APPLICATION OF WEB SERVICES SECURITY USING AIRLINE RESERVATION MODEL

Sanjay Patel*

Indravadan S. Patel*

ABSTRACT

Web Services Security (WSS) is a specification that protects SOAP messages to ensure end-to-end security for web services. Business applications of WS-Security have not yet been fully investigated. Applying WS-Security to actual businesses is the next step. We applied WS-Security to airline (flight) booking transactions and succeeded in ensuring end-to-end security by signing and encrypting credit card & Visa card numbers. We give an overview of the experiment, point out the problems experienced and provide a possible solution. The experiment revealed that problems still remain with respect to communication via an intermediary.

Keywords: *Web Services, Security, XML, SOAP.*

*****Assistant Professor, Department of Computer Science, Ganpat University, Kherva**.**

INTRODUCTION

Web services is XML [2] based systems technology integration that uses SOAP [3] message standardized communication protocol, and implement-tation of various system Integration; Web services have recently become popular for many years. Into a number of web services are already in practical use. Web services security complex problem when the real business application like airline reservation, stock quotes, whether web service etc. What, payment getaway from the W3C SOAP HTTP protocol for exchanging information on the XML-based. XML makes it easy to send messages between the applications, standards - based method provides. Web services use SOAP service and its client(s) and send messages. Because HTTP is supported by all Web servers and browsers, SOAP messages according to their platform or programming language can be sent between applications. Web Services Security (WS-Security)[5] is a specification that protects SOAP messages to ensure end to end security for web services are:

It defines how SOAP messages in XML signature and encryption is used for XML. It is the security (for example username / password and X.509 certificates) to define the tokens in SOAP messages attached. WS-Security was originally developed by IBM, Microsoft and VeriSign. Oasis of these companies, international standards are provided for the WS-Security E-business for the organization. Technical Oasis Web Services Security (WSS TC) committee [4] In July 2002, and WS-Security standards for the design and development continues. WS-Security Oasis standard as approved in April 2004 and was completed in the first stage of standardization. The next step is to use WS-Security to actual businesses. WS-Security Interoper-ability has been a sensitive subject. Oasis WSS TC Specifications for the development of interoperability tests were conducted in parallel. These activities focused on interoperability between SOAP message sender and receiver, so that the main concern was whether or not the recipient of a message sent by the sender usually can be treated. When we use WS Security In real business, we and other issues through the end of one to end security in a wide range of test has not been fully evaluated in the interior. We are booking airline, hotel, texi registration on WS-Security is used in transactions, and an end - to - make sure in the end took over security. It is possible to study and protect the feet of this paper [1] provides a solution to resolve.

XML WEB SERVICES ARCHITECTURE

Figure 1 shows that client proxy receives the request from the client, serializes the request into a SOAP request which is then forwarded to the remote Web service. The remote Web service receives the SOAP request, executes the method, and sends the results in the form of a SOAP response to the client proxy, which desterilizes the message and forwards the actual results to the client.

