SLA Renegotiation According to Traffic Demand

Rafael L. Gomes, Luiz F. Bittencourt, Edmundo R. M. Madeira
Institute of Computing, University of Campinas (UNICAMP), Brazil
Email: {rafaellgom,bit,edmundo}@ic.unicamp.br

***Abstract*—To access the Internet, companies define a Service Level Agreement (SLA) with Internet Service Providers (ISPs). Nevertheless, the current Internet does not assure Quality of Service (QoS), what points toward the concept of network virtualization and software defined network (SDN) to support the Future Internet. Moreover, the initial parameter defined in the SLA could be insufficient if the traffic vary, could result in a lower quality experienced by users. Within this context, this work proposes a solution for the SLA renegotiation problem in the context of resource usage variation, aiming to guarantee the QoS provided by the ISPs.**

I. Introduction

Nowadays, the idea of the "Future Internet" is a consensus and the Network Virtualization (NV) appears as one of the important concepts to support it [1]. The flexibility achieved through virtualization allows clients and providers to negotiate both resources and features utilized, customizing the characteristic of Virtual Networks (VN).

In the same way, Software Defined Networks (SDNs) appear as a key approach to be adopted in the Future Internet [2]. SDN is a network design which separates the control and data planes, allowing the programmability of the network. The SDN and NV approaches can be mixed through technologies as Flowvisor [3], which allows the slicing of the network in layers. We consider VNs as networks that can be deployed with SDN or with traditional approaches.

Usually, the client negotiates a VN through a Service Level Agreement (SLA) with an Internet Service Provider (ISP). However, sometimes the parameters necessary in the VN not always remain the same to guarantee a good QoS for the client. Mainly in scenario of mobile access networks, the changes in traffic demand through the time could decrease the quality experienced by the user.

Within this context, this work proposes an SLA renegotiation approach, based on the traffic demand. The idea is to develop a framework to identify resource usage and to adapt the virtual network according to the amount of resources necessary to maintain the quality experienced by the client, i.e., increase or decrease the resources allocated in the virtual network based on the client's usage.

The next section presents the goals of the proposal, as well as it shows the expected results of the proposed SLA renegotiation approach.

II. Goals

Currently, client and ISP sign a SLA to deploy a VN, where the SLA specifies some parameters of the VN as bandwidth and network protocols. However, the traffic demand of the client could vary through the time. So, sometimes it is necessary to renegotiates the parameters initially defined in the SLA, aiming to maintain the QoS. This process aims to verify if the SLA is suitable to the current network usage.

The proposed renegotiation method has two main goals: (i) avoid the waste of ISP resources in cases of underutilization of resources, since to the client it represents unnecessary financial cost, whereas to ISP it symbolizes lower amount of available resources to future negotiation with other clients; and, (ii) prevent the loss in the quality experienced by the client, because an overload of the network resources tends to generates a high packet loss rate and high delay situations.

Figure 1 shows three scenarios: (1) underutilization, (2) overload, and (3) the suitable utilization. The functions presented in the figure represents the resources demand requested by the client, whereas the red line represents the amount of allocated resources for the virtual network, and the green part is the amount of resources used by the client.

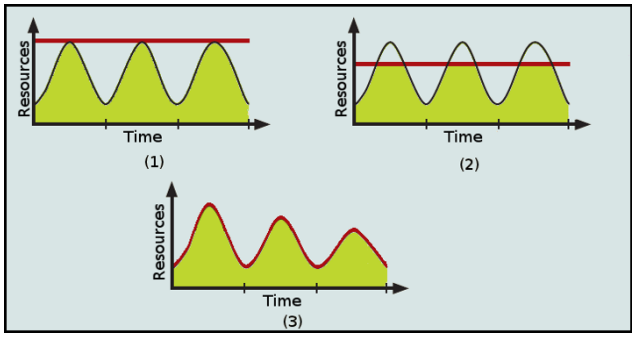

Fig. 1. Resources Allocation Scenario.

Scenario (3) illustrates the goals of the proposal, i.e., the adjustment of the allocated network resources as close as possible to the demand requested by the user. It prevents the resources idleness, as well as the loss of QoS experienced. Therefore, it is expected a behavior similar to the illustrated in scenario (3) of Figure 1.

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