

Based on the Agency Web Service Security Architecture

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Abstract—Pick the paper describes the service oriented architecture of background, and analyzes the Web services based on service oriented architectures of the application system of safety defects existing. Combined with agent technology and Web service technology, puts forward the respective advantage based on the agency Web service security architecture, and designs the client and the server proxy security processing module, expounds how to handle each module, to realize a SOAP message level security function, news and improve the performance of the system processing news.

Keywords—Service oriented architecture, Web services, agent

I. PREFACE

With the deepening of the informatization construction of enterprise, corresponding application system is becoming increasingly complex, how to effectively organize and USES the enterprise scattered IT capital to become the enterprise information construction process had to cross the barrier, and service oriented method for overcoming the difficulties of an opportunity. Service Oriented Architecture (Service - Oriented Architecture, SOA) is a kind of flexible distributed systems design and integration method, based on SOA application system will system function to encapsulate the form of interactive services, making the Service can be other application system reuse.

With more and more enterprises to adopt SOA constructs the enterprise the basic application, and because the system between the open and service, make the interactivity of the safety of the SOA system step by step, and exposed widely attention. Article SOA analyses present the security of the system, and from the network layer, business process, summarizes three levels of the system software service oriented architectures system must consider the security objectives. In the SOA Security " in the book the author analyzes the traditional safety technology in dealing with SOA system Security deficiencies, and puts forward three new methods to deal with this kind of system safety problems, this includes: news Security protection, safety namely service, strategies driven safety .proposes model driven method. Domestic to SOA system security research although started quite late, focus on the safety of Web service with the combination of services in security, article have reflected. The above safety technology in the process of realizing isn't a good and the application of the system logic completely separated, cause the system application and safety of strong coupling, to bring the difficulties the reuse of the system. So had to consider service oriented security architecture design, this paper based on this background is

proposed based on agent service oriented security architecture, through an agent to achieve the Web service in a SOAP message encrypted and signature processing, achieve end-to-end news level security and reduce the system coupling.

II. WEB SERVICES AND AGENT TECHNOLOGY

A. Web Service and its Architecture Model

Web services is a software application by URI logo, the interface and binding can form through the XML standard definition, description and found, and with other xml-based applications interactive. Web services technology has good encapsulation and loose coupling, interoperability and platform-independent characteristics and highly integrated ability, this to realize the application system based on SOA provides technical support and integration. Web services model consists of service requestor, service providers and services registration center three roles. Service provider provides Web services, will services description released the service registration center; The service request by the query service registration center or local search services description, use services description and service providers, and call realization binding Web service to implement or interact with it. Figure 1 shows the Web service system architecture model

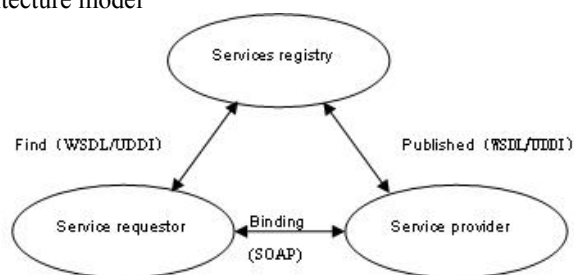


Figure 1. Web services architecture model

B. Agent Technology

Agency (Agent) is distributed computing and the combination of the artificial intelligence, is able to independently perception environment, has certain intelligent and can move independently in Internet software entity, it stretches over a specific technology area and dynamic, open environment treatment interact algorithm. Agent of autonomy and receptivity, alternation, initiative, etc feature undoubtedly can effectively solve the and deal with system dynamics, openness, uncertainty, etc. But in how to effectively respond to the Internet organization, technology

diversity, across heterogeneous etc characteristics remains to be further improved.

Thus, in constructing the application system based on SOA when Web service and Agent technology, the advantage complementary to each other. Agent can compensate for the autonomy of the Web technology characteristics of insufficient, and Agent need in interoperability between heterogeneous platforms realize characteristics and loose coupling Web services is really good at. In this context, will integrate the two technologies is very necessary, is not only for each technical superiority, compensate its defect, and because after fully integrated adapted to the development trend of the Internet for reusable software system development provides technical way.

