Traffic Monitoring for Green Networking

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Abstract [en]

The notion of the networked society is more than ever true nowadays. The Internet has a big impact on our daily lives. Network operators provide the underlying infrastructure and continuously deploy services in order to meet customer demands. The amount of data transported through operator networks is also increasing with the introduction of new high band width services and over the network content. That being said, operators, most often deploy or operate networks to meet these demands without any regard to energy-efficiency. As the price of electricity continues to grow, tends to become a problem with serious implications. To solve this problem a trend towards more energy efficient networks has emerged. In this thesis, we investigate a way to facilitate the introduction of new energy efficiency paradigms for fixed networks. Towards this end, we investigate the energy efficiency schemes proposed up to now and select one that we believe is more realistic to deploy. Furthermore, we specify the inputs required for the selected "green" routing approach. Moreover, we study existing and new protocols that can provide basic network monitoring functionality that enables the acquirement of these inputs. In the end, a Software Defined Networking (SDN) approach is proposed to facilitate the development of energy-efficient aware networks. The details of a basic SDN monitoring application are presented from an abstract architectural point of view and three designs stemming from this basic architecture are discussed. The three designs are namely All_Flow, First_Switch and Port_FlowRemoved. The first two were implemented as steps towards understanding the full capabilities of performing monitoring in SDN enabled networks and provided useful input towards realizing the third one as a proof of concept. Their usage and faults are discussed as they can provide useful insight for possible future implementations. The Port_FlowRemoved is the design and implementation that is suggested as providing the most fitting results for the monitoring purpose at hand. This purpose is to retrieve the identified inputs for the selected "green" networking approach. The differentiation factor among the three designs is how they collect the required inputs from the network. A fast-prototype is created as a proof of concept in order to validate the proposed architecture and thus empower the validity of the idea.

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