Enumerating Regional Failures in Communication Networks

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The Internet is a critical infrastructure. Due to the importance of telecommunication services, improving the preparedness of networks to regional failures is becoming a key issue. The majority of severe network outages happen because of a disaster (such as an earthquake, hurricane, tsunami, tornado, etc.) taking down many or all equipment in a given geographical area. Such failures are called *regional failures*. Many studies touched the problem of how to prepare networks to survive regional failures. The topic is started as a subproblem in the related articles solved with simple solutions, such as assuming that fibres in the same duct or the 50km neighbourhood of every network node is subject to regional failure. Next, they were improved by examining the historical data of different type of disasters (e.g. seismic hazard maps for earthquakes) and identify the hotspots of the disasters. More recent studies are purely devoted to this particular problem and adapt combinatorial geometric based approaches to capture all of the regional failures and represent them in a compact way. Here the challenge is that these regional failures can have arbitrary locations, shapes, sizes, effects, etc.

In this talk we will discuss the state of the art models and enumeration techniques for regional failures.