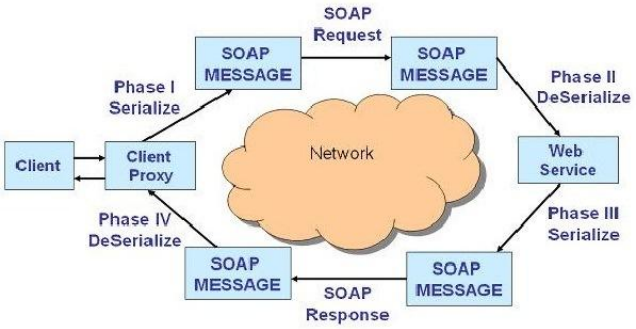

Figure 1: XML Web Services Architecture

BUSINESS MODEL FOR AIRLINE RESERVATION

Electronic Data Interchange (EDI) has been on since the beginning of the Airline travel used in industry. A standard data format, data formats unique to each system was necessary to reduce. For personal reservation booking has been developing XML-based Specifications. However, in package tours, travel is more popular than individual tours. Therefore, OTA specification is not appropriate for the Japanese portable business. Travel XML [8], was developed by the Travel Association of Japan(Later) agents [10] and XML Consortium [12] a, XML-related technologies used to show and spread to the organization was established. The package tour bookings to define the data structures. Business model for the travel industry in Japan is shown in Figure 2. Some companies are working to make booking a package tour is included. Railways, airlines and train tickets from wholesalers, the hotel rooms on the purchase of aircraft seats. They plan to package tour this combination has already purchased. Then, the package tour wholesalers sell to retailers for commissions. Manage tourists traveling through retailers.

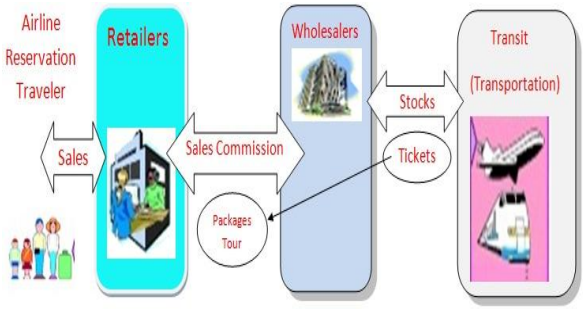

Figure2: Business Model for Airline Reservation

DEMONSTRATION SCENARIO

There is an overview of the demonstration system in Figure 2. It consists of three types of entities, i.e., retailers, wholesalers and transits. These systems exchange the data defined by XML using web services.

The demonstration scenario was as follows:

1. The prospective traveler visits a retailer whose sales clerk selects a suitable package tour according to his/her requirements.
2. The retailer sends a "Booking Request" to the wholesaler.
3. The wholesaler receives the "Booking Request" and updates the number of ticket in stock.
4. The wholesaler sends a "Allocation Booking Report" to the transits to the airline company.
5. The airline company receives the "Allocation Booking Report" and updates the status of the booking.

WEB SERVICES SECURITY DEVELOPMENT

Web services security can be classified in Transportation SOAP layer security and message level security. Because Establish a transport layer security technology, we It is here to work with. We focus on the SOAP message in this experiment,

The level of security for a single Web services, an old-style database transaction may in some cases be sufficient. However, as soon as web services are complex services, on-ACID transactions are needed so that resources do not have to be locked for long periods of time. A Web Service that uses ACID transaction per default should be able to differentiate between a simple request to its ports and complex request by another Web Service.

The Airline ticket reservation in credit card information is sent from the retailer. Though Credit card information is sent via a wholesaler, wholesaler does not need credit card

information to know. We use WS-Security to protect credit card end to end ensure the security of information. By using the XML encryption as profiled in WSS, credit card profiled Information is not disclosed to the wholesaler .By using the XML signature as profiled in WS-Security, The Flight is able to conform the credit card information has not been modified.

RETAILER

There is an outline of the "booking request" SOAP message in Figure 3. <BookingRequest> Element Defined by XML is placed in the Soap Body. Element contains the booking <BookingRequest> Information (departure date, and other for details.), And the traveler's credit card information.

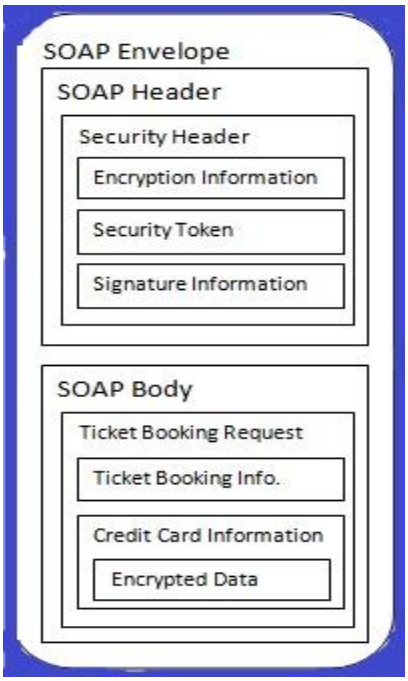

Fig. 3 Ticket Booking Request SOAP message

The retailer creates a <Security> header inside the SOAP Header to place security related material. The retailer then digitally signs the <CreditCardNumber> element which is included in the credit card information, and describes signature information inside the <Security> header. Then, the retailer places the X.509 certificate as a safety token inside the <Security> header for message receiver to verify signature. X.509 certificate is defined as a <BinarySecurityToken> element defined by WSSecurity.

