Towards Flexible and Modular Simulation Models

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In this talk we discuss the increasing need for flexible and modular simulation models and our ongoing work in this area. Although a huge number of simulation models are available today, these models do not interoperate and cannot be easily combined to form a full protocol simulation stack.

Commonly, developing and evaluating a communication protocol in a simulator consists of several steps: (1) Implementation, (2) first evaluations and debugging with the help of simple underlying models, and (3) full evaluations with complex and realistic models. Thus, at each of these stages, the developer either has to adapt his model to the chosen underlying models or even implement his own ones.

We propose the use of interchangeable simulation models. Thus, at each of these stages the developer composes the models for his communication stack and the surrounding ones - such as models for the environment in case of mobile networks - from a set of building blocks. For example, the developers can choose a detailed MAC model but combine it with simple environment and radio propagation models to ensure a fast simulation.

In our ongoing work in this area we designed a framework to compose modular and flexible simulation models. In addition to developing and implementing our own models in the framework, we are currently extracting detailed simulation models from NS-2 and OmNet++ to adapt these to our framework.