Network Based RFID Positive Feature Executive Resolution Established on Cloud Services

Mr R.Vijai¹, K.Venkatesh² and C.Prasanth³

¹ Assistant Professor, Information Technology, Anand Institue of Higher Technology, Kazhipattur, Chennai.

> ² Information Technology, Anand Institue of Higher Technology, Kazhipattur, Chennai.

> ³ Information Technology, Anand Institue of Higher Technology, Kazhipattur, Chennai.

ABSTRACT

RFID (Radio Frequency Identification) technology has been around for many years. There are many common uses for RFID that includes toll road passes. access ID cards and badges, the tiny ID chips that are inserted in animals for identification purposes and also for other tracking purpose. The recent introduction of RFID in the supply chain, in addition to several authorization has added to the awareness and value of this technology. In this paper an RFID architecture has been presented where the traditional role of the localized middleware has been distributed to the RFID reader and a cloud based web service supported by a web based user interface, eradicate the role of the former. An interface allows a consumer to control and carry out all of the major RFID related operations in a typical supply chain based situation remotely.

Keywords: RFID, Reader Web Services, Cloud Services, Web based User Interface.

1. Introduction

Presently, an organization which plans to use RFID needs to have supporting staff qualified in handling hardware, software issues, deployment and related aspects. Setting up an RFID infrastructure also needs extensive installations of enterprise management systems, middleware, databases etc which generally act as an obstacle for interested organizations. One can envision that in the future, an RFID service could be like a mobile phone service, where a user can simply buy the hardware and plug it and begin using the RFID service. The Reader Web Service can be similar to the switching station. The different services available within an RFID solution can be created and maintained by different stakeholders. As an example, the initiation service of the readers could be provided by the manufacturers, data processing and filtration web service is offered by one stakeholder, database services are provided by another stakeholder and so on. This ensures that each component of the RFID solution is individually managed and optimized by different stakeholders who have expertise in that component. Cloud based computing has been frequently cited as a favorable replacement for many types of software systems where the computation was previously localized. In this work, we are trying to create RFID solution for supply chain systems with a web-service based architecture which pushes a lot of the traditional middleware based data processing to the more powerful readers and to the cloud infrastructure. This allows us to inject federation into the architecture.

1.1 Web Service

A web service is a software system designed for interoperability between applications running on different computers. It extends the World Wide Web infrastructure to allow applications to communicate with each other. Each network service has a unique Web Service Definition Language (WSDL), which is essentially an XML file that contains web services-related information, such as its location and a list of supported methods. To access a method supported by a service, an application must generate messages as specified by the WSDL. The messages may need to be enclosed in a SOAP envelope before they are transmitted to the service using HTTP. The advantages of web services are that they use open standards and protocols, they support any operating system, and they can securely work through corporate firewalls.

1.2 Cloud Computing

Cloud computing refers to computational resources that are accessible as on-demand services over the network. It may be broadly categorized as software-asa-service, platform-as-a-service, and infrastructure-as-aservice (Napper and Bientinesi, 2009). The software-as-aservice (SaaS) which is also known as application-as-aservice includes the process of any application being delivered over the platform of the web to an end user, typically leveraging the application through a browser. It is based on the traditional timesharing model where many users shared one application and one computer (Dabas and Gupta, 2010). It leads to cost savings and risk reduction since a big amount of capital expenditures are eliminated which were required in the deployment of infrastructure or large-scale applications in-house (Napper and Bientinesi, 2009).

1.3 Web based interfaces

The web-based user interfaces can be used to build a dynamic, user-friendly tool, integrating various components of a project such as inputs/outputs macro programs and documents, as well as external resources such as guidelines, user-manual, examples and useful hyperlinks to various web sites.

1.4 Radio Frequency Identification

RFID (Radio Frequency Identification) for the past decade has been playing an important role in various kinds of supply chain based industrial applications. It is an data collection technology that uses electronic tags for storing data. The tag, also known as an "electronic label," "transponder" or "code plate," is made up of an RFID chip attached to an antenna. Transmitting in the kilohertz, megahertz and gigahertz ranges, tags may be batterypowered or derive their power from the RF waves coming from the reader. RFID allows business modules to expose methods via web services. External applications running on different platforms and located across networks can access these methods to receive rich RFID content. Using the ubiquitous formats and protocols of web services, enterprise applications can securely communicate with RFID business modules.

2. Related Works

- (2004) S. Chawathe, V. Krishnamurthy, S. Ramachandran, and S. Sarma, presented an overview of RFID data management from a high-level perspective and introduced the idea of an online warehouse but without providing details at the level of data structure or algorithms.
- (2007) Dan Lin, Hicham G. Elmongui1, Elisa Bertino, Beng Chin Ooi, proposed an efficient method to manage RFID data, which explore and

take advantage of the containment relationships in the relational tables in order to support special queries in the RFID applications.

- (2010) Daniel Owunwanne, Rajni Goel proposed implementing RFID technology using cloud computing framework to reduce the implementation cost.
- (2009) D.Sundaram, W.Zhou, S.Piramuthu and S.Pienaar proposed a sixlayered framework for an RFID based web service which communicates and controls individually with RFID tags that pass through the readers and shares this data with other systems when required. It addresses the problem of integrating heterogeneous and loosely coupled components to form a service chain.

(2009) – E.Welbourne, L.Battle, G.Cole, K.Gould have showcased a web based RFID tracking solution primarily for personnel in an indoor environment. Their work is to attach RFID tags to objects which would be read by the reader and the movements and location patterns would be recorded. This is used for personnel tracking only and also the low level tag movement to high level event translation was passive.

(2011) - Arunabh Chattopadhyay, B.S.Prabhu, Rajit Gadh proposed a system for Web based Asset management system established on cloud services.

3. System Architecture

A strong web based user interface is built which is used to manage the database. The user will be given administrator privileges once he registers through user interface. There the user can manage, add, edit or update data. The cloud service plays a major role as they form the backbone for this proposed solution. They are mainly used as they are cost effective and provide high security. They store data and generate the RFID codes effectively.

The web services acts as intermediate between the database (cloud service) and the Reader Resident Application (RRA). The RRA is used to read the RFID codes which are strongly encrypted such that the third party/external user cannot access or modify it. The RFID codes are highly encrypted as they can be only read by the Reader Resident Application (RRA). RFID codes provide authentication and high confidentiality. The web service which has replaced the former localized middleware is too powerful. The web services which function with active internet connection are responsible for the data transfer from the database (cloud service) to the RRA as RFID codes (Fig.1).



Fig:1Proposed Architecture for RFID using Web Services

The RFID using web services can be effectively used in Supply Chain Management as well. The proposed RFID solution using web services can manage multiple web services at the same time (Fig.2). Data traffic and collision can be avoided by the web services as they act as an efficient intermediate interface.

Multiple services upload their services in cloud which are then forwarded to the subscribed users as RFID codes. These RFID codes can be decrypted only through RRA(Reader Resident Application).



Fig:2 Supply Chain Management system for multiple services

4. CONCLUSION

In this paper the design and implementation of an RFID tracking solution based on web services and cloud

computing resources has been shown through Supply Chain Management system. This allows multiple services to act in the same time. This overall system enhances to perform high level tasks and the possibility of resources on a cloud

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computing platform gives it the benefits of low setup cost and time and remote controllability, hence an increased business value. Thus in future the combined architecture of RFID and web services using cloud resources can be used in major fields and technologies.

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