The retailer then encrypts the <CreditCardNumber> element using the ticket public key and changes it with the <EncryptedData> element defined by XML Encryption. Then, the retailer places the encryption information inside the <Security> header.

WHOLESALER

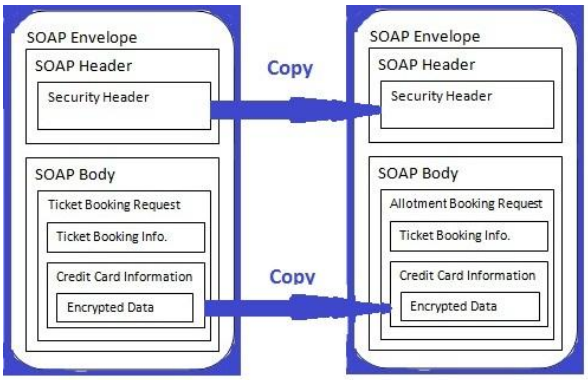

Figure 4: security processing by wholesaler

There is an outline of security processing by the Wholesaler in Figure 4. Wholesaler does process neither signature nor encryption. The wholesaler copies security related data and forwards this to the transit. The wholesaler receives the "Booking Request" from the retailer and constructs the <AllotmentBookingReport> element defined in XML. The <AllotmentBookingReport> element includes the wholesaler's name, check in date, and other information. The wholesaler copies the credit card information included in the "Booking Request" into the "Allotment Booking Report". The wholesaler also copies the <Security> header into the "Allotment Booking Report".

TRANSIT (TRANSFERABLE)

The Transit receives the "Allotment Booking Report" and decrypts the credit card information. Then the Transit verifies the signature using the security token included in the <Security> header.

EXTRACTING TRANSACTIONS USING THE SECURITY PROBLEMS SOLVING THE STRUCTURAL MODEL

In Figure 5, this diagram still contains a mixture of Web service structure and workflow issues, which will have to be divided into two separate layers in the future which lead to different transactional requirements as shown below?

1. The end user of the compound Web service only knows the states Start, Reservation ("Running"), Success, and Failure. The whole process should therefore either succeed or fail, and in case of failure any primary results should be deleted (atomicity guarantee). Compensation is not required.

