

This paper sought to measure the effects of changes in the Internet using the BGP routing algorithm. One main conclusion they found was that the Internet does not actually support an effective method for dealing with implicit route replacement. The delay of route convergence between ASes is due mostly to the differences between individual vendor implementations of routers. The type of change to the network makes a significant difference in convergence time. When a route is added to the network convergence occurs much more quickly than when routes are removed. Using only minor modifications to BGP implementations it would be possible to reduce minimum convergence time from linear to constant complexity.

This paper used extensive actual network measurements from which they drew most of their conclusions and they also had mathematical explanations for the theoretical bounds on convergence complexity. A tremendous amount of data was collected over two years for this paper so it seems like it should be possible to get a lot more information from it than is presented in this paper. This paper was more focused so they may have used the data for other papers as well and it was mentioned that related discussions were still being researched.

This paper states that they confronted vendors about implementing the optimizations described and that at least one vendor would be including some of the optimizations in all future routers. Some routers in the Internet may have this included in them by now, but it is unclear how much of an impact it has made. Having faster convergence in BGP is almost certainly more important today than it was five years ago as VoIP has become much more common in that time. VoIP and other systems which require a certain QoS are much more adversely affected by varying convergence times caused by changes in the network.