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WEB SERVICE BASED E-LOGISTICS APPLICATION

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Abstract — The paper describes the approach for developing e-commerce applications from web services. The applications implemented in heterogeneous platforms and areas can collaborate through Web Services. Presentation layer communicates with database systems through services interface layer. The legacy system layer consists of the existing data sources and information technology systems available for each organization involved in the integrated application. The service interface layer enables the functionality of the legacy systems to be available as Web Services, abstracting from the implementation details. The methodology for building an application using web services illustrates the approach through a use case on e-logistics. The e- logistics platform is integrated with the GPS/GIS technology for efficient logistics distribution management information platform for tracking purpose.

General Terms: E-commerce, web service, tracking, E-logistics

Keywords: SOAP, UDDI, WSDL, service interface layer, connection layer, GPS/GIS technology

I. INTRODUCTION

With the intent of Web Services as part XML-based distributed computing, the integration of business applications on the Web became an easier task. Web Services enable business organizations to provide services by exposing process functionalities through a standard interface description, keeping implementation of computing systems. Thus, applications in diverse areas such as e-commerce and e-governance can interoperate through Web Services implemented in heterogeneous platforms.

The standards used are Web Service description (e.g. WSDL, Web service description language) and publishing (e.g. UDDI, Universal Description Discovery and Integration). XML plays a role of trivializing the exchange of business data among organizations by providing cross-platform approach in the areas of data encoding and data formatting for most integration architecture which is a platform and language neutral content representation technology. For example, SOAP, built on XML, defines a simple way to package information for information exchange across system boundaries between different business applications. UDDI Registries, on the other hand, allow programmable elements to be placed on Web Sites where others can access remotely. Making use of the above technologies, we get interoperability for applications our customers and can use our multi-platform approach to provide better offerings and solutions with the help of which any organization can accomplish their transactions efficiently and profitably.

Logistics management is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory and the related information flows through the organizations and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfillment of orders. The tacking of moving entities can be performed by the integration of GPS/GIS in the logistics platform.GPS (Global Positioning System) and GIS(Geographic Information System)performs pinpointing of specific locations and complex mapping technologies that is connected to a particular database.

II. E-LOGISTICS FRAMEWORK

The business to business (B2B) transactions is performed through different application platforms. Here many logistics service providers are taken into consideration. Although, the applications are developed in diverse platforms, they can provide services through unique interfaces. The communication between the user and the applications is done through different layers.

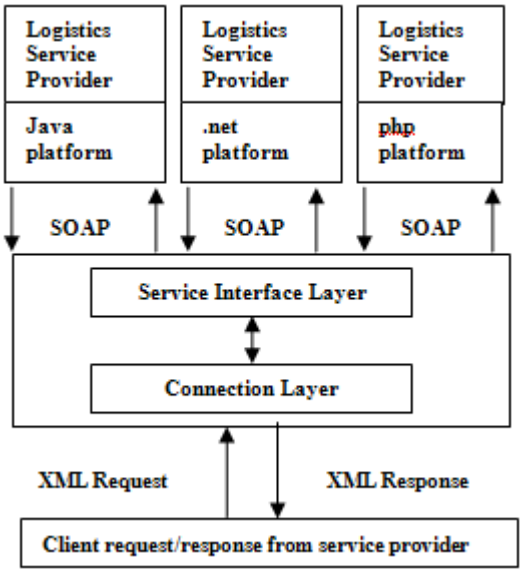

Fig 1: Framework of the system

The client request is placed in connection layer and through the service interface layer, the request is placed to appropriate service provider by SOAP messages. The logistics service provider integrates the response with the information in the request and produces SOAP response. The response will pass through the layers and then delivered to requestor as XML responses. According to the Council of Logistics Management (CLM), logistics is the process of planning, implementing, and controlling the efficient effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.

Fig 2: E-logistics working flow

Large numbers of companies now view for their own websites for e-commerce purposes. Logistic management is the management process which integrates the flow of supplies into, through and out of organizations. Logistics Management is that part of a Management Solution that plans, implements, and controls the efficient, effective forward flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. The transactions must be integrated with the business process manager and the back end server.

III. LAYERS AND SERVICES

A. Service interface layer

A set of common interfaces are available to carriers, and provides more flexibility to service requestor. Requestor can place the order through standard interface instead of multiple requests. Application developing involves coding once for service providers .By increasing reliability and availability, quality of service can be improved. Easier adaptation to new services makes the system more flexible.

B. Connection Layer

The connection between the Web Services and the legacy system is provided by this layer. This is the service broker between service requestor and service provider response. Transportation broker communicates with UDDI register.

