A Decision-Making Support for Business Process Outsourcing to a Multi-Cloud Environment

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ABSTRACT

The business process outsourcing (BPO) remains among the most adopted strategies by organizations to cope with the harsh competition of today's market. This practice has been intensified with the advent of the Cloud computing that has attracted companies by its new way of consuming and paying for resources. Nevertheless, the exposure of business processes (BPs) to Cloud-related threats and non-compliance risks as well as the diversity of Cloud offers in terms of price and quality are ones of the biggest obstacles in BPO to the Cloud. The organizations should therefore examine different factors to determine which BP parts to outsource and to assign them the most suitable Cloud offers. This article proposes a decision-making support called DMS4BPO that helps organizations in outsourcing their BPs to the Cloud by considering security, compliance, cost and performance criteria. DMS4BPO includes on the one hand an AHP-based method for the Cloud offer selection, and on the other hand, a Business Intelligence-based method for the exploitation of the execution history.

KEYWORDS

INTRODUCTION

Nowadays, companies are facing a highly competitive environment in which they must evolve permanently. Business Process Outsourcing (BPO) is seen among the most widely adopted strategies for surviving in such an environment, especially for small and middle-size companies. Indeed, the efficiency and the way of performing the business processes (BPs) of a company have a great influence on the quality of its products or services and therefore on customers' satisfaction. The trend of BPO trend has been accentuated with the emergence of the Cloud computing and the benefits that it brings. In fact, the Gartner research firm (Gartner, 2017) estimates the BP market in the Cloud at $40.8 billion, thus exceeding the market of other service models. The organizations are mainly attracted by the Cloud elasticity and the new economic model of pay-per-use.

Despite the previous advantages, the Cloud is often criticized for various security issues like data breaches and denial of service. A list that sorts out the most important Cloud threats is regularly published and updated by CSA (Cloud Security Alliance (CSA), 2013). Organizations have also to cope with an increasing number of laws (such as SOX and HIPAA act) and standards (such as ISO) especially those operating in heavily regulated sectors such as the financial or medical sector. As the non-compliance may lead to fines, penalties and a bad reputation, organizations need to be well aware of the rules imposed on their processes. However, ensuring compliance becomes more challenging when BPs are under the control of different Cloud providers that may neglect certain regulations or follow laws of the country where they are located.

On their side, the Cloud providers propose a multitude of services, at different prices and with various quality levels. Consequently, the organizations have trouble finding the best Cloud offers that fulfil their requirements. Furthermore, since BPs can encapsulate critical knowledge in terms of know-how, it is recommended to spread them over several Cloud providers that will have only a partial view of processes (Goettelmann et al., 2013).

Given the previous factors, an organization must be very cautious and make a deep analysis when outsourcing BPs to the Cloud. Indeed, it needs to decide whether to migrate their processes to Cloud or not, which processes are concerned and more precisely which activity if it is a partial outsourcing, and finally what are the most adequate Cloud offers for each activity.

All these choices are not obvious and waste a lot of time for companies especially in selecting Cloud solutions (Goettelmann, Dahman, Gateau & Godart, 2014). In fact, the decision makers spend almost 80% of their time in deciding about the suitability of outsourcing BPs (Rekik et al., 2015b). Thus, a decision-making support is required for organizations in order to decide right and rapidly. In this context, several works are proposed but they do not exploit the execution history of processes and often overlook the compliance criteria. To the best of the authors' knowledge, our work is among the earliest efforts that on the one hand consider both risk and compliance as recommended by governance, risk and compliance (GRC) experts (Papazafeiropoulou & Spanaki, 2016), and on the other hand exploit business intelligence (BI) solutions to analyse the execution history. In fact, we have already proposed a BI approach for Cloud broker in (Zarour & Benmerzoug, 2017) by considering reliability and risks in a general way.

In this paper, we propose a comprehensive decision-making support (DMS4BPO) that helps organizations in outsourcing their BPs by considering the criteria of security, compliance, cost and performance. The proposed support consists of two complementary parts. The first part is based on the AHP method and allows from the requirements of each activity to compare and rank the most suitable Cloud offers. The second part is based on BI solutions such as data warehouse and online analytical processing (OLAP) cubes to exploit the execution history of outsourced processes. The business process management (BPM) aims to improve processes in a continuous way by handling their iterative lifecycle, which includes the modelling, automation, execution, and optimization phases (Workflow Management Coalition [WfMC], n.d.). DMS4BPO contributes in the optimization phase since the only way to optimize outsourced processes towards the Cloud is to assign them the best offers.

The remainder of this paper is organized as follow. Section 2 overviews DMS4BPO by describing the involved concepts and the considered criteria. Section 3 and 4 depict respectively the AHP-based method for selecting the best Cloud offers and the BI solutions for analysing the execution history. Section 5 discusses the used tools and techniques supporting the implementation of the proposed support. Section 6 presents some related works. Finally, Section 7 concludes this paper and provides directions for future works.

OVERVIEW OF THE PROPOSED DECISION-MAKING SUPPORT

In this section, we give an overview of the proposed decision-making support by defining the relevant concepts, the considered criteria as well as the added values.

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