



Trusted interaction approach for dynamic service selection using multi-criteria decision making technique

Will Tao*, Guangquan Zhang

Decision Systems and e-Service Intelligence Laboratory, Centre for Quantum Computation and Intelligent Systems, School of Software, Faculty of Engineering and Information Technology, University of Technology, P.O. Box 123, Broadway, Sydney, NSW, Australia

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ABSTRACT

Recent developments in information technology have shifted the computing paradigm in a more dynamic direction, and this has raised new challenges. In a dynamic computing environment, (1) the number of transacting entities is not fixed; (2) the relationship between these entities are very dynamic; (3) transacting entities may not necessarily have previous knowledge of each other; (4) the surrounding context may possibly constantly change; and, (5) it is possible that the transaction is conducted in fully a automatic approach. Based on these unique feature in a dynamic environment, we claim that two important challenges need to be resolved: one is transacting entities should be able to establish trusted interactions between each other, and another is transacting entities should be able to select the most suitable transacting entities by pre-programmed business rules and current context. Based on our previous research work on MobiPass, this paper proposes a technique which successfully solves the above two important research issues by using Multi Criteria Decision Making (MCDM) on top of the MobiPass framework, to help transacting entities select the most suitable transacting partners under a trusted interaction in dynamic environments in real time.

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1. Introduction

As the platform of computing becomes more advanced, the composition and characteristics of modern computing infrastructures and contexts are becoming more dynamic and, therefore more unpredictable. Transacting entities will have to deal with unforeseen circumstances ranging from unexpected interactions in dynamic environments, which raises new issues about trusted interactions during transaction. How to ensure that the information received from unknown entities is trustworthy is an important issue in dynamic environments, which needs to be resolved to ensure business success [1,3]. Jones et al. [10] claimed that trust in information services and technologies has become an increasingly important issue. The development of trust between businesses, consumers, and other stakeholders is seen as crucial for survival of the business. For example, literature has shown that the buyer's trust of the vendor is a critical precursor to a transactional relationship in an e-commerce environment [17]. Chang et al. [2] found that trust becomes crucial to the enterprise or corporation, business, service provider, government and consumer making a decision to carry out an interaction on the internet. Lack of trust between communicating parties results in a situation that is popularly known as the 'prisoner's

dilemma', in which either of the two parties could resort to unfair practices.

However, the trust models currently employed do not provide adequate support to cope with the fast changes in modern computing paradigms [18]. One commonly known example is e-commerce where the platform is very open and buyers and sellers generally do not know each other. It shows that one of the most severe restraining factors for the proliferation of e-commerce is the lack of trust between customers and sellers, consumer privacy concerns and the lack of security measures required to assure both businesses and customers that their business relationship and transactions will be carried out in privacy, correctly, and in a timely manner [12]. Furthermore, in dynamic environments, to streamline the process, improve the efficiency and reduce the businesses operation cost, many services are designed and implemented to be run in a fully automatic manner. Suppose that the interactions between different transacting entities are trusted, how to select a most suitable transacting entity is another important question, as this is the key issue that makes the service more intelligent and efficient, and best fulfills businesses requirements [13,5,6]. To perform business more smoothly and efficiently, there must be an approach to help these transacting entities to make the right decisions in a programmable and real time manner, i.e., the transacting entities should be able to execute pre-defined business logic and also adjust the logic/behavior when internal/external circumstances have been changed. For example, in Web Services, service

* Corresponding author. Tel.: +61 2 9514 4475; fax: +61 2 9514 4517.

E-mail addresses: wei.tao@uts.edu.au (W. Tao), guangquan.zhang@uts.edu.au (G. Zhang).