Based on the agency Web services two security model

1) *Web service safety situation*

Along with the wide application of Web services, and Web service related standards and norms continues to mature, a lot of enterprises to adopt Web service building based on service oriented architecture of information system. In this information system, group enterprise headquarters and each subsidiary, or between with partners exist between the frequent service call relations, cross the secure domain visit Web services and moments exist, the security service call got great challenges. According to the characteristics of SOA, design standard service oriented security model is the premise of SOA application system deployed.

The current distributed security model to basically have two kinds: distributed security middleware and distributed security integration model. For distributed security middleware, developers in complete system application logic, and the development work must be considered outside the safe disposal of each application system, storage, identity module identity authentication, access control, such as message sending integrated work. Service provider and services requested contain its own security and processing module of complete Web services such as receiving, safe handling news. Figure2 below.

As can be seen above, the complexity of the application system for application logic and safety of dual factors that influence the logic and improve. For different application system and safety logic must satisfy the system needs, and so when the new system designed to redesign safety logic, caused the system of redundancy, do not accord with the characteristics of the reuse of the SOA. Based on the above problems, this paper proposes a Web service based on the security agent model, through a client and a server by deploying security agent respectively, the integrated security agent safe disposal, complete Web service core modules requesting and provider messages between safe handling etc. Grade based on the agency Web services.

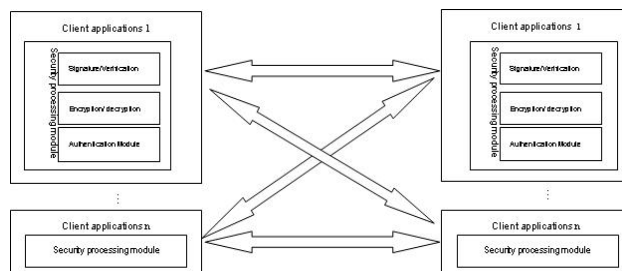


Figure 2. Web Services Security

2) *Architecture*

Based on the agency Web service security model shown in fig3 shows, with the current Web service security model based on agent, compared the safety model has the following features:

- Business and security separate, through an agent unified security processing, reduced the client and application system load.
- The reusability application system to be further improved, can use Web services on the business process process unitary organization and scheduling, increases on the whole system performance.
- Further reduced the coupling between systems, system by service in the form of between calls, to avoid the application logic and safety logic correlation.
- Scalability enhancement, through the deployment of more safety logic such as: identity authentication, access control, information detection realize more security function.
- System load reduction system for handling efficiency has been greatly improved

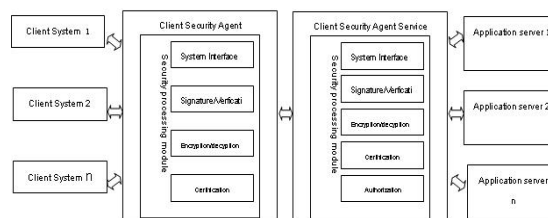


Figure 3. Agent-based Web services security

III. THE CLIENT AND THE SERVER DESIGN

A. *Client Safety Agency Design*

The client security agent for the safe disposal of a SOAP message mainly includes:

- In a SOAP message to add security token;
- To part or whole digitally signed a SOAP message;
- To part or whole encrypt a SOAP message.

The client security agents use module mainly includes: application system interface module, matching module, synthesis module, security policy module, encryption module and signature module. The relationship between modules as shown in fig4 shown.

The client safety agency executive service request the function of the security agent: first of all, complete business processing is completed, provided by the client agent of safe handling, complete news interface by agents on safe Web service calls.

