

Question: Do you think current networking protocols are suitable for wireless networks? Provide your reasons. (NOT mentioned in the lecture)

Answer:

I believe that current networking protocols are not suitable for wireless networks, which is basically due to far more complex conditions that MAC/PHY layer is facing in wireless networks. Detailed items are listed as follows.

Firstly, quality of channel is playing a vital role in wireless communications. Tough situations like fading, multi-path, Doppler and so on are becoming key issues to be considered in wireless world rather than only traffic control in wire-line networks. Due to that consideration, more algorithms related to modulation and codec in PHY layer should be performed to compensate the quality loss in the air. Accordingly, protocols in upper layers also need to be changed or even redesigned in a clear-slate way to match the modifications in PHY protocols.

Secondly, there is only one type of signal running on the medium, the wire line, in the Internet world; however multiple types of network signals exist simultaneously in the air. Signals of WiFi, WiMAX, BlueTooth, DVB and GPRS will mix together and cause severe troubles. The environment for wireless transceivers will get even worse when overlap in frequency domain between signals from different type of wireless network is caused by frequency excursion.

Thirdly, when architecture of wireless network itself is moving from single-hop to multi-hop, resource allocation problems are becoming more and more noteworthy. Opportunistic scheduling in single-hop networks is no longer fit for the emerging problems in multi-hop networks. Algorithms obtaining map to different layers of the network (transport, network, MAC/PHY) are required to achieve optimized system performance. And changes in protocols are also responsible for balancing performance, complexity and stability when the new algorithms are being implemented in real products.