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Agent based Dynamic Policy Contract Enforcement in Service Oriented Network

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Abstract: In our project, there is service oriented architecture (SOA) plays a vital role for integrating the legacy systems with new technologies in the enterprise world. A service is usually done by a client service contract (CSC). It specifies the requirements the rate at which a service should be accessed, and limits it to no more than a number of service requests during an observation period. They are several approaches are used. Such approaches are both static and dynamic credit based strategies. These have been developed to enforce the rate specified in the CSC. Existing approaches leads to some problems like starvation, approximations and rapid credit consumptions. For this, we propose and use the algorithm called DOWSS. It is mainly used for service traffic shaping. It is mostly show via simulation process. It has several advantages such as it eliminates the starvation, approximation issues and avoids rapid credit consumption. It overcomes the disadvantages of existing approach.

Keywords: Service-oriented networks, Web services, Service Traffic Shaping, Policy Based Enforcement, Token Bucket Algorithm and Agent.

I. INTRODUCTION

Service-oriented architectures (SOA) have become the main solution for the integration of applications and technologies in the business domain and for the collaboration among industrial partners. A way to implement SOA is through the concept of web services (WSs). These are software systems designed to support machine-to-machine inter-operability through a set of Extensible Markup Language(XML) based open standards, such as Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP), and Universal Description, Discovery and Integration (UDDI). Even though the use of XML-based standards allows easy integration with external data sources, one of the major issues preventing wider adoption of WSs is performance. Indeed, as the time needed to parse an XML document can take up to a few minutes, the response time of a WS is potentially large. To better satisfy business goals, service providers use specific hardware that provides acceleratedXML processing called service-oriented networking (SON) appliances. Traffic shaping is a well-known classic problem in network traffic engineering. Nevertheless, in SON the problem is fundamentally different. The main difference is that, unlike classic networking where traffic shaping is done point-to-point, in SON service clients usually access services from multiple access points. Furthermore, in SON, multiple SON appliances can be used to address issues such as security, fault tolerance, and performance. Therefore, the key challenge is how to enforce the CSC by taking local actions at each appliance. The typical solution consists of using a manual and static (MSA) allocation strategy, in which the allowed rate is equally divided among all the access points. This solution, although simple, is quite inefficient as it only provides satisfactory performance when the incoming traffic rates at the SON appliances are identical.

Besides processing XML documents, enabling security, and integrating with legacy systems, SON appliances may also be responsible for controlling threat at which documents are sent to the service hosts(i.e., they shape the traffic). A service is typically governed by a client service contract (CSC) dictated by a service level agreement (SLA). The CSC specifies, among others, a service access requirement (SAR), which is the rate at which the services may be accessed to prevent them from being overwhelmed.

II. RELATED WORK

In the scheduling process the servers purchase the limited bandwidth from its ISP [1] by placing limitations on the server's uplink. Servers load is defined in the load on the server's uplink. To evaluate the performance of both from the client and the server perspective it records the client side response time. This process can be scheduled based on the policy called fair scheduling. In this, unfair scheduling can also be used for those requests with short remaining time; it can be processed, based on the model called SRPT [1]. The main objective is to optimize the server's workload. In the Fair scheduling process, when the heavy workload comes, there is some starvation appears for getting the service. It is a time consuming process, when it gets the process from ISP's.

SLA-Driven Distributed Application Development it presents about the process of end to end service level agreements. It is by providing the various stages of business process of development using formally encoded SLA's [2]. It is a distributed architecture for the execution of business process. The main objective of this paper is to how the SLA's can be achieved in SON architecture. It is also for design and development of a cost model. It is a distributed architecture to execute business process. It is dynamically provision resources based on high-level

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goals. It is an evaluation of the distributed execution engine. The objective of this paper is modeling of the process through development, deployment, execution and runtime of the process. It is only the process for develop and deploying the SLA level process. It does not monitor about the workload process and scheduling process. It is only the process for how to integrate the SLA's. It does not have the process of how to mitigate the traffic when it occurs during the SLA [2] process.

Internet Traffic Modeling is, it is a process of controlling the traffic when it is occur during the web services. It is based on the model called PRBP [3] means Poisson Pareto burst process. It is a simple and accurate model for controlling the traffics. PPBP predicts the queuing performance of realistic traffic streams is carried out via computer simulation. It is based on the three parameters. The parameters are based on measurable statistics commonly used in tele traffic modeling. Parameters are mean, variance and Hurst parameter. These parameters are fitted into the PRBP for traffic shaping. The parameters are based on measurable statistics commonly used in teletraffic modeling. Parameters are mean, variance and Hurst parameter. These parameters are fitted into the PRBP [3] [4] for traffic shaping. It is fully based on the aggregation of parameters. Due to this attackers may be available in the process.

III. EXISTING SYSTEM

They are many approaches are available for client services contract enforcement. Among them one of the approaches is Credit based approach. It is for assigning the credits for each appliance. From this to calculate the weight for each appliance. It monitors the traffic based on regular basis and based on the credits for each appliance and queue sizes. The credit based approach has some drawbacks such as fast start, starvation, flooring effect.

A. Flooring effect

It is the existing credit-based solutions require the use of a flooring function to approximate the results to the integer immediately below. In some cases, when the number of appliances is not a divisor of the available credits, the use of a flooring function leads to under-utilization of the system.

B. Fast start

When the system operates under high input rates, all the available credits are rapidly consumed early in the enforcement period. This may result in overwhelming the service host, because a large number of requests are being sent during a time period substantially smaller than the specified enforcement period.

