ISSN : 2347 - 8446 (Online)
ISSN : 2347 - 9817 (Print)
Vol. 2 Issue Special 1 Jan-March 2014
International Journal of Advanced Research in Computer Science & Technology (IJARCST 2014)

RFID System with IP Based Distributed DBMS

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Abstract
Unique identification of the individuals can be successfully done by maturing technology Radio Frequency Identification (RFID). Different Domains are incorporated to get the database built for the access of Information, Transaction, and Verification which is generally called as Distributed Data Base Management System (DDBMS). Different kind of client side end points will access the DDBMS by unique Identification as per their requirement and parameters belong to their corresponding Domains. In order to provide easy and efficient access to the DDBMS and avoiding separate scripting for different domains, here is the proposal of general IP based scripting for all domains.

Keywords
RFID, Unique Identification, DDBMS, IP, Network ID

I. Introduction

Radio Frequency Identification (RFID) is the maturing technology to perform Unique Identification based tasks. When the system is federated there should be the centralized DBMS, it could be Distributed DBMS which is the combination of several different site DBMS together to make the purpose of accessing the information from different domain and to make the availability of required data to the corresponding domain without fail. But there is the constraint of the permission that a domain is supposed to give its corresponding data. To achieve this, there could be different script developed by the different client end points in order to access the DDBMS. It seems complex in structure and increased number of resources and duplication required and mainly there would not be a federated system. But the purpose of RFID is unique Identification of the individuals in the federated system consists of DDBMS.

To get the process of unique identification with corresponding response from the server of DDBMS, Here is the proposal of IP based processing of the query can be scripted in the server. Whatever the client end point of different domains is, there is the federated DDBMS server and general script for all query which will be optimized by IP (Internet Protocol). The request could be the unique identifier of the individuals. The request content is simply the unique identifier of the individuals from the RFID scanner. Thus the system provides the same GUI client end point for all domain of the federation which gets off the use of different parameters as per the domains.

II. RFID

Radio Frequency Identification (RFID) is the wireless non-contact use of radio-frequencyelectromagnetic fields to transfer piece of data, for the purposes of automatically identifying tags attached to objects either cards or embodied as microchips. The tags consist of electronically stored information which is Unique Identifier of our concern.

A. Tag

RFID system uses tags attached to the objects to be identified. RFID tags could be passive, active or battery-assisted passive. An active tag has an on-board battery with it and periodically transmits its ID signal. A passive tag is cheaper and smaller because it has no battery. The power for the passive tag is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it and energizing the circuits in the tag. The tag then sends the unique identifier encoded in the passive tag's memory. RFID tags can be read at a faster rate than barcodes.

B. Reader

Two-way radio-transceivers are referred as readers send a signal to the tag and read its response. A reader contains an RF module, which acts as both a transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to create the carrier frequency. A modulator to impinge data commands upon this carrier signal and an amplifier to boost the signal enough to awaken the tag. The receiver has a demodulator to extract the returned data. An Active Reader Passive Tag system has an active reader, which transmits interrogator signals and also receives authentication replies from passive tags.

III. Different domains

A federated system is integrated with several domains. Unique Identification System consists of all details about the individuals. The complete detail is the information from various sectors about the individuals. The Domains could be Medical department, Banking sector, civil department etc. Details of the individuals will be updated by the relevant domain with the authority of the Government.

The card with RFID tag will be needed to do anything in the society. Nothing can be done without RFID tag by a citizen. If the Traffic controller wants to analyze a citizen while driving, whether he has got the license to drive. He would read the card by RFID reader, the unique identifier is given to the server and the response from the DDBMS. The response would be just the information about license and related stuff.

If a citizen wants to access medical department for his regular yearly health checkup. The same card with RFID tag would be used by the medical department to access his health care records by his unique identifier. The response from the server would be the medical records and health care information from the DDBMS.

If the same citizen wants to access a shopping market, at the time of payment his card will be accessed for the money transaction with his authentication, The transaction related stuff only will obtained by the same RFID tag which is the one used in the previous two domains.

