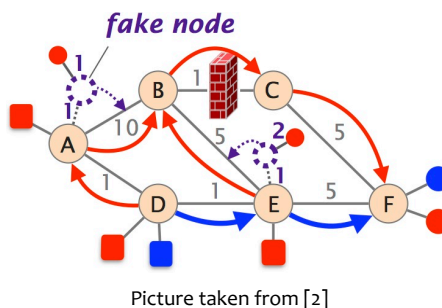


Making networks robust again

Software-Defined Networking (SDN) promises to bring flexibility in network management and automation by centralizing network control. Yet, moving the network logic away from the devices negatively impact convergence time upon failure.



Dealing with network failures has become an inevitable part of today's network management. Consider an Ethernet interface with a mean time between failures of 20 years. Even in a small data-center with 1024 servers and 3072 Ethernet links, the probability of a link failure over a single day would already be roughly 57%!

In an attempt to conciliate logically centralized management and fast reconvergence, researchers have proposed several solutions, which mainly falls within two categories: (1) proactive and (2) distributed reactive rerouting. An example of (1) consists of installing backup rules that are activated whenever a primary rule points to a failed interface [1]. An example of (2) consists of adding distributed routing computation, similar to OSPF, IS-IS or BGP, that is triggered whenever a device failure happens in a network [2].

In this project, you will study how to make network routing robust to failures while avoiding congesting the network. One idea is to take existing pro-active techniques and arm them with traffic load-awareness. This project is part of a collaboration with University of Vienna, ETH Zurich, QMUL, and University College of London.

[1] J. Liu et al. "Ensuring Connectivity via Data Plane Mechanisms". In NSDI 2013. https://www.usenix.org/conference/nsdi13/technical-sessions/presentation/liu_junda

[2] S. Vissicchio et al. "Central Control Over Distributed Routing". In SIGCOMM 2015. <http://doi.acm.org/10.1145/2785956.2787497>