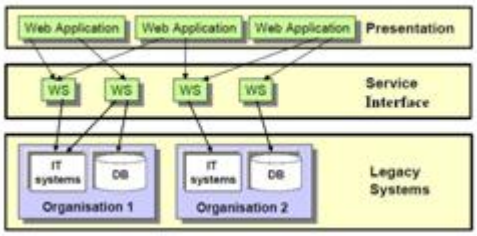

Fig 3: Application architecture

When the request for the web service generated, it is forwarded to the connection layer. The authentication involves signature mapping between requestor and Web Services methods, protocol transformation (e.g. from SOAP to HTTPS). After, the server is invoked. Response from the server is aggregated by connector layer and is sent to the client. Aggregation functionality involves splitting service request to multiple service providers and integrating the responses according to dynamic data.

C. Presentation and legacy systems

Presentation layer holds the applications developed in diverse platforms. Presentation layer communicates with legacy systems through connection layer and service interface layer which is build on XML technology. Legacy systems built for different organizations.

IV. WEB SERVICES

XML manages the exchange of business data between different applications by platform-neutral approach for encoding and formatting. For example, SOAP, built on XML, defines a simple way to exchange messages across applications.

A. Order web service

The application can send an order request to the order Web Services. Then the order will be mapped to a XML message and will send to the connector layer. After the order creation, it will be embedded to the SOAP message. Based on the order information, the order processing is done and forms transportation planning. Here transportation web service is invoked and communicates with database servers. Then the response formed by these processes is sent back to requestor as SOAP.

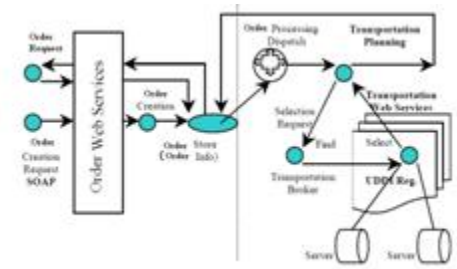

Fig 4: Services and processes

The service interface layer directs the request to the service providers and aggregates response from the servers, binds the data received from the service provider with the response XML and send to the requestor application. The flexibility to choose the best services according to the quality of service is provided to clients. The authentication based in username and password is required for secure transaction. For example, the XML request is

<? xml version=”1.0”>
<LicenseNum>123</LicenseNum> <Username>John</Username>
<Password>kinnng</Password> <transport>
<Source>
<City>Kochin</City>
<State>Kerala</State>
<PIN>577664</PIN>
<Country>India</Country> </Source>
<Destination>
<City>Coimbatore</City>
<State>Tamil Nadu</State>
<PIN>678654</PIN>
<Country>India</Country>
</Destination>

<Weight>500</Weight>
<Unit>kilogram</Unit>
</transport>
The service request will be sent to the server and the response will be given to the requestor .The Response XML template can have followingstructure:
<?xml version=”1.0”>
<Response>
<Weight>500</Weight>
<Unit>kilogram</Unit>
<Rate>
<Charge>
<Currency>Indian Rupees</Currency> <Value>1200</Value>
</Charges>
<DaysToDeliever>1</DaysToDeliever>
<DelieveryTime>10:00AM</DelieveryTime>
</Rate>
</Response>

B. GPS tracking Web Service

This gives instantaneous position of the vehicle to the clients and thus provides the information about the progress in transportation. The authenticated user can request the GPS location of the vehicle. The alarm function is used in emergency. When the driver was robbed on the way, can press the car's GPS alarm device to alert the monitoring center. The status of the shipment corresponding to a specific order can be monitored by the client. After the map server gets the transport status from the Tracking Web Services, the connector layer can communicate with other layers and services.

C. Transport Web Service

After selecting the transport medium and order processing, the data should bind dynamically with destination, weight, and source with connector layer. The connector layer then sends the request to the appropriate service provider and gets response from the service provider. The server binds the data with the request with the response. The client will get a response containing transportation information. The processes are authenticated through username and password.

V. SYSTEM DESIGN

Combining GIS and GPS technology, platform is formed based on the analysis of the latest computer technology and Logistics business. Focused on the mobile users Logistics information requirement, the system architecture, workflow and functional modules is put forward and designed.The system consist of map server which stores and manipulates all identified locations, local monitoring GPS server, GIS server and the GSM network for vehicle to server communication. Map server and the GIS server collectively provide the information for decision making which is essential for the supply chain management. Effective routing can be done by locations in the map server. Most transportation services require spatial and temporal information.

However, traffic monitoring detectors described above are localized and lack spatial coverage. Remote sensing imagery from satellites cannot provide time continuous transportation information.