Passport information is regularly being updated in the DBMS of the passport management. Whenever the situation that the citizen

ISSN : 2347 - 8446 (Online)
ISSN : 2347 - 9817 (Print)

wants to use his passport while travelling, his tag will be accessed by the Airport management to get the full-fledged details of his passport with same RFID tag of his. Domains will be accessed through the RFID tag which contains identifier.

IV. ddbms

A Distributed DB is a collection of normal databases but physically distributed over a network.The data is split into "fragments" on separate machines; each running a local DBMS. It manages distribution of data and processing in a fashion that is invisible to users.

A. Homogeneous DDBMS

All sites in DDBMS use the same DBMS product. Different DBMS products are Oracle, MySQL, and DB2 etc.

B. Heterogeneous DDBMS

Sites may run different DBMS products, which need not be based on the same underlying data model, and so the system can be composed of relational, network, hierarchical and object-oriented DBMSs.

In a heterogeneous system, translations are required to allow communication between different DBMSs. Involving the mapping of the data structure in one data model to the equivalent data structures in another data model. For example, relations in the relational data model will be mapped to records and sets in the network model.

It is also necessary to translate the query language used (e.g. SQL SELECT statements will be mapped to the network FIND and GET statements). When discussing access to distributed databases, Microsoft favors the term distributed query, which it defines in protocol-specific manner as "SELECT, INSERT, UPDATE, or DELETE statement that references tables and row sets from one or more external OLE DB data sources". Oracle provides a more language-centric view in which distributed queries and distributed transactions form part of distributed SQL. Heterogeneous DDBMSs use different DBMSs/Platforms and require GATEWAYS or other middle-ware to convert queries/data models between sites.

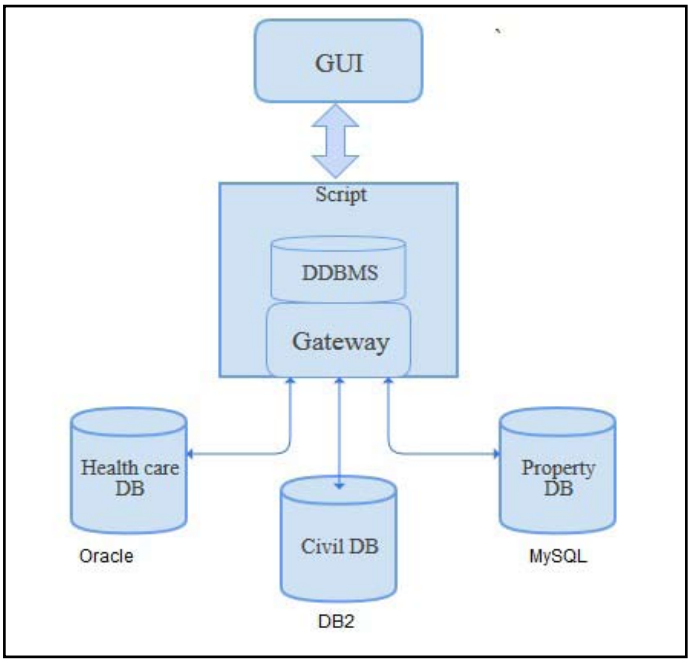

Fig. 1: System's Heterogeneous DDBMS

C Gateway

Some relational systems that are part of a heterogeneous DDBMS are to use gateways, which convert the language and model of each different DBMS into the language and model of the relational system.

D. Distributed Query Processing

Distributed query processors translate a high-level query on a distributed database, which seems as a single central database by the users, into an efficient low-level execution plan expressed on the local databases. The translation must be a correct transformation of the input query so that the expected result can be produced.

V. IP Based Scripting

An Internet Protocol address (IP address) is a numerical label assigned to each computer. Computer participating in a computer network that uses the Internet Protocol for communication. In our system, the input is always be the unique identifier of the individual for all the domains. Every computer system has the IP address used by the domains to access the RFID tag in order to get the unique identifier. Here we are making the IP (Internet Protocol) as the query optimizer.

