

Quality of Network Resilience — Challenges, Solutions, and Trends

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Communication networks form a part of the critical infrastructure of the today's society. Thus, provisioning of their reliability is of paramount importance. This goal is achieved by making a network survivable (resilient, dependable), i.e., able to automatically react to failures, e.g., link cuts or software errors, by redirecting traffic from routes affected by failures to routes which are fault-free. After an overview of the fundamentals of recovery methods in multi-layer communication networks, I will briefly present different resilience-related features which determine the quality of communication services. Then, I will concentrate on an important issue of resilience differentiation. The challenge is to enable provisioning of services with different resilience characteristics such as the availability, continuity, and duration of downtimes in the same network. The different resilience requirements stem from the various kinds of services, e.g., real time services vs. background bulk data transfer, as well as from a different usage of the same service, e.g., emergency handling and financial services vs. leisure activities. An important issue for the coming generations of communication systems is to be able to tailor the reliability of the provided services to the user needs and the characteristics of the service itself. I will discuss the relevant approaches, based on the experiences gained from our research projects.