absolutely necessary for continuously improving the service and for preventing potential crisis situations for the client company.

The decision to migrate towards the cloud computing environment is influenced by other relevant aspects, as well, such as the solutions which are currently available on the cloud computing market and the access to adequate suppliers. Since we are dealing with a dynamic, competitive and ever-growing market, the range of suppliers and services is, unsurprisingly, quite vast. The crucial criteria one must take into account when choosing a business partner are: their field expertise and experience, a diverse and flexible supply, their reputation or the feedback coming from other customers and their accreditations.

Choosing a type of service and a deployment model is directly linked to deciding to adopt the cloud computing technology. Given the fact that every organization features its specific set of characteristics and needs, one must pay special attention to the selection phase, in order to be able to fully reap all its benefits and to avoid unnecessary costs. The last part of this chapter is dedicated to effectively implementing a cloud computing solution. For this reason, we have presented, both theoretically and practically, the methods and stages of the migration process and the steps to be taken in order to make the transition to the cloud computing medium.

The fifth chapter spotlights one of the most common problems encountered in the process of adopting the cloud computing technology. Since most companies choose to transfer only certain capabilities in the cloud, while also keeping some of their already existing applications, the need arises to integrate this service within the local system. In order to help the companies that might be facing this problem, we have suggested the integration of both environments, focusing on the most important implications. The last chapter also comprises a case study on a

Romanian company, whose representatives chose to adopt the cloud computing technology, while also integrating the already existing applications with the ones in the cloud.

In short, the integration process entails adapting the existing applications so that they would allow accessing the cloud computing service. The model we have proposed in this chapter can be perceived as a solution for the problem of locally integrating the applications with the ones in the cloud, thus facilitating the compatibility between the two technologies. This matter has been thoroughly analyzed, since it is a key aspect in the implementation of cloud computing, while also being a crucial aspect of this research.

On the other hand, we notice that there is a possibility of simultaneously adopting several cloud computing services, for instance, when one wishes to collaborate with more suppliers at once. In this case, one must ensure the interoperability of the two services. There have been instances in the current business environment when companies have had to resort to simultaneously using more than one cloud computing solution, while also creating certain links between them. Such cases have also been examined within this chapter.

In addition, our research also features examples of companies wanting to make the transition of their data and applications between several cloud computing environments (provided by different suppliers, if possible). We have taken this situation into consideration, as well, because taking all the right steps to ensure portability can significantly reduce a risk which deters many companies from adopting a cloud computing service, namely the risk of blocking a certain supplier's data or applications.

The final section of our paper comprises the conclusions and the limits of scientific research. Lastly, we have displayed a selection of the most relevant bibliographical references, which we have consulted in order to lay the grounds of this dissertation. The literature we have examined includes scientific articles, books, market surveys and state-of-the-art forecast analyses, published by experts or internationally, nationally and regionally well-renowned authors. All the bibliographical resources have been properly cited throughout the entire length of our paper, thus abiding by the ethical principles of scientific research.