

Documents

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BNITE: Bayesian Networks-Based Intelligent Traffic Engineering for Energy-Aware NGN
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Abstract

Network Management Systems (NMS) are used to monitor the network and maintain its performance with a prime focus on guaranteeing sustained QoS to the services. However, another aspect that must be given due importance is the energy consumption of the network elements, specially during the off-peak periods. This paper proposes and implements a novel idea of energy-aware network management that looks at a scenario where the NMS plays an important role in making the network energy efficient by predictively turning the network elements to sleep mode when they are underutilized. To this end, it designs and evaluates a Bayesian Networks (BN) based Intelligent Traffic Engineering (BNITE) solution, which provides intelligent decisions to the NMS for it to adaptively alter the operational modes of the network elements, with minimum compromise in the network performance and QoS guarantees. Energy-aware Traffic Engineering algorithms are developed for both stand-alone (single router) and centralised (multiple routers) scenarios to prove the concept. Simulated network experiments using NCTUns and Hugin Researcher have been used to demonstrate the feasibility and practicality of the proposed solution. Significant energy savings with minimal degradation in QoS metrics demonstrate the benefits of BNITE solution for real-world networks such as the NGN. © Springer-Verlag Berlin Heidelberg 2012.

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