The client end points use the Computer to request the server with unique identifier which would have been read from the RFID tag. Query will be optimized as per the IP address of the client end point. So the response from the DDBMS server will be corresponding to the particular domain. It is all because of optimization of the IP address which is the IP address of the client end Computer of the corresponding domain.

A. Network Identity

Network ID is the portion of the IP Address. It specifies to which network a computer belongs. Systems belonging to same physical network have same network id. The network id may be same but host id within "same network id" will be different. An IP address starts with network ID and ends with host ID. Network Id will be found out by using the default mask of relevant Class.

e.g. If the IP address of the client end is 100.64.250.192, It belongs to Class A. Default mask of the Class A is 255.0.0.0 The network ID of the client end is 100.0.0.0

B. Query Optimization

Query to the DDBMS server will be optimized as per the network id of the IP address. E.g. network id 100.0.0.0Scripting would be done as per the network id of the IP address of client end host in the network.

For an Example, Assume the Relation model, Table name is "net_id_table" which consists of the Domain Id and corresponding network_id used by corresponding Domain.

Table 1. A Relational Table: 'net_id_table'

S.No	DomainName	Domain Id	Net Id
1	Health Care	TN200GJ1	101.0.0.0
2	Police	TN100GJ1	130.2.0.0
3	Health care	TN200GJ2	150.35.0.0
4	Passport	TN099GJ1	97.0.0.0
5	Asset	TN105GJ1	145.0.0.0

C. Query to DDBMS

After successfully optimizing the request based on the Network id of the IP address of the client end Computer, query to the DDBMS server will be the parameters of Corresponding domain. The network id of IP address of the client end Host would be optimized by mapping it with the network id present in the relational table of all domain network ids. So the input of the all domain's client end point is the unique identifier from RFID tag, and Response from the DDBMS server will be different as per the corresponding domain which is done by IP based query optimization.

```
$ip=$this->input->ip_address();
$net=$this->model_id->net_id($ip);
$this->db->select('Domain Id');
$this->db->from('net_id_table');
$this->db->where('Net Id',$net);
$domain_id=$this->db->get();
$this->domain_model->get_dom($domain_id);
```

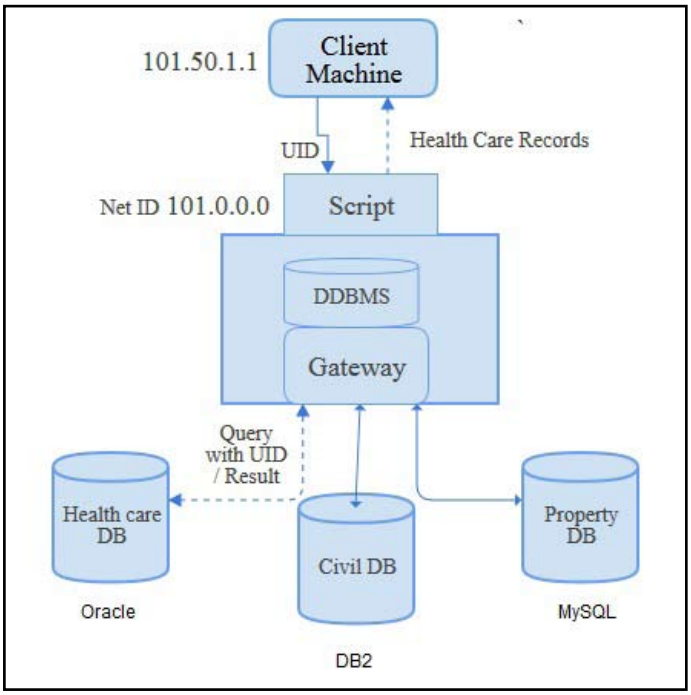

Fig. 2: IP Based Optimization of Query

VI. Security

To Ensure the RFID System Secureness, some of the security parameters must be considered. Here is the necessity to analyze about Data Privacy and Identity. The Internet Protocol (IP) communication between RFID readers and network is secure.

