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The Cognitive Network

One of the biggest hurdles we will face in the near future is the exponential expansion of the internet. This growth has started already and the current infrastructure shows its age. Since its early days and even today, the internet relies on routers, switches and hubs to relay data. As the number of devices increases and type of traffic varies more, however, these devices can no longer manage traffic in the most efficient manner. The newest type of traffic we see is IPTV and VoIP. In the case of IPTV the data streams are enormous, and in the case of VoIP, latency is a big issue so quality of service (QoS) is mandatory.

The internet of the future will require a new way of transporting data efficiently, at high speeds and in the most redundant manner possible. This will require a whole new approach to computer networking. Scientists are looking at nature for inspiration, and their goal is to reproduce similar results that can be applied to data. Some of these traits are: adaptation to failure, self-healing, self-protecting and maximizing efficiency over time. At the moment, some of the biggest internet companies that manufacture, design and maintain internet networking devices have come up with a few new designs. The new devices and algorithms will determine the best path for the data to follow; they will sense network outages and the type of data sent and received, and also plan ahead in order to prioritize available resources.

The other challenge we face is backward compatibility. Although not mentioned in this paper, legacy devices will remain on the current network and they will be here in the foreseeable future. Starting a network from scratch is hard enough but making it compatible with today’s devices will be even harder. To give a good example of how such a compatibility issue has been avoided so far, we only have to look at our current cellular telephone networks. Cellular phones that were built in the mid 90’s can connect to today’s networks. The first generation network (1G) is compatible with today’s (4G) network.

Being introduced to this radical new approach to networking has given me new insight on what it will take to sustain connectivity between devices in the near future. Currently the IPv4 protocol is still working, and IPv6 is sparsely used; which means we are nowhere near the billions of devices the article mentions. This, however, is a good opportunity to ask ourselves how we will deal with the massive influx of data in the near future.