SqoS and multiple independent paths in Large-Scale networks

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ABSTRACT

Ongoing research in the area of Structural Quality of Service (SQoS) is presented. The basic idea is to use graph theoretical concepts in the planning of Large-scale networks, as an alternative to the ad hoc based approach widely applied today.

To ensure reliability in Large-Scale networks the ability to route packets of information through a number of independent paths is essential. However, in many Large-Scale networks today no more than 2 independent paths are supported due to algorithmic complexity, even though more independent paths can exist on the physical level. At the same time, reliability is becoming a key issue in the convergence of communications towards the Internet platform: If even critical information can be transmitted over general purpose networks, such as the Internet, the building and maintenance of dedicated networks can be limited.

The approach we have chosen is to construct networks with a set of global properties, including a general 3-connectivity, supported by simple algorithms. But the networks also has to satisfy other properties, especially should the length of paths be shortest possible. Two classes of structures are discussed: the N2R(p;q;r) class of graphs introduced by Ole Brun Madsen and an extension of grid networks, such as the 4-regular grid and the 3-regular honeycomb. A number of problems, especially dealing with scalability, are addressed.