Separation of user and control plane in mobile radio networks

Author(s) - Institution(s):
Haibin Zhang, TNO

Corresponding author email: haibin.zhang@tno.nl

Corresponding WG group: WG3

Abstract:

The achievable efficiency of current mobile networks is limited by some key characteristics of the current cellular radio network architectures. One limit is the fact that the data transmission (user plane) is always coupled with the transmission of control signaling traffic (control plane), although they have different characteristics. The major impact is: a significant part of the network should be “always on” even without any traffic, resulting in unnecessary usage of resources, including energy. Recently, new and fundamentally different principles of radio network architecture design have been/are being proposed, with the core idea of user plane-control plane separation. It is expected that separation of user plane and control plane enables the optimization of data transmission part and control signaling part separately, according to their respective characteristics. Meanwhile, the “always on” part is minimized. In this TD, mainly the following aspects will be discussed:

(1) The limits of legacy mobile networks in achievable energy efficiency.
(2) The essence of user plane-control plane separation being more energy efficient.
(3) Modeling of signaling traffic
(4) Impact to the design of key network functions (e.g. delivery of system information, session setup and management, mobility management, etc.)