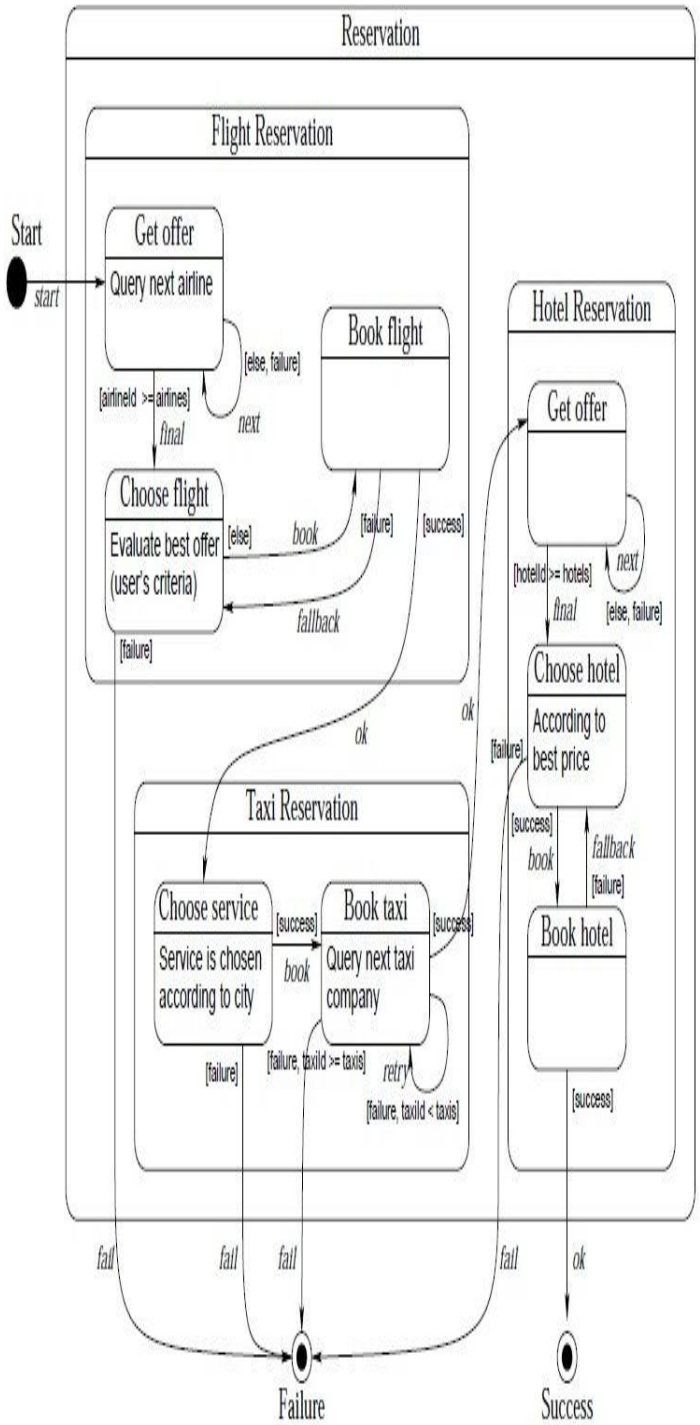

Figure 5: Structure State chart Diagram

2. The booking service queries the airline reservation service, the taxi reservation service, and the hotel reservation service in sequence. Each of those services either fails or succeeds. In the case of a failure, results from earlier services need to be compensated to fulfill requirement 1.

3. The flight reservation, however, cannot be compensated therefore, its transaction needs to be protracted until the other transactions commit successfully. The flight reservation service internally invokes the Web service of each airline in turn. Then, it compares the offers to find the one which best suits the user's requirements. Finally, the flight is booked. As we have stated in requirement, the airlines do not offer return. A transaction with an airline may run as long as 4 hours, then it is terminated by the airline's server. Therefore, we wait until the taxi and the hotel are booked until we confirm the transaction.
4. The taxi booking facility itself only invokes fundamental Web services depending on the desired location, and therefore does not need to fulfill transactional assurances. The local taxi reservation services, however, provide atomic services since the servers are geographically close together. Therefore, the local transaction requires the short timeout of 5 minutes. On the other hand, taxi reservations can be remunerated within an hour after booking.
5. The hotel reservation works similar to the airline reservation, except that the hotel reservation can be canceled. However, according to 2, compensation is not necessary at the higher level. (In a real-world example, we would, after this realization, rearrange the design of the sub transactions of the reservation service so that the airline transaction is invoked last.)

CONCLUSION

We conducted experiments to demonstrate the web Services system using XML. In the experiment, we used WS-Security to the end - to - end security ensures. We are clarify problems with WS-Security to request and suggested the possible solutions to this. However, unresolved issues with differences in the versions of WS-Security. There were problems with processing by the wholesaler for the signed data. . The intermediary needs to be careful not to invalidate the signature .The first sign and then encrypt the signature recognition can maintain an effective manner. Internal process with the other problem is that they have not changed the method using the method to be valid. We rewrite the system needs to deal with encrypted data.

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