Evaluation of IPv6 services in mobile WiFi environment

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Abstract

The introduction and the widespread use of the mobile services over IPv6 can be considered as one of the most important advantage of the Internet2. We may ask the following question with reason: How deeply does the mobility impact the TCPv6 and UDPv6 services?

In order to provide a really qualitative answer for this question we need to perform some comparative measurements that spot the differences between IPv4 and IPv6 technologies. Accordingly we have set up an outdoor WiFi test system, containing IEEE 802.11b access points and mobile clients. As we already know, the IEEE 802.11b standard supports the roaming function as well, but the bandwidth of wireless data transfer heavily influenced by the distance between the access point and the client. A mobile client approaches to and diverges from the AP during its action, causing an automatic bandwidth switching between 0:1:2:5,5:11 Mbps values. During roaming the transfer occurs at the speed of 11:5,5:2:1:0:1:2:5,5:11 Mbps. Large files are transmitted according to the TCP Slow start and Windowing algorithms. The bandwidth alteration of the datalink layer will involve the adjustment of TCP window size. The roaming phase duration of WiFi technology vigorously affects the efficiency of the TCP sessions. The UDP transfer is much more adaptable by its nature.

In our presentation we will demonstrate the effects of the processes occurred during the roaming phase of the WiFi system on the IPv4 and IPv6 connections. The TCP connections are significantly affected by the interaction between the relative speed of mobile clients to the APs and the execution of roaming, whilst it has minor effect to the UDP transfer. We well get a realistic view about the behaviour of the IPv4 and IPv6 in mobile environment by using statistical methods to gain results from the comparative measurements. Furthermore we well get details about how the IPv6 protocol really provides a higher quality on mobile environment over wireless data-link compared to its predecessor, the IPv4.