A Test Bench Development for 802.11 Standard Models Verification

Vitaly Petrov, Sergey Andreev
Tampere University of Technology
Tampere, Finland
{vitaly.petrov, sergey.andreev}@tut.fi

Abstract

The 802.11 (WiFi) is now the de-facto standard for the overwhelming majority of Wireless Local Area Networks (WLAN). Up to now, lots of different 802.11 models, including channel models, stack models and traffic models, were proposed to estimate the protocol characteristics. Almost all of them are based on the network simulation in MATLAB [1] , OPNET [2], ns-2 [3] or other packages. Unfortunatelly, some assumtions made by the simulator developers do not come to the standard. Moreover, WiFi card vendors may not obey all the standard requirements in order to provide better characteristics for customers. Therefore, the model verification with the real hardware is topical.

To obtain this, a tesh bench, consisting an access point, several senders and receivers, is developed. In addition, traffic generator and traffic analyzer are proposed (see fig. 1).

FIGURE 1. Test bench architecture.

Using this test bench, different types of traffic (TCP, UDP, VoIP, Video, etc...) could be generated in both saturation or not. The traffic analyzer provides the possibility to estimate major network characteristics, such as throughput, delay, conflict probability, etc... From the technical point of view, the test bench is a set of Linux PCs and laptops with open-source wifi driver installed (MadWifi [4], in particular). By insugnificant driver modification, such internal data, as Packet Error Trace (PET) and packet arrival time, could be loged and futher used by traffic analyzer.

Network model could be verified by compairing the nework characteristics it estimates with observed on the test bench in simmular conditions. Additionally, some analitical models for 802.11 network could be proposed.

Index Terms: 802.11, WiFi, Test Bench, MadWifi, Model Verification.

REFERENCES

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