VI. GPS/GIS INTEGRATION

The functionality provided by the system is accurate information supporting, graphical display enhancing analysis, wireless communications makes the logistics platform controlled. The stored information contains property and time characteristics and uniform geographical coordinates. Thereby it can able to display, express, analysis all information accurately, in a comprehensive manner which distributed continuously in time and space to support a variety of analysis and decision making. In Logistics platform management, it is used in spatial information management, such as the change of goods spatial location, the reasonable choice of transportation routes, the warehouse layout, the distribution center layout, etc. The GIS functions as a graphical user interface. The functionalities are storage, analysis, forming analytical maps according to the positions. The GIS spatial analysis function, which does different spatial analysis against point, line, surface and body, has a unique role in Logistics analysis, such as the shortest path, network analysis, distribution region segmentation, etc. We can calculate the optimum Logistics route to the destination with the help of GPS real-time road information. The instantaneous route tracking, communication with the central server, proposes the idea of just-in time delivery of the products. As shown in Figure 5, basic components of data system can be divided into two parts: field-based and office-based components. Recording and reporting of coordinates are involved in the first part followed by the second part of data storage, data retrieval, data analysis, and information distribution system to perform the transactions and thereby we can build an integrated E-logistics system.

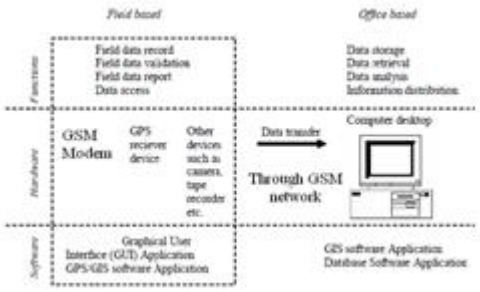

Fig 5: The proposed data system

The instantaneous route tracking and analysis system, proposes an integration of core technologies, which GPS and GIS and map server in which database software application and GIS software application is running, the office based system. In this framework, the GSM receiver device and GSM modem are integrated to a single device, communicate with attention commands. In the map server, there will be another GSM modem which will communicate with the GSM modem placed in field based system. So with the existing infrastructure,(GSM network) the data transmission can be performed with little effort. After the non-spatial and spatial data are gathered, GIS would be a versatile database management tool for other tasks including data retrieval, data analysis, and information distribution.

VII. CONCLUSION AND FUTURE SCOPE

Through the effective integration of web services in different e-logistics platforms, the client can select the appropriate services. The implementation details are abstracted in the developing section and business transactions is done across these heterogeneous applications by SOAP and UDDI. The web service develops a communication framework for legacy systems with existing data sources and information technology systems. The order web services, tracking web services and transport web services makes the request-response scenario more flexible. The current system is only for acquiring the web services to get the information regarding the logistics service provider as per user preferences. As a future scope, we can extend the

REFERENCES

[1] Geert Van de Putte, Joydeep Jana, MartinKeen, Sandhya Kondepudi, Roberto Mascarenhas, Satish Ogirala, Daniela Rudrof, Ken Sullivan, Peter Swithinbank "Using Web Services for Business Integration"
[2] Tung-Hsiang Chou, Yu-Min Lee," Integrating E- services with a Telecommunication E-commerce using Service-Oriented Architecture" Journal of Software, Vol.3, No.9, December 2008
[3] Christopher.M.Judd,"Consuming and producing Web services with web tools"
[4] Carreker,L.E.Bachman,W.(2000) Geographic Information System Procedures to Improve Speed and Accuracy in Locating Crashes, Transportation Research Record 1719, TRB, National Research Council, Washington D.C., 215- 218
[5] Y.Xue, A.Cracknelland, H.Guo,"Telegeoprocessing: the integration of remote sensing, Geographic Information Systems (GIS), Global Positioning System (GPS) and telecommunication", International Journal of Remote Sensing,Vol. 23, 2002, pp. 1851-1893.
[6] N. Uno, F. Kurauchi, H. Tamura and Y. Iida,"Using Bus Probe Data for Analysis of Travel Time Variability", Journal of Intelligent J.-C Thill, "Geographic information systems for Transportation in perspective", Transportation Research Part C, Vol. 8, 2000, pp. 3-12
[7] Zhirong Chen, Ling Zhu, Yu Teng College of Science, Ningbo University of Technology Ningbo, China."Application of GIS/GPS Technology in Mobile Logistics Public Information Platform", Logistics Engineering and Intelligent Transportation Systems (LEITS), 2010 IEEE International Conference.
[8] Z. R. Chen and C. J. Xu, "Application of Mobile GIS in Special Equipment Inspection Based on PDA,"