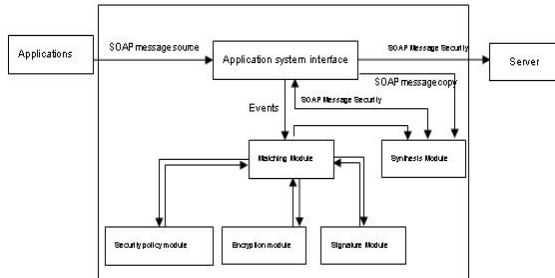


Figure.4 Client Security Agent

B. Server Security Agency Design

The client sends SOAP message arrival, after the server must pass the server first through the security agent declassified, signature verification and identity authentication can be submitted to the application system of business by application system, process, and then later as a SOAP message handling the form of the requesting party returned to service, news also return to the front of the safety treatment involves news.

The server security agent for a SOAP message processing mainly include:

- In a SOAP message encrypted decryption part;
- The signature verify a SOAP message part;
- of client identity verification;
- encryption or signature back to send clients; a SOAP message

The effectiveness of verify the news.

The server security agency in logic structure as shown in Figure 3.2 shows, the server security agents use module mainly includes: application system interface module, validation module, mode authentication module, security policy module, decryption module and signature verification module, the relationship between modules for:

The server security agency executive service provider security functions, receiving Web services requested to send a SOAP message then finish processing pass service provider, service providers need for safe operation, only need attention verified business logic processing, Web services respond to messages from both ends of the safety treatment are complete. Agency

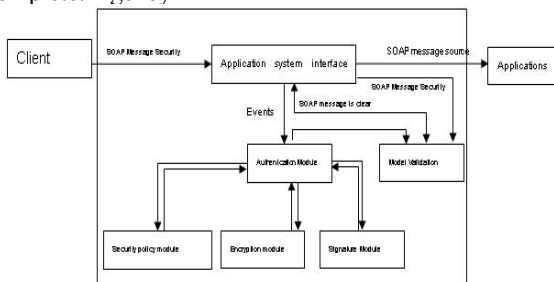


Figure 4. server customers on behalf

IV. EXPERIMENTAL ANALYSIS

Through the deployment of the J2EE operation environment, use Java program for design of agency. Meanwhile, respectively Tomacat 5.5 and use Asis 1.4 as application server and SOAP server. And will the client Security agent with wide application of implementing scheme of the WS - Security plan Java Rampart performance comparison.

Specific test method is: for the entry of SOAP messages using fixed SOAP message header. And using the same safety tactics used to encrypt AES128 elements, the use of RSA and volume of SOAP SHA1 signature. Through gradual increase input SOAP of news, the number of elements in the body of two schemes memory consumption time and processing time for testing.

Comparison chart figure5 and figure6 can see safe handling memory consumption along with the increase of the number of the processing elements and growing larger. But the method based on Agent in performance exceeded the Rampart of method based on the DOM.

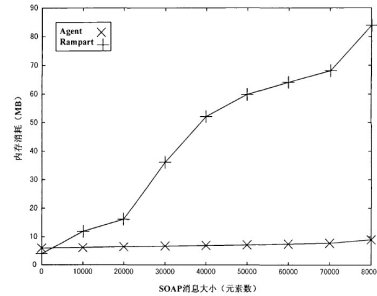


Figure 5 with the SOAP message memory consumption graph

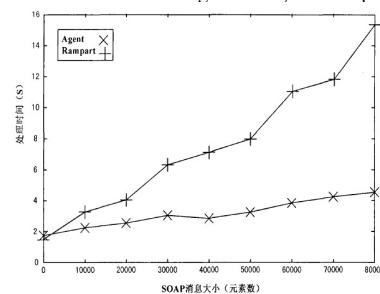


Figure 6. relationship between processing time and the SOAP message

V. CONCLUSION

This paper puts forward the Web services based on security agent, will serve security architecture of business and security, and emphatically security agent separation of a SOAP message processing, completed safety agency logic structure design, and through the contrast of secure proxy system treatment were obtained on the basis of performance ascension. But the paper within security agent of other security technology without thorough research, such as identity authentication, access control, single point login etc, henceforth there needs further study.

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