A. Data Security

There must be the controlled access to the data. It defines; only authorized entities such as people, system can read and write data. There must be control over access to the system. It defines; only authorized entities can configure and alter the system and all devices, components in the system must be authentic.

B. IP Spoofing

The IP address spoofing technique can enable a pirate to send packets on a network without having them be intercepted by the packet filtering system firewall. Firewall systems are usually based on filtering rules indicating the IP addresses that are authorized to communicate with the network's internal machine. Incorporating IPsec, Implementing the filtering of both inbound and outbound traffic will significantly cut down on the risk of spoofing.

C. RFID Readers Integrity

Readers can use random frequencies with tags designed to follow a frequency dictated by the reader. RFID Readers can change frequencies randomly so that unauthorized users cannot easily detect and eavesdrop on traffic. Data transmitted between the reader and the RFID application server could require verification of the RFID reader's identity. Authentication mechanisms can be implemented between the reader and the backend application to ensure that information is passed to the valid processor by valid RFID reader.

RFID tags can be shielded with a container made of metal mesh or foil, known as "Faraday Cage". This foil-lined container can block radio signals of certain frequencies (predefined unauthorized frequencies). RFID environments can be equipped with special devices to detect unauthorized read attempts on tag frequencies. These read detectors can be used to detect unauthorized read attempts on tags.

VII. Conclusion

In this proposal, the emerging RFID technology involved in unique identification of individuals for getting access to the DDBMS by client end points of different domains as per the IP based query optimization. In Future, Unique Identification will rule the world. Adoption of RFID technology would have been by governments for unique identification of citizens. To secure the tag from theft, loss, there is the conceptualization of embodying or implanting the tag inside the body of every citizen, has been evolving. Research based on policies, rights, security and privacy is being developed about the human implantation of the RFID tags, simply known as Microchips. "Both small and great, rich and poor, civil and criminals, to receive a tag on their hand or on their foreheads, And that no one may buy, sell, trade, drive, loan or live except one who has the tag".

VIII. AcknowledgEment

I thank God the almighty for this wonderful opportunity to present my proposal and I am inspired to this after I read the Book of Revelation which is one of the books of New Testament.I am very much grateful to my parents who supported me to get it done. Thanks to staff, friends who encouraged me throughout this research.

References

[1] *The Book of Revelation.*
[2] *RakeshAgrawal, Alvin Cheung, Karin Kailing, Stefan Sch¨onauer, "Towards Traceability across Sovereign, Distributed RFID Databases"*
[3] *The Government of the Hong Kong Special Administrative Region, "RFID Security".*
[4] *M. Tamer Özsu, Patrick Valduriez, " Distributed Data Management: Unsolved Problems and New Issues"*
[5] *Chiu C. Tan and Jie Wu, Temple University, USA, "10 Security in RFID networks and communications"*
[6] *ChristophJechlitschek, "A Survey Paper on Radio Frequency Identification (RFID) Trends"*
[7] *Thomas Hollstein, Manfred Glesner, Ulrich Waldmann, "Security Challenges for RFID Key Applications"*
[8] *Marco Spruit, WouterWester, "RFID Security and Privacy:*

ISSN : 2347 - 8446 (Online)
ISSN : 2347 - 9817 (Print)

Threats and countermeasures"
[9] Sarah Spiekermann, Oliver Berthold, "Maintaining privacy in RFID enabled environments –Proposal for a disable-model"
[10] MandeepKaur, HarpreetKaur, "Concurrency Control in Distributed Database System"
[11] Deepak Sukheja, Umesh Kumar Singh"A Novel Approach of Query Optimization for Distributed Database Systems"
[12] SheetlaniJitendra, Gupta V.K. "Concurrency Issues of Distributed Advance Transaction Process"
[13] Swati Gupta, KuntalSaroha, Bhawna "Fundamental Research of Distributed Database"

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