C. Starvation

The weighted strategies used for dynamic credit allocation are based on queue sizes. As a consequence, the appliances with at least one queued event may be allocated all the credits, thus depriving the appliances with empty queues from credits.

IV. PROPOSED SYSTEM

In the existing process, traffic is shaped by using the algorithm called DOWSS. In that, there is no policies has been used. It is processed in the centralized approach. In Enhancement, we have to provide some policies for traffic shaping. Instead of DOWSS algorithm token ring bucket algorithm has been used for traffic shaping. In Enhancement we have to do client service contract enforcement in the distributed platform.

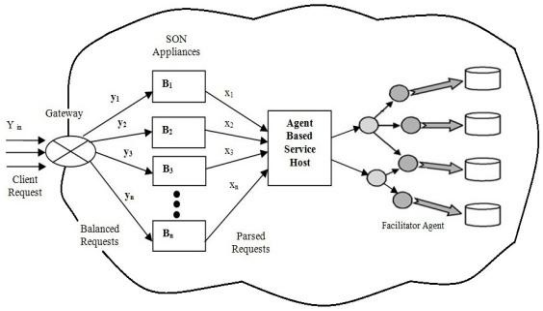

Fig. 1 System architecture showing the different elements and Policy involved in the service contract enforcement procedure

DoWSS is based on the notion of enforcement sub period. The enforcement period is divided into K sub periods. During each sub period, the algorithm will measure the number of requests that were processed and forwarded to the service host and queue sizes, and adapt its sending rate for the next sub period by assigning credits to each appliance. A credit allows an appliance to send a processed request to the service host. CSCs specify the SAR in requests per second within the enforcement period. Consequently, credit-based approaches must approximate the number of allocated credits by an integer value.

The main difference between DoWSS and existing credit-based approaches is the type of function used to approximate the number of allocated credits to the integer. Instead of using a flooring function, like other approaches, DoWSS uses a ceiling function. Even though the use of a ceiling function may lead to a noncompliance of the maximum request rate, the CSC can still be enforced by using the communication capacities of the appliances. Since the SAR is a fixed value, all SON appliances have this information beforehand.

Therefore, when calculating the rate allocated to each appliance at each sub period, the noncompliance of the CSC can be detected. If the credits that are to be allocated to each appliance exceed the number of remaining credits, one or several appliances will be penalized by having credits reduced, so that the CSC is respected. This penalization is done randomly, and the procedure varies depending on whether or not there are queued requests in any appliance.

A. Client

The clients are nodes that generate service requests. They can be located anywhere in the Internet. It denotes the input rate of Requests into the system.

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B. Gateways

These are border routers. They are responsible of forwarding service requests to the SON appliances, and distributing the service load among the appliances without any deep-content inspection.

C. SON appliances

These are middleware responsible for translating XML requests into the system's local language. They are also responsible for controlling the rate at which the service requests are forwarded to the service host[5]. In the figure, xi denotes the number of processed requests appliance Bi sends to the service host within some time interval as it will become clearer later on in this paper, we use "numbers of requests" instead of "rate" to simplify the integration of the service contract into the algorithm.

Agents are an innovative technology designed to support the development of complex, distributed, and heterogeneous information systems. Commonly cited main attributes of agents include the following:

A. Autonomy

The ability to act autonomously to some degree on behalf of users for example by monitoring events and changes within their environment.

B. Pro-Activity

The ability to pursue their own individual set goals, including by making decisions.

C. Re-Activity

The ability to react to and evaluate external events and consequently adapt their behaviour and make appropriate decisions to carry out the tasks to help them achieve their goals.

D. Communication and Co-operation

The ability to behave socially, to interact and communicate with other agents (in multiple agent systems (MAS)) i.e. exchange information, receive instructions and give responses and co-operate when it helps them fulfil their own goals.

E. Learning

The ability to improve performance over time when interacting with the environment in which they are embedded.

F. Agent Based Service Host

The intelligent agents based multi agent system which virtually integrates the databases. The Databases are being integrated together by means of a component called as the "Facilitator"[6]. The facilitator has the details of the databases and selects the appropriate database based on the request from the user.

The facilitator has the user agent for each and every individual user and it virtually integrates all the databases into a single component so as it appears to the user as a "Single System Image". The work of the facilitation agent is to map the user agent with the database agent based on the request given by the user and the type of data that is needed to be fetched. It provides such as Load, Sharing of databases, Security, Maintanence.

ALGORITHM

Token Bucket Algorithm

A token is added to the bucket every $^{1/r}$ second.
The bucket can hold at the most b tokens.
If a token arrives when the bucket is full
The bucket will be discarded.
When a packet of n bytes arrives
n tokens are removed from the bucket
Then the packet is sent to the network.
If fewer than n tokens are available
No tokens are removed from the bucket
Finally the packet is considered to be non-conformant.

V. CONCLUSION

Basically service oriented network (SON) is the integration of systems with new technologies. In the service oriented network, it is the process of client service contract enforcement. It is the process of sending X requests to the server, server has been overloaded. During that, to prevent the traffic, first schedule the process and check the process whether it qualifies the policy. If it is based on policy, server accepts the service request. Due to this, we can control the traffic occurs during the process. It is based on the algorithm called Token Bucket Algorithm. It is an efficient method for control the traffic during the web services process by reducing the memory and time consumption.

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BIOGRAPHIES

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