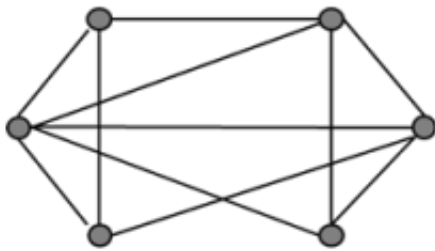


# Optimizing link reinforcements to improve Internet protocol networks

September 25 2014

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Condition 1



Condition 2

Researchers at the University of Electro-Communications, Tokyo, have developed a new optimization scheme capable of predicting the weak links in a network in order to pinpoint where reinforcements are required. Their work could help lessen network congestion on the internet.

Internet protocols are a set of communication 'rules' which are followed in order to deliver data packets between computers. Nowadays, the amount of data that the internet carries is so vast that significant network congestion can occur.

At any given moment in time, a [network](#) can be represented by a series of nodes and links. Each link is given a 'weight' - a measure of the link's quality of service. The aim of an internet engineer is to keep the links as uncongested as possible, allowing as much data as possible to flow freely

at any one time.

In order to transfer [data packets](#) in the fastest and cheapest way, 'start-time optimization' procedures are used to find the best set of link weights to minimize congestion. Stephane Kaptchouang and co-workers at the University of Electro-Communications in Tokyo have successfully built a new 'preventative start-time link-weight optimization' scheme (PSO) capable of predicting the 'weaker links' in any given chain - singling out the ones which need reinforcing in order to create a less congested network.

Applying reinforcements to every link in a network is a costly process in terms of resources, and so predicting which links need to be reinforced is very useful. Previous start-time optimizations considered all possible failure scenarios at any given time on a network, disregarding reinforcements already in place. Kaptchouang's team built their PSO to allow for existing reinforcements, therefore reducing the number of failures the network operators need to address, and speeding up the process considerably.

**More information:** Kaptchouang, S., Ouedraogo, I.A., & Oki, E. Preventative start-time optimization of link weights with link reinforcement. *IEEE Communications Letters*, 18 (7) (2014) [DOI: 10.1109/LCOMM.2014.2325814](#)

Provided by University of Electro Communications

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