

A Method for Evaluation of Quality of Service in Computer Networks

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Abstract— Monitoring of Quality of Service (QoS) in highspeed Internet infrastructures is a challenging task. However, precise assessments must take into account the fact that the requirements for the given quality level are service-dependent. The backbone QoS monitoring and analysis requires processing of large amounts of data and knowledge of which kinds of applications the traffic is generated by. To overcome the drawbacks of existing methods for traffic classification, we proposed and evaluated a centralized solution based on the C5.0 Machine Learning Algorithm (MLA) and decision rules. The first task was to collect and to provide to C5.0 high-quality training data divided into groups, which correspond to different types of applications. It was found that the currently existing means of collecting data (classification by ports, Deep Packet Inspection, statistical classification, public data sources) are not sufficient and they do not comply with the required standards. We developed a new system to collect training data, in which the major role is performed by volunteers. Client applications installed on volunteers' computers collect the detailed data about each flow passing through the network interface, together with the application name taken from the description of system sockets. This paper proposes a new method for measuring the level of Quality of Service in broadband networks. It is based on our Volunteer-Based System to collect the training data, Machine Learning Algorithms to generate the classification rules and the application-specific rules for assessing the QoS level. We combine both passive and active monitoring technologies. The paper evaluates different possibilities of implementation, presents the current implementation of particular parts of the system, their initial runs and the obtained results, highlighting parts relevant from the QoS point of view.

Keyword—broadband networks, data collecting, Machine Learning Algorithms, performance monitoring, Quality of Service, traffic classification, volunteer-based system



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