Study on an Information System Integration Scheme of Enterprises Based on RFID Technology with SOA

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ABSTRACT

Radio frequency identification (RFID) is high technology, which can rapidly and real-timely acquisition information and accurately deal with information. And it has broad application prospects in retail, logistics, transport and other fields. Service oriented architecture (SOA) is a service-oriented architecture, which is used to design and realize the loose coupling software. For the existing shortcomings of current enterprise information system integration, the RFID technology and SOA are introduced into system integration in order to propose a new enterprise information system integration scheme in this paper. In the proposed system integration scheme, the middleware uses the business documents as the carrier of data exchange among other enterprise application systems, and the data stream technology is used to filter and package RFID data. The rule parsing technology is used to control the business processes. The SOA is used to realize the loose coupling and integration of RFID data event and application system, and deal with the configuration of the components. At the same time, .NET Remoting technology is used to realize the distribution architecture of middleware in order to ensure the deployment flexibility of middleware. The applied cases of a demonstrative application system, blood management and traceability system are used to illustrate its feasibility and effectiveness of the proposed integration scheme. The enterprise information system integration scheme provides an effective solution for system integration between different enterprises or internal enterprises. It can solve the compatibility between different application systems, and takes on the higher service efficiency, less CPU average occupation and better average response time. This study provides a stable and effective solution for information sharing between enterprises, improves the work efficiency and reduces the whole work management capital, and continuously improves the informatization level of the enterprises.

KEYWORDS

Data Stream Technology, Enterprise Information System, Integration Scheme, Loose Coupling, RFID Middleware, SOA

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INTRODUCTION

RFID technology is a fast, real-time, accurate, highly automated information identifying technology (Want, 2006; Chen et al., 2017; Wiseman, 2014). It is a wireless communication technology, which can identify the specific targets by radio signals and read and write data. It is composed of the high frequency technology, communication technology, database technology and manufacturing technologies (Achilleas et al., 2009; Konstantinos et al., 2007). And the deployments of item-level RFID are very important for the framework of RFID application (Rizzi et al., 2016; Bertolini et al., 2015). In the last decade, the RFID technology is evolving as major technology due to the lower cost and the increasing capabilities (Lyu et al., 2010). So, the RFID technology has widely applied in the fields of the production, logistics, transportation, automatic control, security, medical treatment, management, information and so on (Bradley et al., 2010; Hsiao et al., 2010; Cho, 2011).

The RFID middleware is the middle of the readers and database system and application system. It’s a critical component in RFID application system, and plays an important role between tags and application system (Gama et al., 2012). This layout can help the integration between RFID equipments and application system. But it can’t provide higher data integration level due to the loose coupling and poor adaptability, and so on (Wang, 2008; Choy et al., 2017).

Enterprise information system is the most great applications for RFID technology (Ikeda, 2006). The challenge of the successful RFID applications is to relate to the efficient gathering, filtering and spreading of RFID information. The RFID system generates a great deal of events by using heterogeneous sources, which are administrated to be a scalable and reliable method. The distributed enterprise information system need to access the transaction and message from sensors (Valero et al., 2016). They must possess and display the scalability, openness, interoperability and accessibility.

LITERATURE REVIEW

Enterprise information system has become increasingly popular over the last several decades. It integrates and extends the business processes across the boundaries of business functions, corporate walls, industries, as well as geographic borders. In recent years, experts and scholars have put forward all kinds of enterprise information system integration technologies and methods. Lämmert et al. (2008) presented a process of enterprise system integration. Fang et al. (2009) presented an integrated platform based on SOA for real estate to strengthen the efficiency of surfing Internet. Su et al. (2009) presented a subscription integration methodology based on RFID technologies for enterprise information systems. Pahl et al. (2009) proposed a service-centric software system integrating framework for emphasizing SOA. Kocher et al. (2011) presented a novel data mining system in order to effectively extract the information for the motion character of RFID tags. Yeh et al. (2011) presented an intelligent service-integrated platform for preventing the monetary loss because of information gap. Maria et al. (2011) presented the interplay of all that contemporary RFID middlewares provide, and actual expectations from them, in terms of desirable “features” and “aspects”, SOA-based strategy that helps to consolidate representative design aspects of a well-federated RFID middlewares. Zhang et al. (2011) presented an innovative all-in-one Smart Gateway technology for capturing real-time production data from various manufacturing resources attached to different types of RFID/Auto-ID devices. Ryzko et al. (2012) presented a hybrid architecture based on multi-agent and SOA in order to conduct trade in a multi-commodity markets. Jong et al. (2012) combined the RSA encryption and decryption algorithms to raise the safety and the information security systems. Leitao et al. (2012) presented the integration of 2D/3D digital software tools with Petri net based SOA. Dai et al. (2014) presented a novel fiber Bragg grating sensor multiplexing system. Thomas et al. (2012) presented a system integration method based on RFID and SOA.

For these enterprise information system integration techniques and methods, they better solved system integration problems. But these techniques and methods exists some shortcomings, such
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