Interconnection And Quality Of Service (QoS)

In The Market For Internet Connectivity

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Extended Abstract

The Internet is a network of networks owned by different companies, which share common network standards for addressing, routing and naming data traffic. As high-bandwidth Internet applications like video-on-demand gain more and more importance, high QoS becomes critical for the success of these technologies. In this context QoS is a synonym for the speed and reliability of transmissions on the Internet. The quality of the final product, e.g. a video, is better the higher the speed and reliability of the transmission. The overall quality of a transmission corresponds to the minimum quality of all networks and interconnection points the data had to go through. The bottlenecks of the Internet are in general the interconnection points.

There are mainly to ways how to speed up today's Internet (i.e. increase QoS). Either ISPs agree on increasing significantly their interface capacity at the interconnection points or they agree on better and compatible standards for routing data in a more efficient way. These standards are already available but are adopted so far only by few ISP´s.

A common view is that large ISPs will have no incentives to agree on high QoS interconnection with smaller competitors. This paper analyses this problem in a four stage game with vertical product differentiation. On the first stage ISPs choose the QoS within their own network. On the second stage they choose the quality of interconnecting with each other. Finally ISPs set their prices for subscription to their networks and customers subscribe to either network.

When ISPs can differentiate their products horizontally, it turns out that that ISPs will always agree on high quality of interconnection. When it is costly to invest in quality of interconnection, we find that ISPs over invest compared to the welfare maximizing investment level.

When ISPs are just vertically differentiated, the high quality provider has low incentives for high quality of interconnection, but nevertheless it turns out that the prevailing equilibrium is one in which high quality of interconnection is reached. The equilibrium outcome is sensitive to the modeling of the demand side, which is analyzed in detail to test for the robustness of the model.