Title: Look Before You Leap

Abstract:

The Internet and telecom, in general, is struggling to deal with several severe problems multihoming, mobility, security, quality of service, congestion control, out of control complexity, scale, growth, etc. It is a long list. The current projections for global network growth (more devices on the net in a single major metro area than on the Interne today) cannot be sustained with the current technology or with the tweaks to the current technology. For over a decade, there was an effort to FIND a new architecture for a future Internet, which ultimately failed. Rather than focusing on the future and what to build, it would have been more productive to focus on the past and what we did not understand. Starting in the late 70s, the Internet either failed to rectify the known flaws or introduced new ones. While Moore's Law held the problems at bay for far too long, they eventually caught up with it. We have known since the early ARPANET, that Networking is Interprocess Communication. This observation when combined with three or four other fundamental results (none very new) yields a simple, but powerful architecture consisting of a single repeating layer and only two protocols: one for data transfer and one for applications, where multihoming and mobility are inherent in the structure, i.e. free (no home routers, no foreign routers, no tunnels, no anchors, no special protocols) with much faster hand-off and fewer dropped connections; where router table size can be reduced by a factor 4-5 and bounded; where a network can be renumbered in seconds without interrupting traffic flows, even when two layers renumber at the same time and a million node network can be renumbered and verified in under 2 hours; and a large global address space is not required; is fundamentally more secure and has the potential to drop capex and opex by 2-3 orders of magnitude, etc. etc. New simplifications are still being uncovered for capabilities that today require multiple protocols and complex solutions but just fall out naturally. This happens because we emphasize maximizing invariance and minimizing discontinuities. Because we don't break invariances, there are no devils in the details, but rather angels.