

[0148] The gateway module **300, 500, 900**, is also designed for scalability and portability, in the sense that it can be sold as a separate product, to be run on the third-party developer's server, to allow the third-party developer to restrict access to the end users who are running the application **15** consuming the web services **25** or the third-party developer's own web services **25**.

[0149] The pool of authentication IDs is valuable to the end user since they will know that nobody can misuse their authentication ID and make use of the web service **25** that they are paying for. It is also good for the web services provider **20** or host, since web service access will be more secure which may be a requirement to gain contracts with certain clients. The pool of authentication IDs may be used independently from the gateway module **300, 500, 900**.

[0150] The gateway module **300, 500, 900**, makes possible the implementation of a comprehensive solution for web service providers **20** by serving their web service hosting, monitoring and administration needs. The web service infrastructure **201, 501, 1601** is applicable to any party in the chain **1400** of web service providers **20**. This lowers development, distribution, maintenance and support cost for the web services provider or host, which will pass on to the web service providers **20**.

[0151] The ability of the web service infrastructure to abstract away web service addresses and signatures provides web service providers with high degrees of flexibility on how the web services are to be managed and presented to the end users, who in turn benefit from interfaces that are presented in a well-organized manner.

[0152] The ability of the web service infrastructure to aggregate services provided by external entities promotes software reuse and collaboration between web service providers. Since the web service infrastructure is scalable across multiple processing units, web service providers gain additional deployment flexibility, and invest in hardware only as needed.

[0153] The gateway module **300, 500, 900**, provides an elegant, comprehensive and extendable system for handling the most complex of web services **25** billing and authorization scenarios. To web services providers **20**, the gateway module **300, 500, 900**, means reduced administration, resource and upgrade costs. To the end users, the gateway module **300, 500, 900**, opens up the possibility of finely customized billing and authorization options.

[0154] The gateway module **300, 500, 900**, is not dependent on the transport layer. The gateway **300, 500, 900**, performs authentication through the payload, i.e., parameters in SOAP messages. With the gateway module **300, 500, 900**, client applications **15** do not have any direct contact with web services provider **20**. Since the web services provider **20** is not exposed to client applications **15**, advantageously web services providers **20** of the registered web services **25** in the gateway module **300, 500, 900**, do not have to implement authentication.

[0155] The gateway module **300, 500, 900**, according to the present invention may be implemented by any hardware, software or a combination of hardware and software having the above described functions. The software code, either in its entirety or a part thereof, may be stored in a computer readable memory. Further, a computer data signal represent-

ing the software code which may be embedded in a carrier wave may be transmitted via a communication network. Such a computer readable memory and a computer data signal are also within the scope of the present invention, as well as the hardware, software and the combination thereof.

[0156] While particular embodiments of the present invention have been shown and described, changes and modifications may be made to such embodiments without departing from the true scope of the invention.

What is claimed is:

1. A gateway module for managing functionality for one or more web services, the web services gateway module comprising:

a client application interface unit for receiving communication from a client application over a standard protocol;

a communication processor for processing the communication for a web service; and

a web services interface unit for delegating the processed communication to the web service.

2. The gateway module as claimed in claim 1, further comprising a centralized repository for storing information relating to the client application and the web service.

3. The gateway module as claimed in claim 1, wherein the communication processor has a method call processor for modifying a method call received from a client application.

4. The gateway module as claimed in claim 3, wherein the method call processor is a simple object access protocol processor for modifying a simple object access protocol method call received by the client application interface unit.

5. The gateway module as claimed in claim 3, wherein the method call processor is an application programming interface request processor for modifying an application programming interface contract request method call received by the client application interface unit.

6. The gateway module as claimed in claim 1, wherein the client application interface unit sends communication to the client application; and

the web services interface unit receives communication from the web service.

7. The gateway module as claimed in claim 6, further comprising a response processor for modifying a web services response to a method call received by the web services interface unit.

8. The gateway module as claimed in claim 7, wherein the response processor is a simple object access protocol response processor for modifying responses to simple object access protocol method calls.

9. The gateway module as claimed in claim 7, wherein the response processor is a web service description language processor for modifying a web service description language contract.

10. The gateway module as claimed in claim 1, further comprising an authentication module for checking the authenticity of the client application.

11. The gateway module as claimed in claim 1, further comprising an authorization module for checking the authorization of the client application to access the web service.