Proposition de recherche doctorale

Efficient Algorithms for Service Traffic Shaping in Web Server Farms

Mots clés :

- **Directeur de thèse** : Marcelo Dias de Amorim
- **Co-encadrant(s)** :
- **Unité de recherche** : Laboratoire d'informatique de Paris 6
- **Ecole doctorale** : École Doctorale Informatique, Télécommunications, Électronique de Paris
- **Domaine scientifique principal**: Divers

Résumé du projet de recherche (Langue 1)

During the last few years, the rise of the Internet has changed the way business gets done worldwide. To remain competitive, businesses have been implementing information technology support for business processes over the years. However, budgetary issues, the continuous growth of the organization, the heterogeneity of existing systems, among others, increase the complexity of deployment and integration of new technologies. In this context, service-oriented architectures have become the main solution for integrating the existing applications and technologies of an enterprise. SOA can be implemented through Web services, which are software systems designed to support machine-to-machine interoperability through a set of XML-Based open standards, such as WSDL, SOAP, and UDDI. Although the use of XML allows easy integration with external data sources, it also a?ects the performance of web services. Indeed, as the time needed to parse an XML document can take up to a few minutes, the response time of a web service could be slow. In order to tackle this, service providers use speci?c hardware that provide accelerated XML processing, called SOA appliances. Besides processing XML documents, SOA appliances must also control the rate at which documents are sent to the service hosts. This rate is, among others, speci?ed in a client service contract (CSC) in order to prevent a service host from being saturated. From a theoretical point of view, the traffic shaping problem has equivalents in other networking areas. However, existing solutions developed in the networking domain cannot be applied at the service level because of the new constraints it introduces (e.g., multipoint-to-multipoint shaping requirements, specific per-service policies, variable capacity, and specificities of entry- point appliances). In this thesis, the candidate will be in charge of deriving efficient algorithms to solve the service traffic shaping problem between entry-point appliances and service hosts. The specificity of this subject is that it involves both theoretical and practical aspects {the student will start from a real-world problem recently identified by large companies that has no solution to-date. The student will also have the opportunity to handle and obtain practical results with commercial appliances, like the Datapower boxes developed by IBM. This thesis will be mainly conducted in the premises of the LIP6 laboratory of UPMC Univ. Paris 06. Because this work is part of an international research initiative, Prof. Yannis Viniotis from North Carolina State University (NCSU), USA, will also supervise the thesis. In that sense, it is expected that the student will spend some period (at least six months) at NCSU. During this period, the student will also be requested to work with research engineers from the IBM Websphere project (that developed the Datapower appliances).